

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

## International Microsystems Incorporated



## M6650 Memory SD-MMC-MS Card Duplicator Manual

Version 1.5.3



## THE M6650 CARD DUPLICATION SYSTEM

---

Copyright ©2008 International Microsystems, Inc. All rights reserved.

International Microsystems, Inc.  
556 Gibraltar Drive  
Milpitas, CA 95035-6315  
U.S.A.

Telephone: 408-942-1001  
FAX: 408-942-1051  
Email: [sales@imi-test.com](mailto:sales@imi-test.com)  
Website: [www.imi-test.com](http://www.imi-test.com)  
Manual Version: 1.5.1 on December 29, 2008

Information in this manual is subject to change without notice and does not represent a commitment on the part of the vendor.

# THE M6650 CARD DUPLICATION SYSTEM

---

## Table of Contents

<b>1</b>	<b>Introducing the M6650 Card Duplication System.....</b>	<b>1</b>
1.1	M6650 Architecture and Basic Operation .....	2
1.2	M6650 Power Up and Power Down.....	4
<b>2</b>	<b>Running the M6650 Using the GUI.....</b>	<b>5</b>
2.1	Linux Start Screen.....	5
2.2	Finding The M66W Job Files In The M6650 Linux File Directory .....	6
2.3	Starting a M66W Job.....	7
<b>3</b>	<b>Running the M6650 Using the LCD and Keypad .....</b>	<b>9</b>
3.1	The Run Job Menu.....	9
3.1.1	Using the Run Job Menu – An Example for MMC Card Duplication.....	11
3.2	The System Menu .....	12
3.2.1	Info .....	12
3.2.2	Update Software.....	12
3.2.3	Backup Software .....	13
3.2.4	Move Log File.....	13
3.3	Loop Run Job.....	13
<b>4</b>	<b>Running the M6650 Using the M66W GUI .....</b>	<b>14</b>
4.1	General .....	14
4.2	Starting M66W .....	14
4.3	Initial M66W Start Up Screen.....	15
4.4	Technical Description of an M66W Job .....	16
4.5	Editing a "m6j" M6650 Job File .....	16
4.6	Synchronizing Job Files and Data Files.....	24
4.7	Running a Job .....	25
4.8	Log File and Logged Information .....	27
4.9	Setting the Log Information Mode.....	28
4.10	Master Slot Information: ID Drive Info, Size, Checksum, and Master File Creation.....	28
4.11	ID DRIVE Information for the Master Card .....	29
4.12	Master Card Size, Checksum, and Master File Creation.....	29
4.13	Creating a Master File from a Master Card .....	31
4.14	Setting up the M6650 Slices that are Networked to the Master Slice.....	32

**This page intentionally blank**

## 1 Introducing the M6650 Card Duplication System

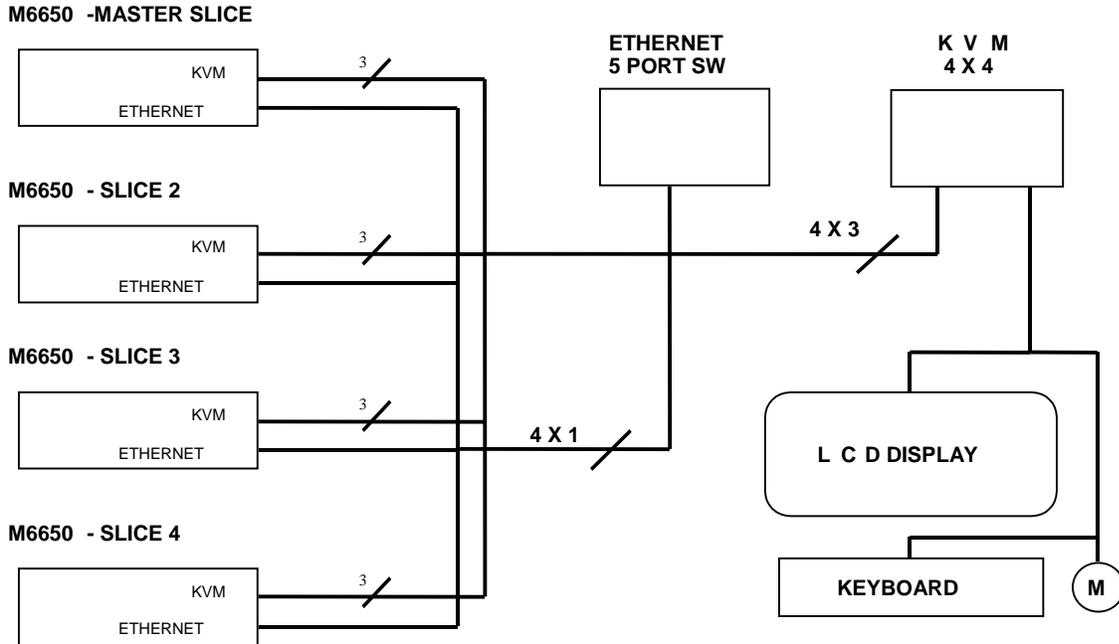
The M6650 provides high volume memory card Duplication System for SD, Mini-SD, Micro SD, MMC, RS-MMC, MMC Mobile, Memory Stick (MS), and Micro MMC. The Micro SD and Mini SD require small adapters; all other form factors are supported directly by the sockets of the M6650. The basic hardware is High Speed MMC/SD/MS slots. The sockets are attached to socket adapters, each holding eight sockets. These socket adapters are easily replaced from the front of the M6650 by pulling on the front panel plastic pulls that release their wedge coupling and then pull straight out.

The M6650 normally comes as a linear stack of Duplication Systems referred to as M6650 "Slices". Figure 1-1 shows a M6650 with two M6650 Slices. Two different sizes of racks are available; namely a two high rack and a four high rack. Normally, all M6650 Slices are controlled using one LCD monitor, keyboard, and mouse attached to the top M6650 Slice referred to as the "Master Slice". At the bottom left of the M6650 rack is a four-position KVM (keyboard, video, and mouse) multi-plexor. At the bottom right is a high-speed Internet switch that provides the means for the Master Slice to communicate with the other M6650 Slices that make up the M6650 stack. An easy-to-use graphical user interface, M66W, running on the M6650 Master Slice, allows the user to set up all connected M6650 Slices with the correct Job and Master Data File. Once configured, the selected duplication job can be started individually on each M6650 Slice allowing the user to sequentially run the different M6650 Slices for improved throughput.



Figure 1-1 M6650-16 SD, MMC, MS Duplication System

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 1-2 M6650 Four Slice Architecture**

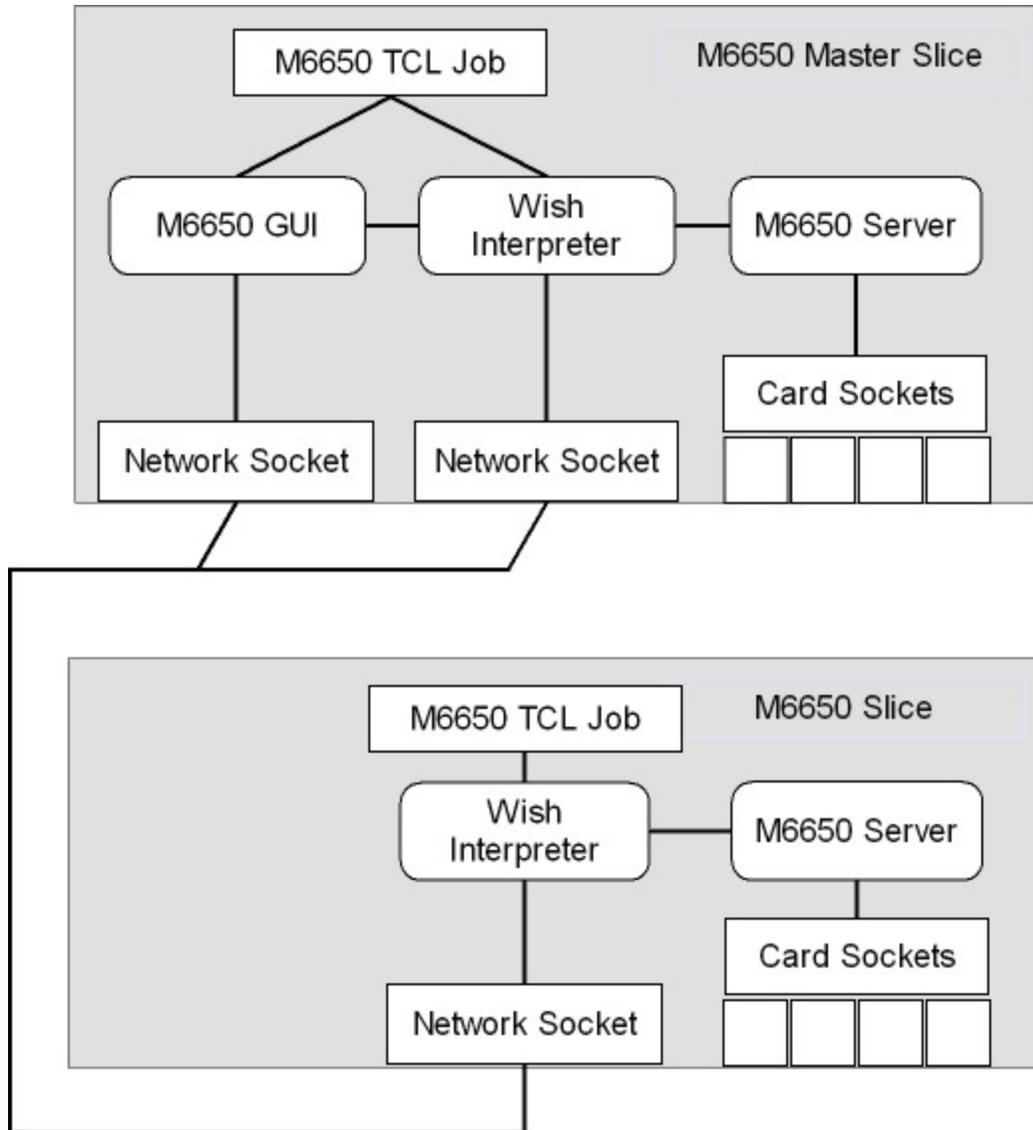
## 1.1 M6650 Architecture and Basic Operation

As shown in Figure 1-2, the M6650 is made from multiple computers networked together thru a high speed Ethernet switch. Each M6650 Slice is assigned a static IP address that is kept in a file on the M6650 Master Slice (“\home\m6000\config\config.ini”). After starting each of the M6650 Slices, the user starts the M66W GUI program on the Master Slice. The M66W program connects to all the other slices using the assigned Ethernet IP addresses.

Each M6650 is a full-featured Linux computer with 512M RAM, a 160 GIG hard drive and a 10/100 Ethernet Port. Upon boot up, Suse Linux version 2.6 is executed on each Slice. The duplication hardware on each of the M6650 slices is controlled by a program called the M6650 Server (the “backend software”). The user must start the M6650 Server program on each M6600 Slice using the KVM switch to address each running slice. Once all M6650 Servers are running, the user launches the M66W GUI on the Master slice. The M66W program automatically connects to all M6600 Server programs and the user is ready to launch a M6650 Job file.

All M6650 Job Files are TCL scripts. TCL scripts are text files that execute under an interpreter program called the TCL Interpreter (or “Wish Interpreter”). The M66W program on the Master Slice launches a TCL interpreter on each M6650 slice. The user then selects a M6650 TCL Job script which when started is executed on each M6650 slice. Each running TCL Job script on the M6650 Slices then provides the communication link between the M66W program running on the Master Slice and the M6650 Server programs running on each M6650 slice.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 1-3: M6650 Program Structure**

A technical issue that needs to be addressed is the synchronization of the M6650 Job and data files on all M6650 slices. That is, since each slice is an independent computer, when the user selects a M6650 Job file on the M6650 Master Slice, is the same job run on all Slices and do the data file(s) used in the job script reside only on the Master Slice or on all M6650 Slices? The answer is that before a job is executed on the Master Slice, the user must make sure that all other M6650's to be controlled by the Master Slice have the same job and same data file(s). This is referred to as “*Synchronization*” and the M66W provides the tools for synchronizing M6650 job and data files.

## 1.2 M6650 Power Up and Power Down

The following instructions assume that all M6650's are wired correctly in the M6650 rack with the Ethernet, KVM's, and power cords correctly connected. Each M6650 Slice uses a key combination to power up the internal CPU board. To Power Up the M6650, follow the steps below.

1. Turning on the M6650 slices requires the simultaneous depression of the two front panel switches labeled "**Power**" on each M6650 slice.

The M6650 LCD's should light up but will not have a message on it for about one minute. Be patient and wait. A short sequence of five notes will play and the LCD will display **Main Menu** on its top line.

The user can monitor each M6650 Slice boot sequence using the KVM to switch. After all M6650 Slices have booted, the user should switch to the Master Slice and start the M66W GUI.

To turn off the M6650, the user should exit the M66W GUI on the Master Slice. There are two options for shutting down each slice.

**Shutdown Method 1:** On the Master Slice exit the M6650 Application. Stop the Server in the IMI Software Menu Window and close that window. Using the KVM, switch to select each M6650 slice and click on the Green circle on the left bottom of the main screen, Select logout and from the four options select window "Turn Off Computer". The system will shutdown

**Shutdown Method 2: (Recommended)** On the Master Slice exit the M6650 Application. Stop the Server in the IMI Software Menu Window and close that window. Using the down arrow on front panel of each M6650, select the Shutdown Option and press Start.

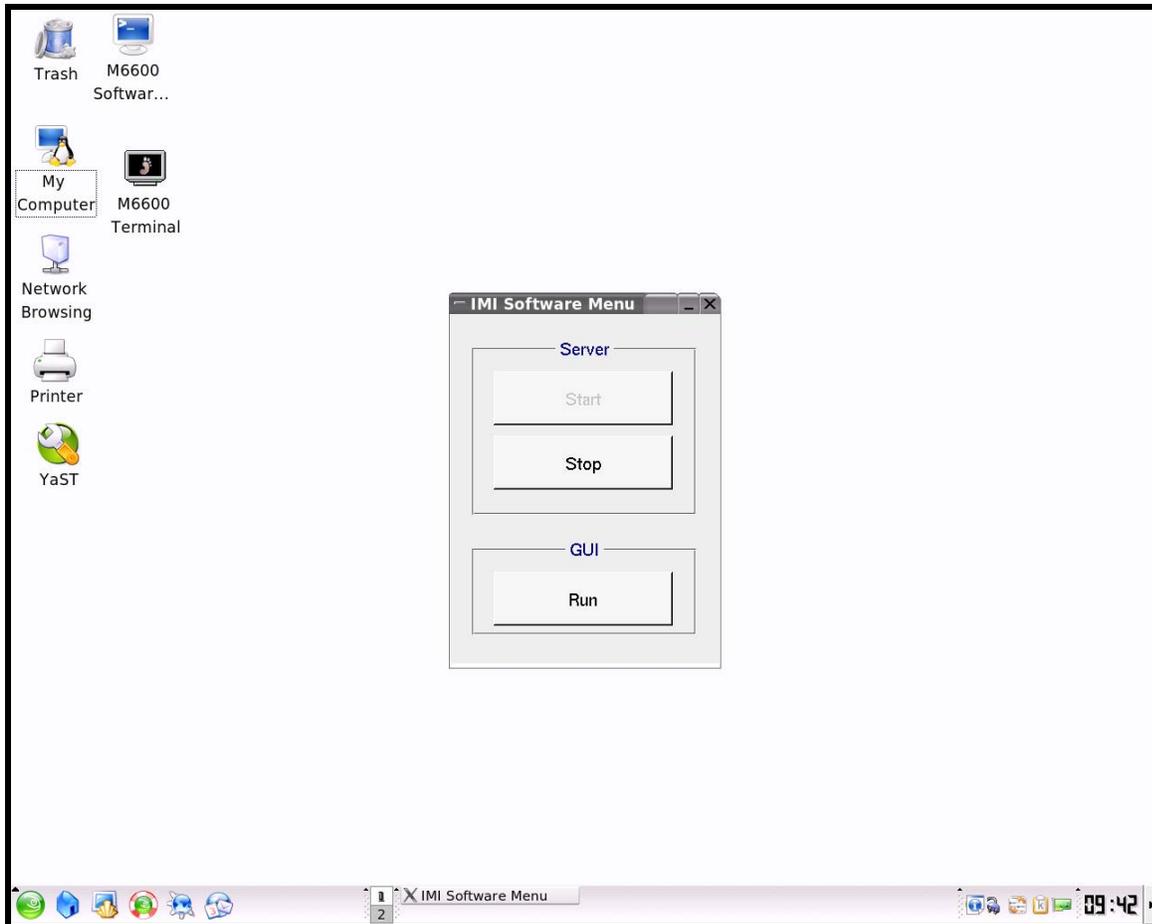


Figure 1-4 The M6650 SD-MMC-MS Duplicator

## 2 Running the M6650 Using the GUI

### 2.1 Linux Start Screen

Linux is a widely used multi-tasking operating system. The M6650 uses a version called Suse Linux 2.6 and the M6650 user is given the highest access level referred to as “root” access. In contrast to Windows, root access means that the user must be careful with what system files he deletes or edits because root access allows the user to have complete control over the operating system.



**Figure 2-1: Linux Start Up Screen**

After all M6650 Slices are started and the user has returned the KVM to the Master Slice video screen, a M6650 Start Up menu is displayed as shown in Figure 2-1. To start the M66W program on the Master Slice, select the M66W RUN button. Figure 2-2 shows the M66W start up screen. The basic M66W operations that the user needs to be familiar with are given below.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

1. Finding the M66W Job Files in the M6650 Linux file directory
2. Creating and Editing M66W Job Files
3. Creating and Storing Master Card Files
4. Running and Monitoring Jobs and Card Status

## 2.2 Finding The M66W Job Files In The M6650 Linux File Directory

Upon entry to the M66W GUI, the following screen, for M6650-SD' with 32 or 16 sockets, Figure 2-2 below will appear.

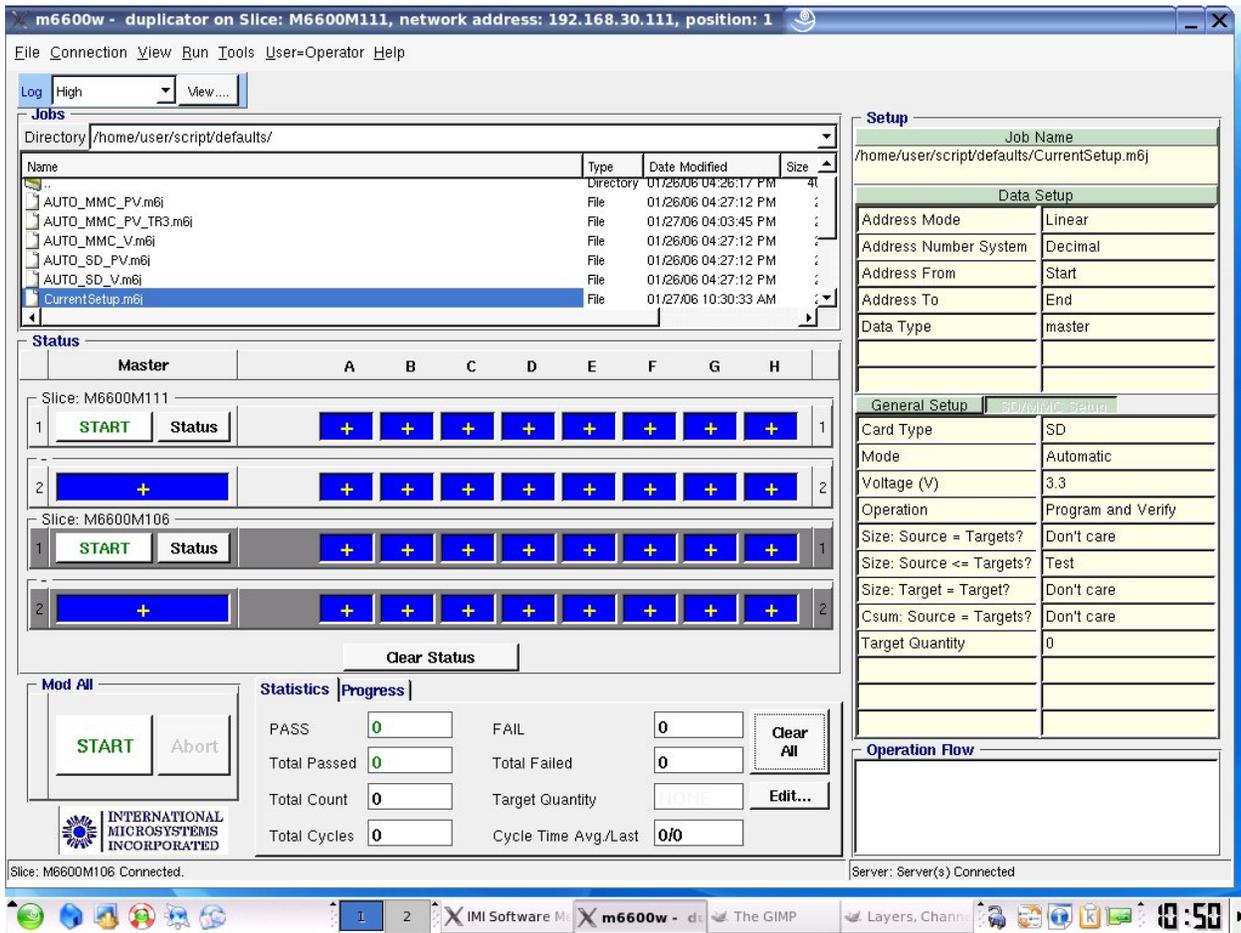


Figure 2-2: M66W Start Up Screen and Job File Selection

For M6650-SD's with either 64 or 48 sockets, there will be two added buttons to the top M6650 screen; namely **Status** and **Jobs**. Choice of the Jobs button will show the current job selection. Choice of the Status button will show the socket status. The rest of the manual will show the M6650 screens for only the M6650-SD's with 32 or 16 sockets.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

Most items in Figure 2-2 are self-explanatory but two elements are worth explanation.

1. The display of all jobs (files with ".m6j" and ".tcl" extensions) are for the current default Jobs directory, **/home/user/script/defaults/**. The directory, **/home/user/script/defaults/**, is a special directory where the jobs with ".m6j" extensions are accessible using the M6650 front panel keyboard and 2 line LCD display. This is also the default directory where the M66W will open upon start up.
2. On the right side of the screen is a group labeled **Setup**. Under **Setup** are the two sections labeled **Job Data Source Setup** and **Job Data Process Setup**. As each job is selected, the entries in these two sections will change.
3. Status information for all enabled M6650 Slices is displayed below the Job section. The Blue bar for each socket shows the M6650's detect a device in the socket.

This color bar for each socket will change upon completion of a job to either Green (Pass) or Red (Fail). The single Blue bar on the left denotes the presence of a card in the Master slot of the M6650. Clicking in any blank space in a displayed Slice will select that Slice for selective status information.

### 2.3 Starting a M66W Job

Each M6650 Slice may be started individually using the small **START** keys on the left of the screen or all M6650's Slices can be started together using the large **START** key on the bottom left.

Normally, a Job is started in the following manner.

1. For M6650-SD's with 64 or 48 sockets, the user presses the **Jobs** button on the top of the GUI screen.
2. The user clicks the desired Job file.
3. The user loads the card sockets with cards to be duplicated.
4. The user clicks the **START** button at the bottom left of the screen.

This starts the Job on all M6650 Slices. The steps in the execution of the job are shown in the **Statistics** widow on the bottom right and the relative completion of the current operation and the relative completion of the entire job are shown in the center of the bottom window. The sequence in the Statistics window and the Percent Completion bars are for the selected Slice.

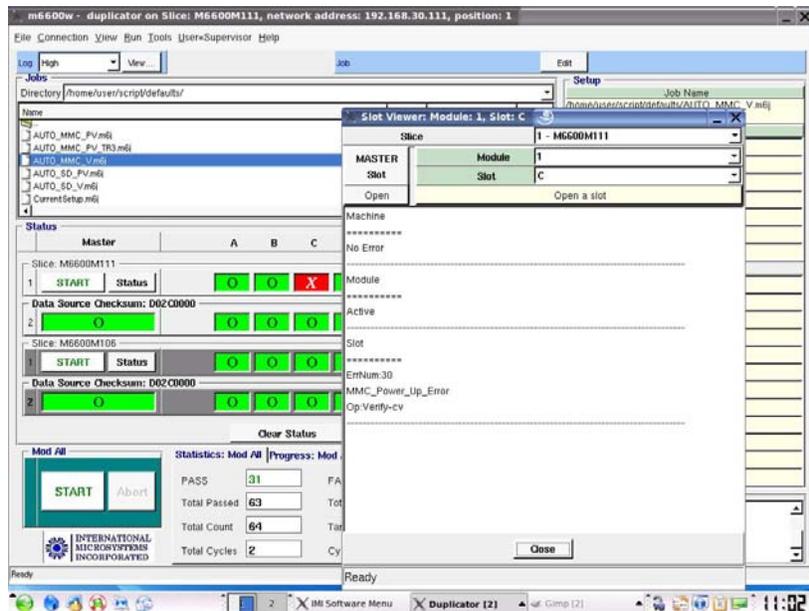
Upon completion of a M66W Job, the Statistics window is updated and the results are displayed as below.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 2-5: Completion of an M66W Job**

Note the Red bar on the third socket of the Master Slice indicating that an error occurred. To learn the reason for the failure, click the Red bar with the left hand button on the mouse.



**Figure 2-6: Display of Error Information**

This ends the introduction to the M6650 GUI program. For a more detailed description of the M66W GUI, please see Chapter 4.

### 3 Running the M6650 Using the LCD and Keypad

The LCD displays the M6650 menus. The keypad allows the user to select sub-menus, make menu choices, and execute commands.

The **Main Menu** is displayed when the machine is powered up or reset. The **Main Menu** displays the message “\*\*IMI M6650 Ver XXX\*\*” where XXX is the software version number of the M6650 code. Below the **Main Menu** are five other menus: the **Run Job** menu, the **Setup Menu**, the **System Menu**, the **Run Loop Job** menu, and **Shut Down**. Selection of one of these items is done by first displaying the menu name on the display with a right arrow to the left of the menu name and then depression of the **START** Key.

When the Main Menu is seen on the LCD’s top line, the Run Job menu name can be seen on the second line of the LCD. A arrow at the far right of the LCD points down indicating that the **DOWN** key on the keypad can be used to see more items on the Main Menu. Pressing the **DOWN** key moves the Run Job menu name to the top line of the LCD and displays the Setup Menu name on the second line. An up arrow and a down arrow are displayed at the far right indicating that you are in the middle of the menu and can move up or down to display other menu items with the corresponding **SELECT** key.

Press the **DOWN** key again and the Setup Menu moves to the top line, again and the System Menu is displayed and again and the Loop Run Job is displayed, and one more time and the Shutdown option is on the LCD bottom line. Now only an up arrow is displayed indicating you are at the bottom of the menu (the Main Menu in this case).

**\*\* IMI M6600 Ver XX \*\***

<b>Run Job</b>	<b>Select a Job that has already been defined</b>
<b>Setup Menu</b>	<b>Define a New Job</b>
<b>System Menu</b>	<b>Perform a System Task</b>
<b>Loop Run Job</b>	<b>Run a Job Multiple Times</b>
<b>Shut Down</b>	<b>Shut Down the M6650</b>

#### 3.1 The Run Job Menu

With **Run Job** displayed on the second line of the LCD, press the **START** key to display the first entry on the Run Job menu. This menu displays the Jobs with extension ".m6j" in the directory `"/home/user/scripts/default/"`. Using the Up and Down keys on the front of the M6650 front panel allows the user to page through the available jobs.

To select a job, press the **START** key. The **Confirm Job** screen will be displayed.

To execute the displayed job, press the **START** key.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

The parameters defined for a selected Job cannot be changed under the Run Job Menu (but can be done under the Setup Menu). If you do not want to execute a job you have selected, press the **ESC** key to return to the top of the Run Job menu.

The LCD screen that appear when a particular job is executed are job dependent. However, a typical job that programs and verifies the Sixteen Copy Cards using the Master Card as the data source will display a screen similar to the one below.

```
Current Setup
→AUTO_MMC_PV ↓
```

```
Master CSUM=CE2E0000
PV P:16/16 F:0/0
```

When the current Job goes to completion, a summary screen is normally presented.

The above screen shows that the Master Card Checksum is the Hex number CE2E0000. This checksum is the simple sum of all bytes in the Master Card that have been copied to the Copy Cards.

The second line shows the operations performed which in this case were Programming and Verify designated with the **PV**. This is the typical copy operation that entails two passes thru the Master Card and Copy Cards; the first being the program or write operation and the second being the verify operation.

After a Job is completed, the Pass and Fail results of the last cycle are displayed with the summary of all total Pass and Fails shown in parentheses.

The total Pass and Fails will be reset to zero when at the start of a new job, or reinsertion of a master card, or change of the operation in the **Setup Menu**.

To complete a Job cycle and start the next cycle, the user should remove all Pass cards (with the Green LED's) and all the Fail cards (with the Red LED's) from the copy slots; fill the empty slots with more cards to be duplicated; and press the **START** key to run the selected job once again to create a new batch of duplicates.

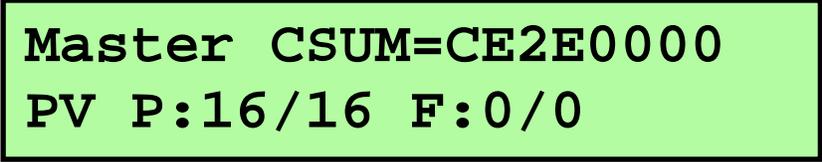
At the completion of a Job, pressing the **ESC** key will return the M6650 to the Main Menu.



## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

6. Upon completion of the Job, a summary screen with pass and fail results will be displayed.



```
Master CSUM=CE2E0000
PV P:16/16 F:0/0
```

The above screen shows that the Master Card Checksum is the Hex number CE2E0000. This checksum is the simple sum of all bytes in the Master Card that have been copied to the Copy Cards.

The second line shows the operations performed which in this case were Programming and Verify designated with the **PV**. This is the typical copy operation, which entails two passes thru the Master Card and Copy Cards.

After the operations are displayed, the Pass and Fail results of the last cycle are displayed with the summary of all total Pass and Fails shown in parentheses.

To complete the cycle and start the next cycle, the user should remove all Pass cards (with the Green LED's) and all the Fail cards (with the Red LED's); fill the empty slots with more cards to be duplicated; and press the Start Key to begin execution of the selected Job once again.

### 3.2 The System Menu

Use the System Menu to display system information (M6650 serial number and firmware version), format a USB drive placed in the front panel USB connector (FAT16), update the M6650 firmware, and Move Log File.

```
System Menu
  Info
  Update Software
  Backup Software
  Move Log File
```

#### 3.2.1 Info

The Info selection under the System Menu provides the software version resident in the M6650.

#### 3.2.2 Update Software

A software update for the M6650 is distributed by IMI via email. The software update will be in a file named like **M6650-NNN.zip**. This update file should be placed on a properly formatted USB disk. Using the provided USB disk, which has been properly formatted, is strongly recommended.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

### 3.2.3 Backup Software

The current software in the M6650 will be backed up on a USB disk in the M6600 front panel USB port. The file name will be **M6650-NNN.zip**. This file should be placed on a properly formatted USB drive as described in **Section 2.3.2**.

### 3.2.4 Move Log File

Move the current log file from the M6650's volatile memory to a USB disk in the M6650 front panel USB port.

## 3.3 Loop Run Job

Loop Job allows multiple execution of a selected Job. This function is normally used for extensive testing of devices as in a burn-in test.

To loop run a job

1. Select **Loop Run Job** from the **Main Menu**.

#### **Loop Job**

#### **Select Job**

2. Select the desired job.
3. When prompted for the number of loop, enter the desired amount to run.
4. Press the START key to go.

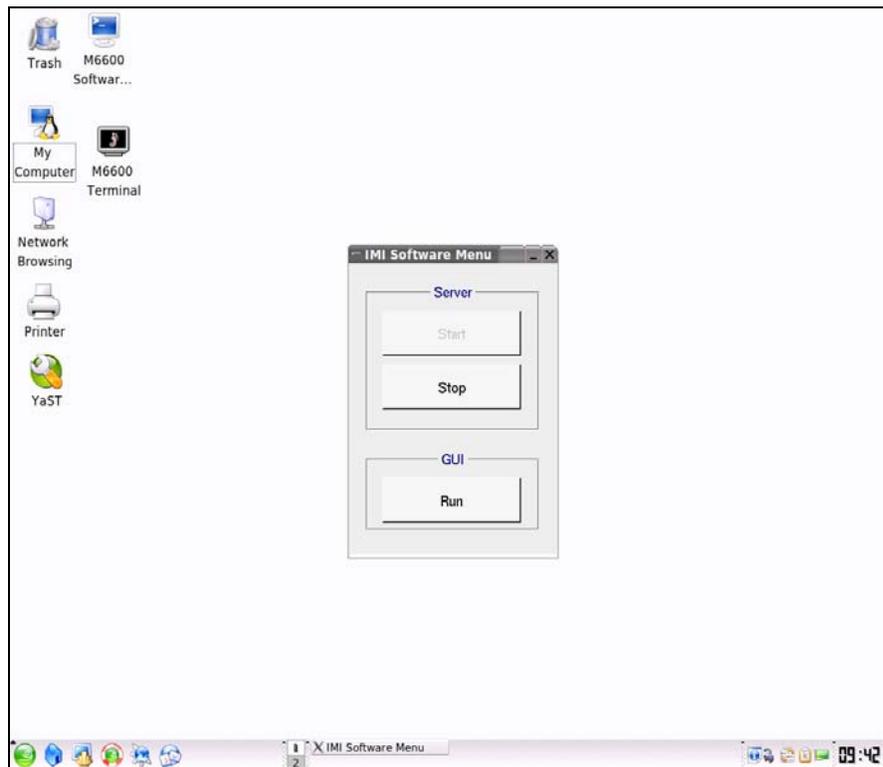
## 4 Running the M6650 Using the M66W GUI

### 4.1 General

The M6650 is normally run using the M66W GUI program on the Master Slice. This chapter covers the various functions that can be done using M66W.

### 4.2 Starting M66W

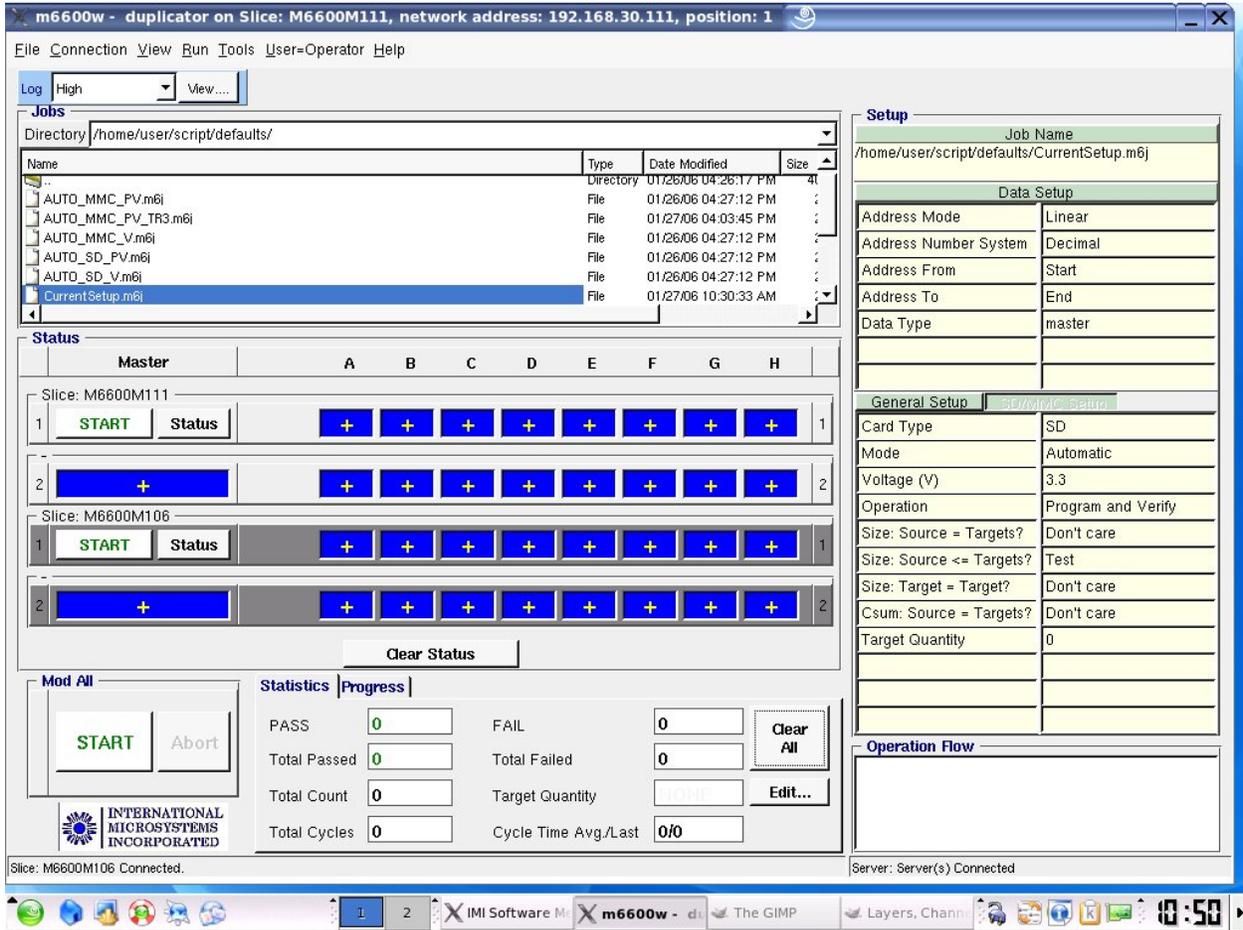
Start all the M6650 slices as in section 1.2. Set the KVM on the Master Slice. The LCD monitor screen should appear as below.



**Figure 4-1: M6650 Start Up Screen**

Using the mouse, click on the RUN key to start the M66W GUI program.

### 4.3 Initial M66W Start Up Screen



**Figure 4-2: M66W Start Up Screen**

Displayed on the M66W start up screen is a list of the default directory for M66W Jobs. The currently selected job is highlighted and the choice list for this selected job is shown on the right. Note that there is a slight difference between M6650's with one, two, or four slices. If the number of M6650 slices is one or two, there is no STATUS button and the status of the two slices is displayed along with the list of available jobs in the current directory. However, if there are more than two slices, there is a STATUS button, and either a list of the current jobs are displayed or, upon click of the STATUS button, the status of all the slices is displayed.

### 4.4 Technical Description of an M66W Job

The file which holds an M6650 job may have one or two types of extensions; namely ".m6j" or ".tcl". An m6j file is a text template file that holds a selection of choices for a specific TCL program that is unique to the M6650. The choices for any selected m6j file are shown to the right of the M66W screen. To edit the choices, the user must sign on in the Supervisor mode by clicking the User button on the top of the M66W main screen, selecting Supervisor, and entering a suitable name and password.

Suitable names and passwords reside in the text file "/home/m6500/config/ password.ini". The default name is "imi" and default password is "123456". Note that these entries are case sensitive. If possible, the user should leave this entry in the "password.ini" file and add other entries suitable for the user environment.

The other type of file that can run a M6650 job is a TCL script with a standard extension of ".tcl". TCL is a "C" like scripting language. A TCL interpreter program interprets TCL scripts. A version of the TCL interpreter program which appears as a standard DOS terminal window is called a "Wish" window. Once a specific Wish window is launched, it may be sent various TCL procedures that add new recognizable commands to the Wish window command syntax. This is the case for the Wish window launched on the M6650 M66W and this Wish window is referred to as the MWish program. Thus, TCL job scripts that run successfully on the M6650 use standard TCL commands as well as MWish specific commands. It is not in the scope of this document to describe the specific MWish commands that are available.

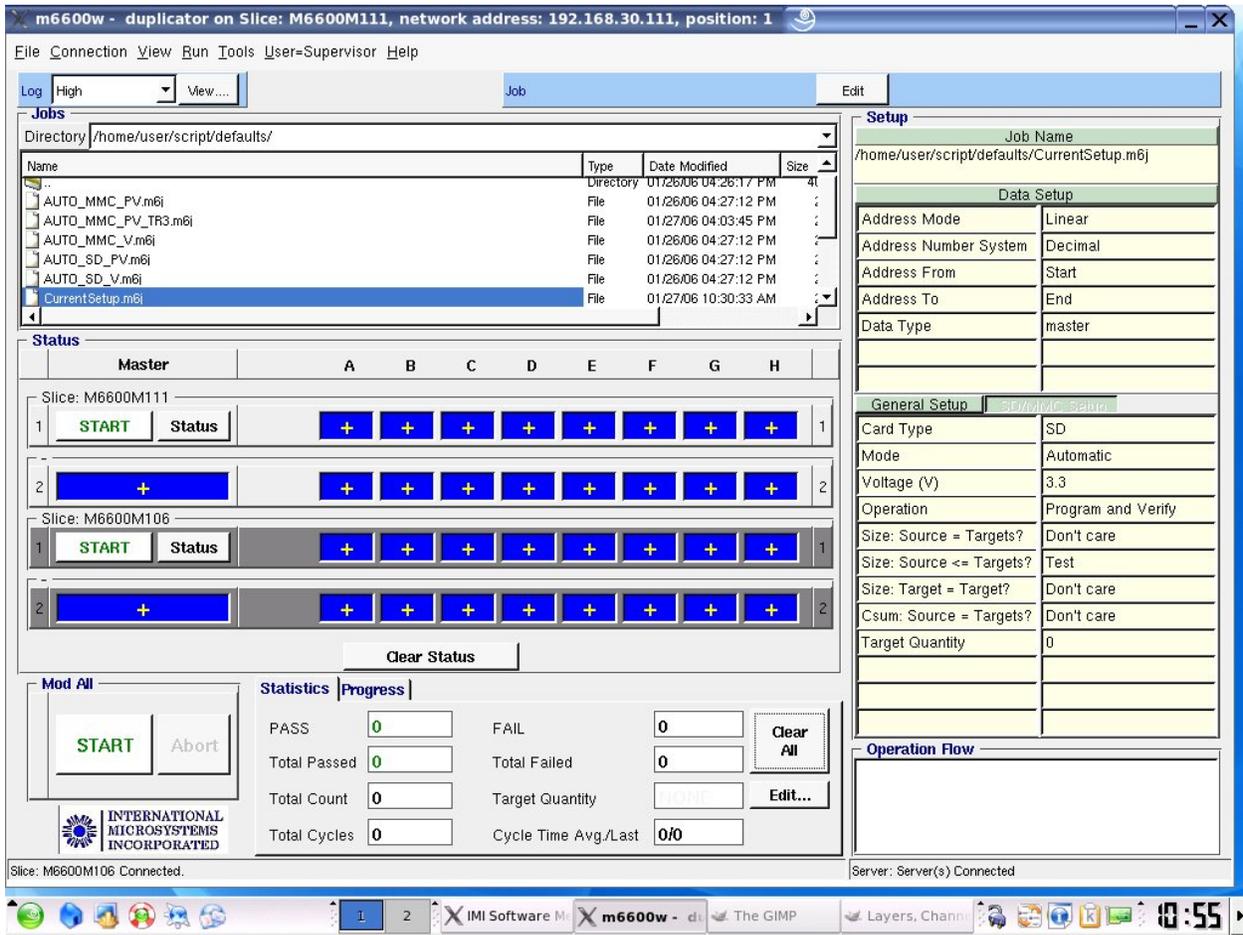
One further note with regard to TCL files is that the jobs selectable from the front panel of the M6650 are also TCL scripts.

### 4.5 Editing a "m6j" M6650 Job File

To edit an M6650 job file, the user must be in Supervisor mode. Click the User button at the top of the screen and enter a suitable name and password such as "imi" and "123456" (see section 4.4 above for more details). Once signed on as a supervisor, the Edit button will appear above the job template selection list on the right side of the display. By clicking on this "Edit" button, the user can change the selected "m6j" job file.

Most of these choices are self-explanatory. A number of the choices have to do with the size of the source of the Master data and the size of the Targets. It is a sad fact of life that many Flash memory cards from different manufacturers are branded with the same size (e.g. 128 Megabyte) but in actuality have slightly different number of sectors or total number of bytes. Thus when a copy is made on the M6650, the user can set a number of different criteria for the exact size requirements of the master source and the target cards. In addition, it should be pointed out the M6650 makes a binary image copy and not a file copy of the master card to the target cards. ***The net result of all of these facts is that IMI highly recommends that the user only duplicate from master flash cards that are the exact same type and manufacturer as the copy cards.***

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



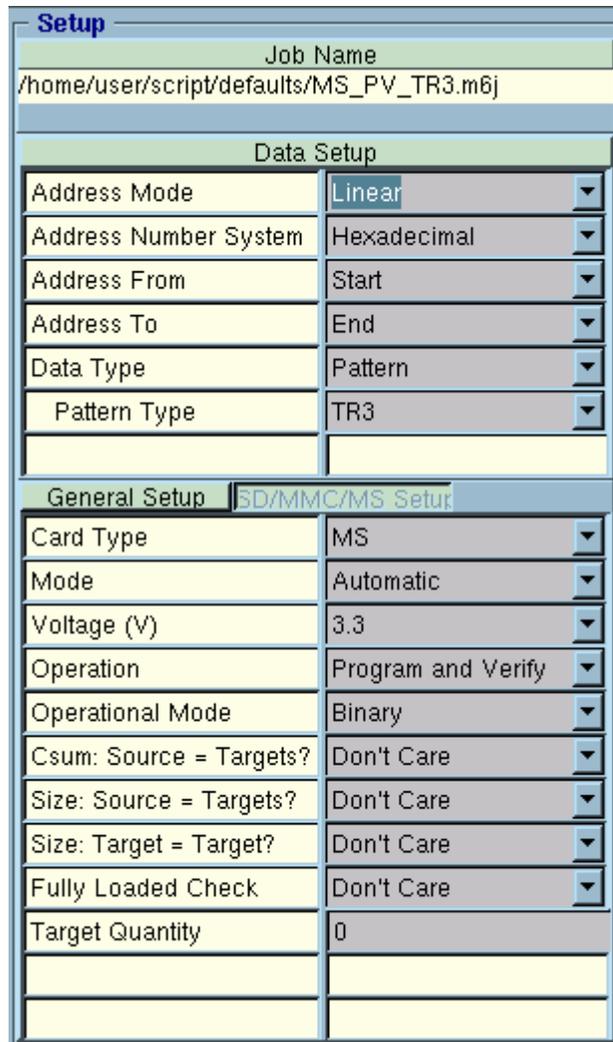
**Figure 4-3: Entering Supervisor Mode**

Once the supervisor mode has been entered and the user has pressed the Edit button, changes can be made to the m6j template selections. When the user is done with the changes, he may save the changes by pressing the Save button (not shown) or the Save As button which appears next to the Edit button.

The Job Editor screen occupies the left portion of the M66W user interface. The upper portion of the Job Editor is for Data Setup while the lower portion is devoted to General Setup of the M6650.

Note that the user may store and later select his job files in any user specified directory. However, all jobs files that the user desires to select from the front panel of the M6650 must be in the directory "/home/m6500/script/defaults/".

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



Setup	
Job Name	
/home/user/script/defaults/MS_PV_TR3.m6j	
Data Setup	
Address Mode	Linear
Address Number System	Hexadecimal
Address From	Start
Address To	End
Data Type	Pattern
Pattern Type	TR3
General Setup   SD/MMC/MS Setup	
Card Type	MS
Mode	Automatic
Voltage (V)	3.3
Operation	Program and Verify
Operational Mode	Binary
Csum: Source = Targets?	Don't Care
Size: Source = Targets?	Don't Care
Size: Target = Target?	Don't Care
Fully Loaded Check	Don't Care
Target Quantity	0

**Figure 4.4. M6600 Job Editor**

## Data Setup

The Data Setup fields are devoted to defining the data source of the duplication job.

### Address Mode

Defines how addresses can be defined in the lower fields.

Linear – Address From and Address To are expressed in bytes

Sector – Address From and Address To are expressed in 512 byte sectors.

Megabyte – Address From and Address To are expressed in Megabytes.

### Address Number System

Defines the number system (base) that are defined in the lower fields.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

Decimal – Address From and Address To are expressed in decimal (base 10) numbers.

Hexadecimal – Address From and Address To are expressed in hexadecimal (base 16) numbers.

### **Address From**

Defines the starting address for the defined operation. If “Start” is used, the starting address will be the lowest address supported by the device (usually 0). If a number is entered, it will be interpreted in terms of the Address Mode and the Address Number System defined above.

### **Address To**

Defines the ending address of the defined operation. If “End” is used, the ending address will be the highest address supported by the device. If a number is entered, it will be interpreted in terms of the Address Mode and the Address Number System defined above.

### **Data Type**

Defines the data source for the defined operation. The available sources can be from a Master Device (in the master socket), a file, or test pattern, a file.

Master – The data will be copied from, or verified with, the device in the master socket.

File – The data will be copied from, or verified with, a defined file. When this option is selected, a Data File field will be enabled below this field. The Data File field will allow the user to select a browser to navigate to the desired file.

Pattern – The data will be copied from or verified with a prescribed pattern. Choices are “Fixed” or TR3. If Fixed is selected a field will be enabled below this field to define the pattern. This can be up to 8 hex characters (0-9, A-F). If TR3 is selected, then an incrementing pattern, based on the address will be used.

## **General Setup**

The General Setup fields are devoted to the general operation of the job, including definition of the card types, voltages, program and/or verify, etc.

### **Card Type**

The M6650 can support several card types. The choices are SD, MMC, and MS(Memory Stick). These choices are subject to the adapter supplied with the duplicator.

### **Mode**

For all card types, the M6650 can query the card under test to determine the optimum speeds and bus widths, etc. The choices for this field are Automatic and Manual. In most cases Automatic will provide the best and fastest results. However, if the user would like more control over the job, Manual can be selected. In the case that Manual is selected a second tab will be enabled titled SD/MMC/MS setup. This will be described in more detail below.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

### **Voltage**

Presently SD, MMC, and MS all support 3.3 volt modes. At present 3.3 volts is the only selection available.

### **Operation**

This defines the main action of the job, such as program, verify, create a master file, etc.

Program and Verify – The devices will be programmed and verified afterward.

Program – The devices will only be programmed.

Verify – The devices will only be verified.

Create Master File – A master file will be created. The data will be copied from the device in the master slot to the file defined by Data File defined in the Data Setup section.

Checksum Master – The master device will be read and the checksum will be displayed in the Status portion of the GUI.

Check Devices – Performs a “Load Test. This process will verify that it can read the internal registers of the device.

### **Operational Mode**

The operational mode will further define the address limits of the job. The choices are Binary, FAT and Start to Pattern.

Binary – The M6650 duplicates data starting from the Starting Address and continues to the End Address this is the fastest and most reliable method of duplication.

FAT – Most data is placed on a card in the form of files. The most common file format, used by MS Windows computers is the FAT (File Allocation Table) format. Typically files do not consume the whole card and often just occupy the lower portion of the card's addresses. In this case the FAT operational mode is the most efficient method of duplication. When FAT is selected the M6650 will scan the FAT structure of the master device (or file) to compute the last used address. A binary duplication is then performed from address 0 to the calculated last address used by the FAT file system. Note that the duplication method is still binary.

### **Csum: Source = Targets?**

This is a conditional pass/fail check that is performed after programming and verify. The verify operation will check byte for byte that the data on the target card is the same as the master card (or file). Choices are Test or Don't Care. If Test is selected, the checksums of the targets will be compared with the source (which is either a master card or a file), mismatches will create a target error. If Don't Care is selected, the checksum comparison will not be performed.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

### **CSize: Source = Targets?**

At the beginning of a job, this will test whether the size of the targets is the same as the source (file or master card). If the size on a target differs from the size of the source, the target card will be failed. Choices are Test or Don't Care. If Test is selected, the size of the targets will be compared with the source (which is either a master card or a file), mismatches will create a target error. If Don't Care is selected, the size comparison will not be performed.

### **CSize: Target = Target?**

This is a similar test to the Source = Target test. However this will verify that all targets are of the same size. This test might be used when the target cards are larger than the source cards. It will confirm that the operator is inserting all of the correct cards. Choices are Test or Don't Care. If Test is selected, the size of the targets will be compared with the other targets, mismatches will create a target error. If Don't Care is selected, the size comparison will not be performed.

### **Fully Loaded Check**

This will confirm that there is a device in all slots. In large duplication runs it is possible for an operator to only partially insert a card so that it is not recognized by the duplicator. This will alert the operator of such a situation. Choices are Test or Don't Care. If Test is selected, all targets must be inserted in order for a job to begin. If Don't Care is selected, the insertion test will not be performed.

## **SD/MMC/MS Setup**

The SD/MMC/MS Setup fields become active when Mode is set to Manual in the General Setup tab. The specific fields that are active are dependent on the Card Type selected in the General Setup tab.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

Setup	
Job Name	
/home/user/script/defaults/MS_PV_TR3.m6j	
Data Setup	
Address Mode	Linear
Address Number System	Hexadecimal
Address From	Start
Address To	End
Data Type	Pattern
Pattern Type	TR3
General Setup    SD/MMC/MS Setup	
Bus Mode	1 bit
Read Write Mode	Single
Clock (MHz)	
Slow Clock (KHz)	100

**Figure 4.5. M6600 Job Editor**

### **Bus Mode**

This is activated for SD, MMC, and Memory Stick. This selects whether the card will operate in serial or parallel mode. For SD cards the choices are 1 bit or 4 bit. For MMC cards the choices are 1 bit, 4 bit, or 8 bit. For Memory Stick cards the choices are 1 bit or 4 bit

### **Read Write Mode**

This is activated for SD or MMC cards. This selects whether the card is to run in single block mode or multiple block mode. Choices are Single or Multiple

### **Clock (MHz)**

This selected the speed of data transfers and is activated for SD, MMC, and Memory Stick. The user should exercise caution, because the cards can have different allowable operating speeds. Whatever speed is chosen, the clock will set to that, regardless of the actual card capability. In general, this is used to define a slower clock for special case cards. A safe value is usually 20 – 25.

## THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

---

### **Slow Clock (KHz)**

This is active for SD and MMC cards. These cards have an initialization mode that uses a slow speed clock. The choices are 100, 200, 300, and 400. In most cases it is best to set this for the slowest speed of 100. This will result in negligible performance change since the cards are only briefly in the initialization mode.

### 4.6 Synchronizing Job Files and Data Files

After a user has edited a m6j job file on the M6650 master slice or changed a master data file, he must synchronize these changes to all the other the M6650 slices.

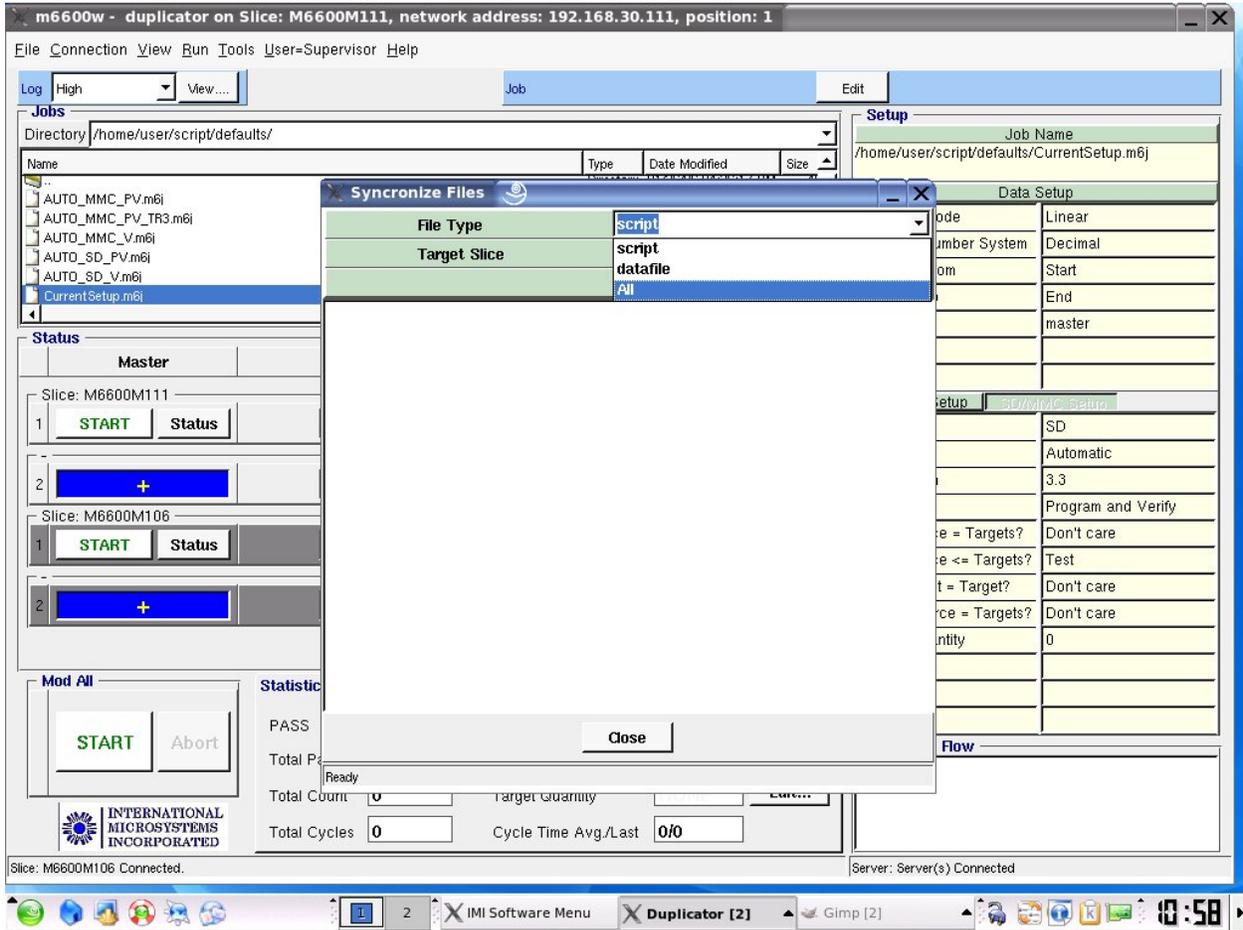


Figure 4-4: Synchronizing Files

To synchronize the files across all M6650 slices, Click on Tools, then Synchronize Files. As shown in Figure 4-4, a choice box is presented that allows the user to specify the type of files to synchronize and the M6650 slices that are included in the file update(s). If the user chooses to synchronize All files, then both data files and Job files will be copied from the Master Slice to the chosen M6650 slices. To start the synchronization process, click on the Start button. Press Close to go back to the standard screen.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

## 4.7 Running a Job

The user starts a selected Job on all M6650 slices by pressing the Start button at the lower left hand corner. Alternatively, the user may start a job on a selected M6650 slice by pressing the Start key on the individual M6650 slices represented in the Status screen ( See below ).

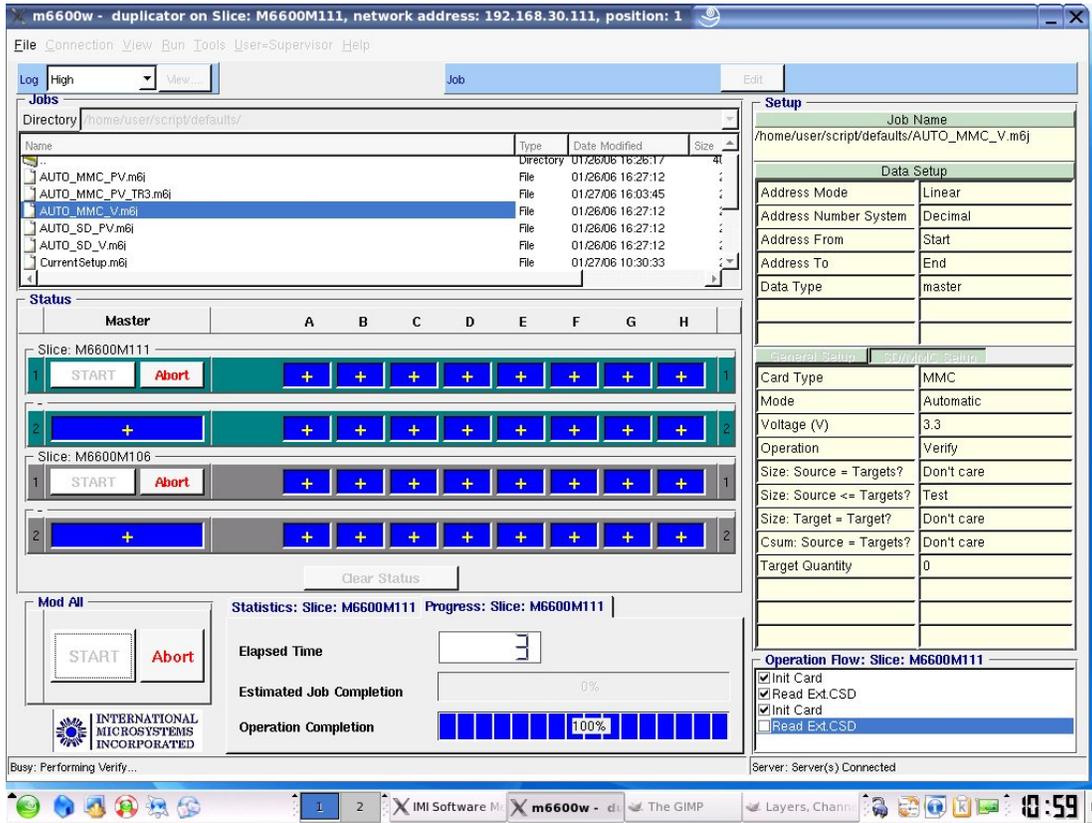
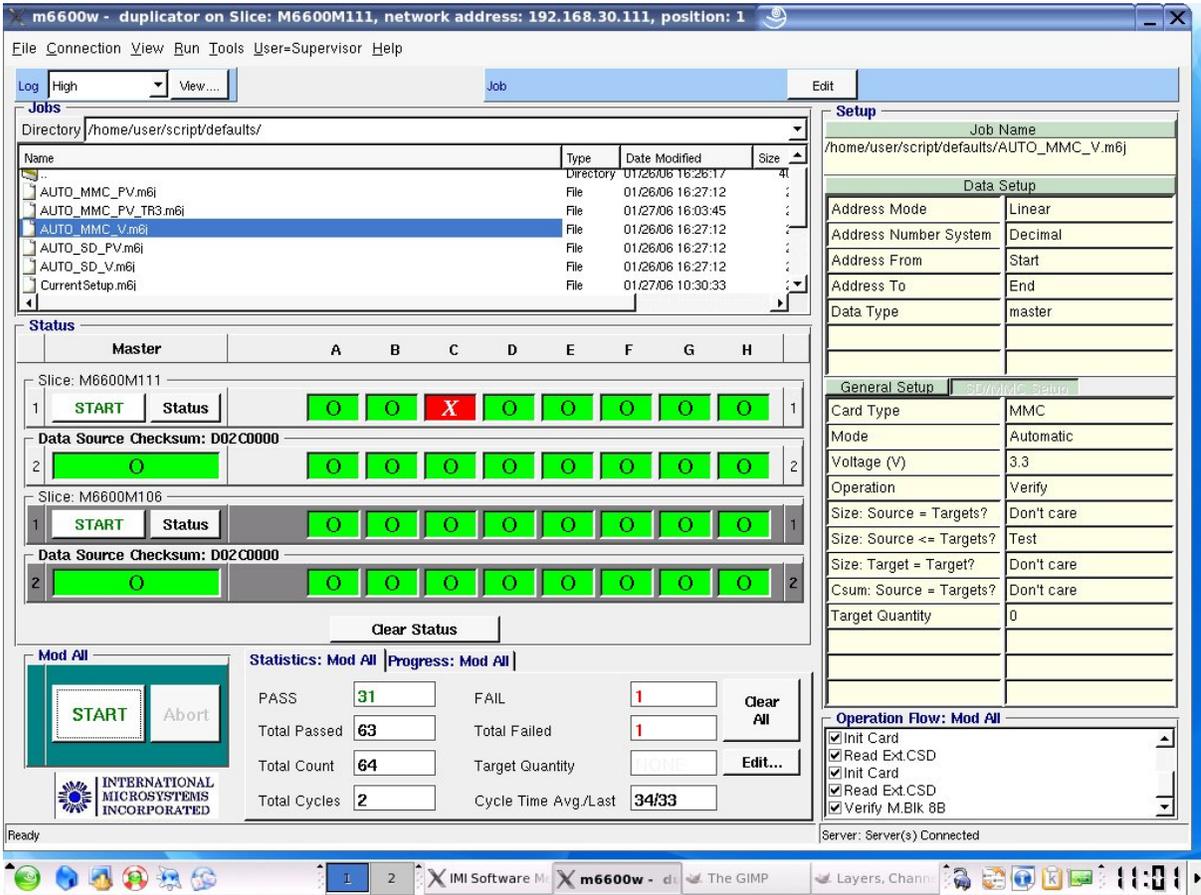


Figure 4-5: Starting a Job

Note the blue Activity Bar at the bottom of the M66W display. A running average is kept of the time that a job takes and this average is used to present the percentage that has elapsed along with the incremental seconds

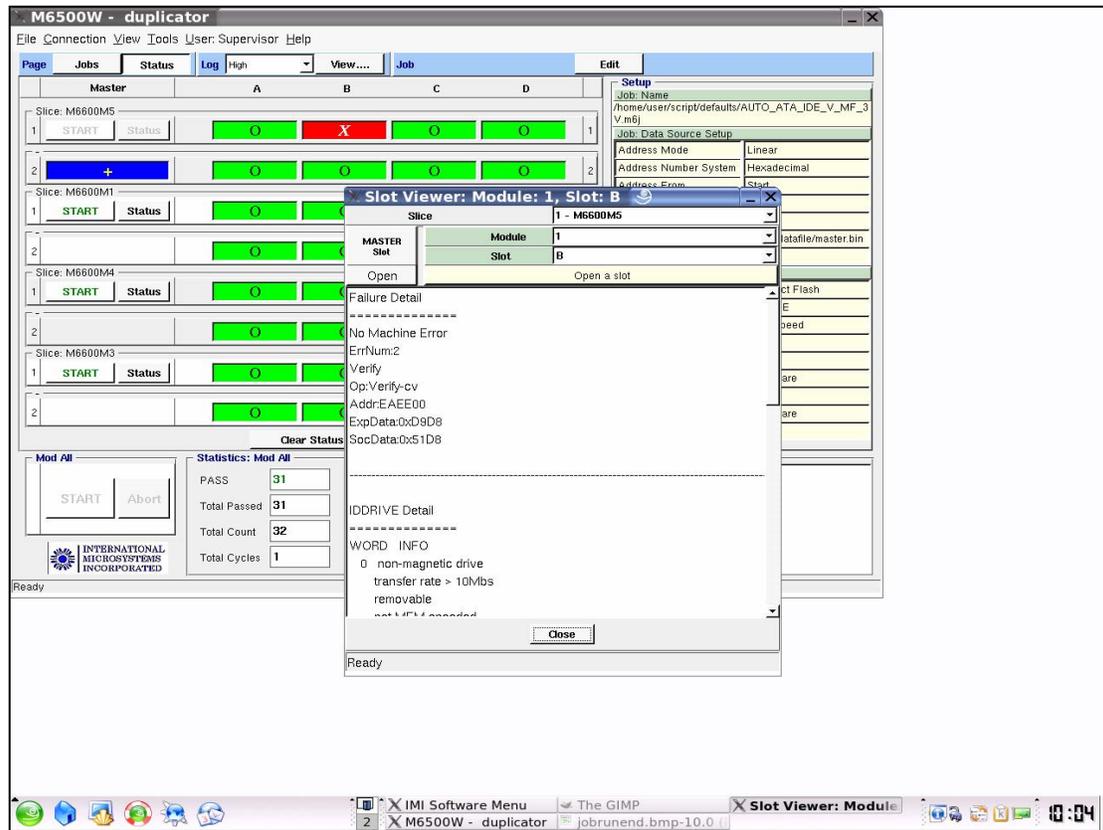
# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 4-6: End of Job - Pass/Fail Information**

At the completion of a job, the Pass/Fail status is displayed for each socket as well as the Pass/Fail summary for the currently run job and all jobs. The summaries appear in the bottom middle of the screen. The Green and Red bars respectively represent each copy socket. To find out why a particular socket failed, click on the red bar of the socket.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 4-6: Socket Error Information**

The error information displayed will inform the user as to the operation that failed as well as other information such as the failing device status and or failing address and data information.

## 4.8 Log File and Logged Information

Logging information is stored in log files that are named by year, month and day and kept in the directory "/home/user/log-all/". For example, a log file with the name "050316.log" contains the logged information for the date year=2005, month=03, and day=16. To view the log files from the M66W program, click on View then Log at the top of the screen and then click on the log file you wish to open.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

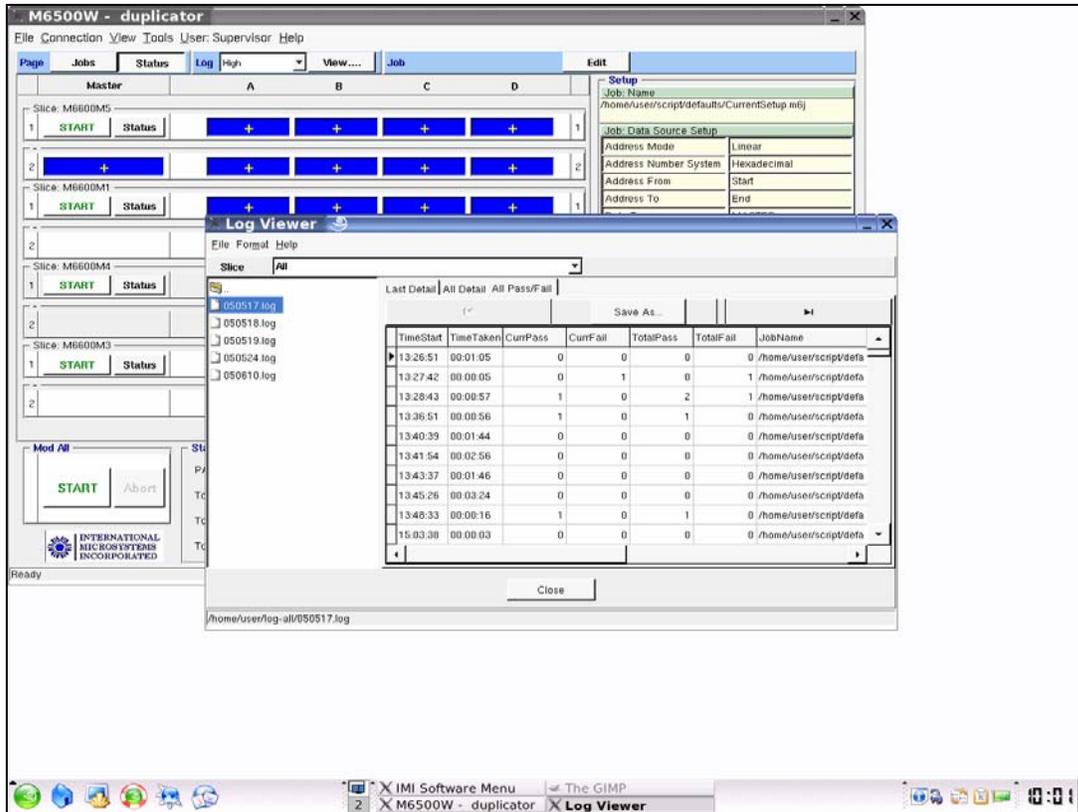


Figure 4-7: Viewing a Log File In M66W

There are three different views of the data that can be selected using the buttons on the top of the log window; namely *Last Detail*, *All Detail*, and *All Pass/Fail*. *All Pass/Fail* is the default window and shows only the summary information for all jobs. *All Detail* lists the entire contents of the selected log file. And *Last Detail* lists the error information for the last run cycle.

## 4.9 Setting the Log Information Mode

The amount of information stored in the active log file is determined by the Log Information Mode; Off, Low, Medium, and High (default). The selection is made using the pull down **Log** menu at the top of the M66W screen.

## 4.10 Master Slot Information: ID Drive Info, Size, Checksum, and Master File Creation

When a master card is inserted into a Master slot on an M6650 which is the single, lowest, left hand slot on an M6650, a blue bar will be seen on the Status screen.

The user may perform various functions on the Master card by use of the **left hand** and the **right hand** mouse buttons.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

## 4.11 ID DRIVE Information for the Master Card

Placing the mouse cursor over the Master Blue Bar and clicking the left hand button on the mouse display the ID DRIVE info for the Master card.

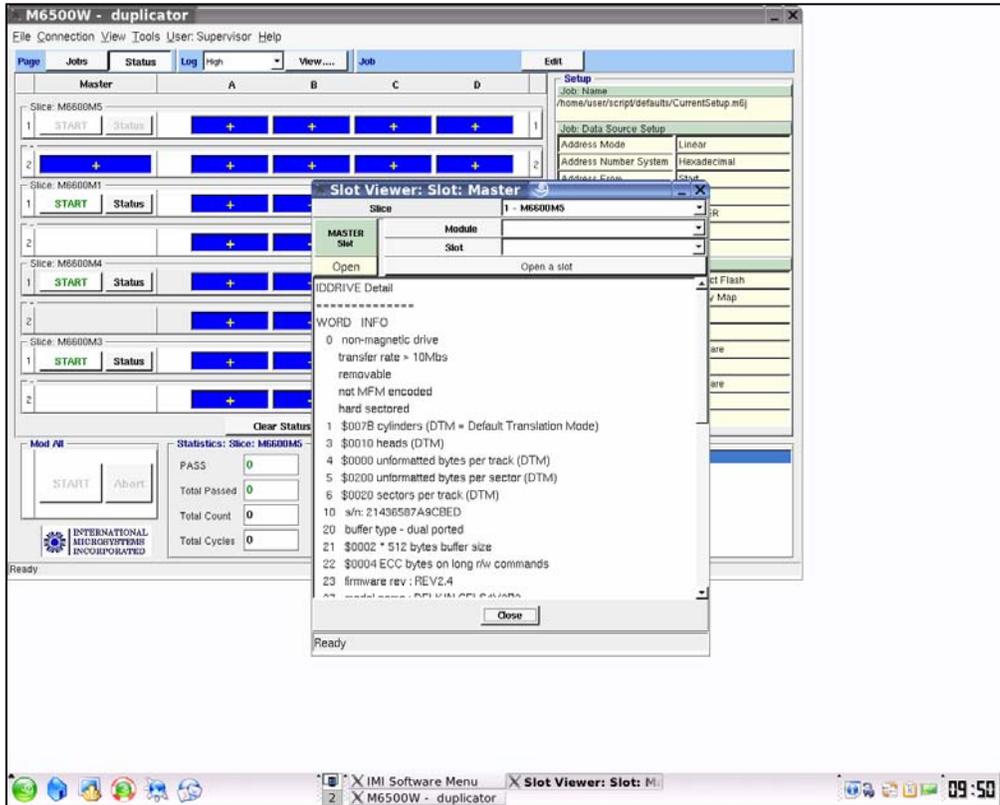


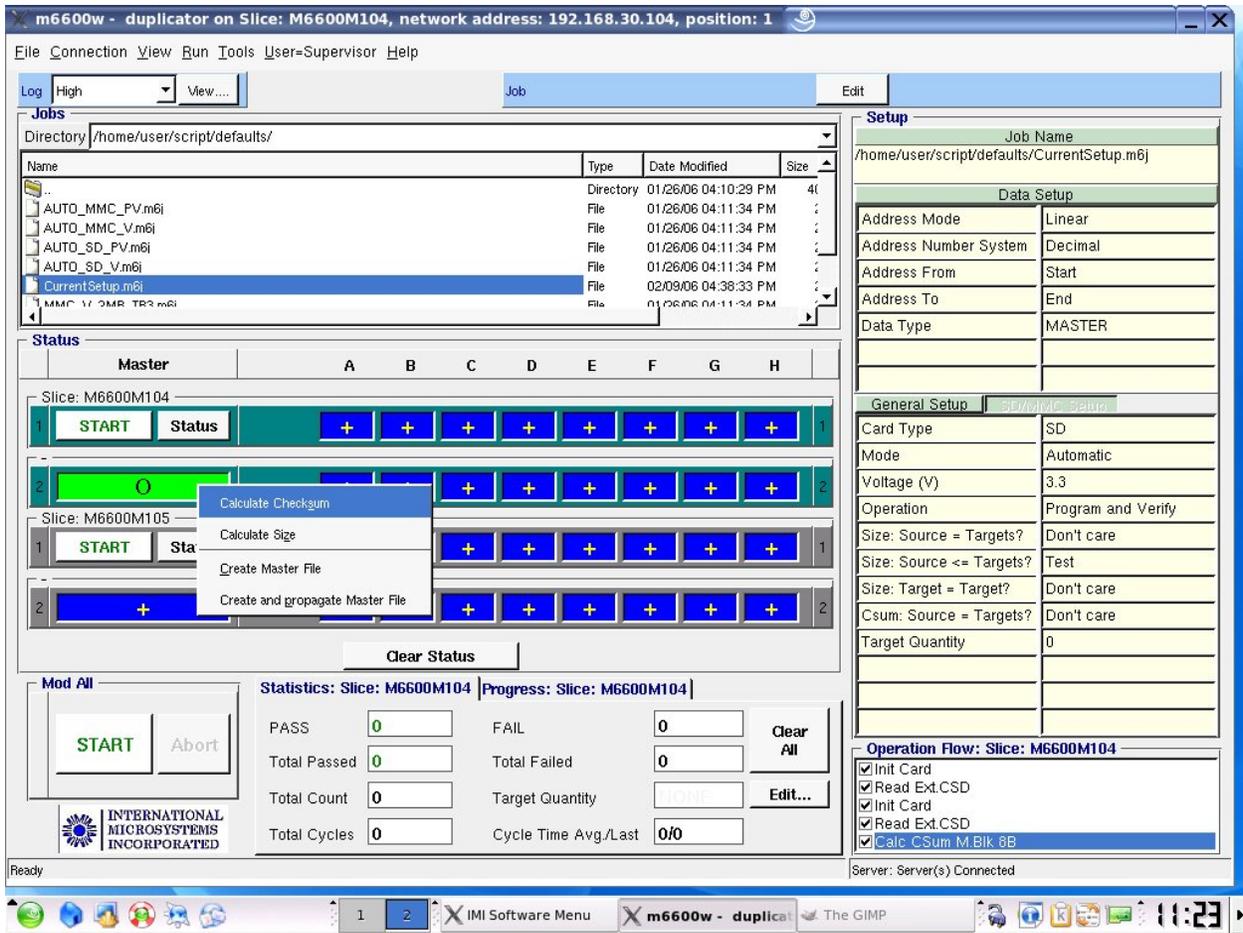
Figure 4-8: Master Card ID Drive Information

A few words about the ID Drive Information displayed. This information may differ depending upon the configuration of the M6650 and the type of card being used. However, MMC and SD cards will return information concerning the drive that is similar to information that can be gotten from a standard computer system hard drive. We refer to this information as the “ID Drive Info”.

## 4.12 Master Card Size, Checksum, and Master File Creation

Most often, two of the pieces of information that a user wishes to know about the Master card are its size and its checksum. To find out these two pieces of information, place the mouse over the Master card Blue bar and press the **right hand** button. A selection menu will appear and allow the user to select the display of either the size, checksum, or allow the user to create a master binary file.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM



**Figure 4-8: Display of Master Checksum, Size, or File Creation**

The Checksum is an eight digit hexadecimal number which is the sum of all 8 bit bytes starting at the first logical block of the drive and up to and including the last logical block of a drive. Note that the M6650 makes an exact copy of the Master drive to all of the copy slots so that the checksum of all duplicated cards should be the same as the Master drive.

The Size in bytes is given in hexadecimal along with the last address. This information is an important method of checking whether two flash drives are exactly the same. Many users do not realize that even though two drives may have the same generic size such as 256MB, the area allowed for user information may be slightly different and therefore an exact duplicate of one drive can not be made into the second drive of nominally the same size. Since the M6650 makes binary image copies of the master to the copy slots, normally it is imperative that the copy cards be exactly the same size as the master.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

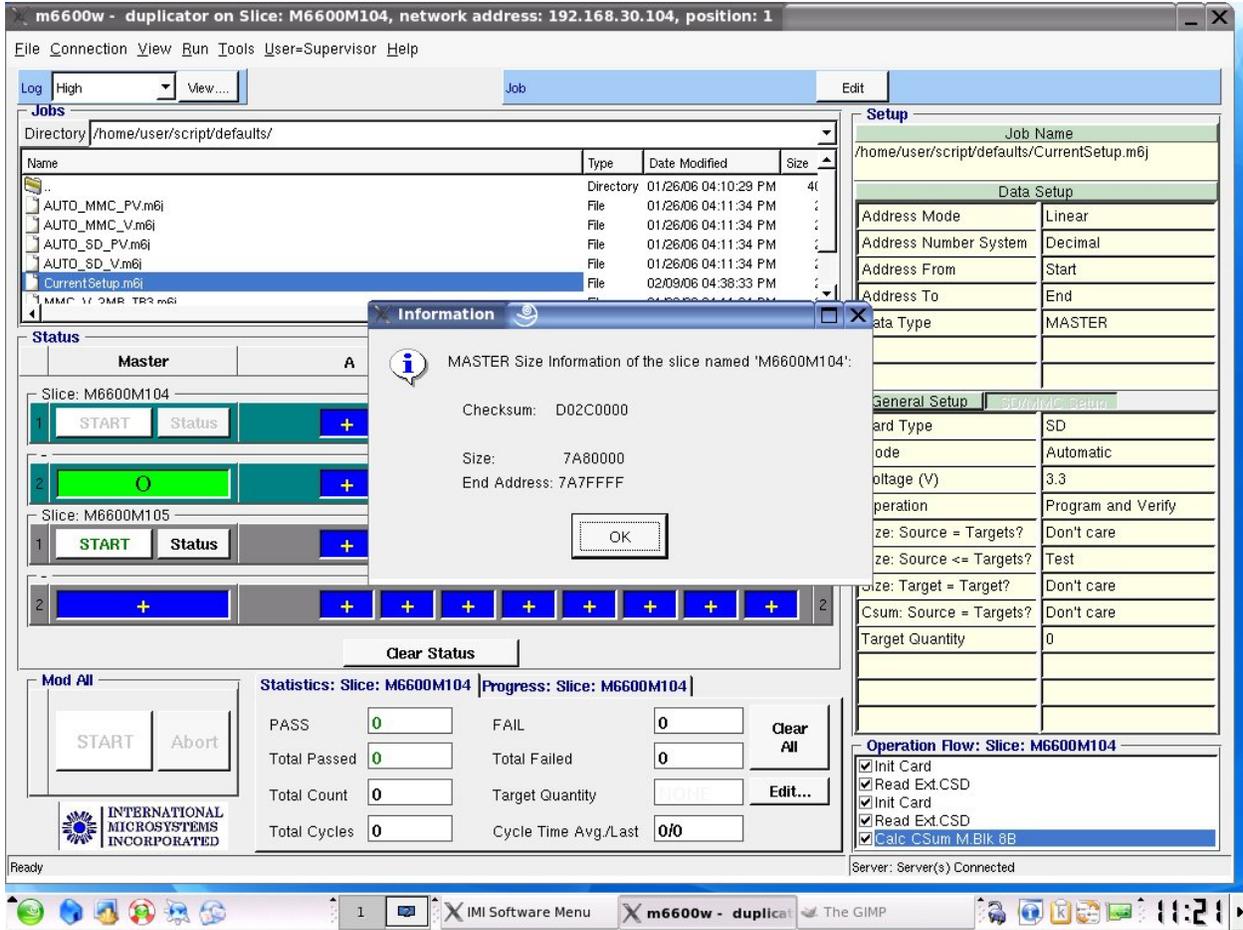


Figure 4-9: Checksum of a Master Card

## 4.13 Creating a Master File from a Master Card

Referring again to Figure 4.8, there are two choices related to creation of a Master File from a Master Card. Selection of the first choice, “Creation of a Master File”, will cause the M6650 to prompt the user into creation of a master binary image file on the current open M6650 Slice.

Selection of the second choice, “Creation and propagate a Master File”, will cause the M6650 to guide the user into creation of a master binary image file on the current open M6600 Slice and then cause this file to be copied to all other networked M6650’s that share the same GUI front end.

# THE M6650 SD-MMC-MS CARD DUPLICATION SYSTEM

## 4.14 Setting up the M6650 Slices that are Networked to the Master

When the Master M6650 Slice is to control other M6650 slices, the M6650's must reside on a local network and have fixed IP addresses. When shipped, M6650's with multiple slices have a multi-port Ethernet switch through which all M6650's are networked together. Also when shipped, the Master slice will have been set up to recognize the other M6650's in a file "/home/m6500/m6w-mach.ini". To edit this file within the M66W program, click on Tools, Configure Machines.

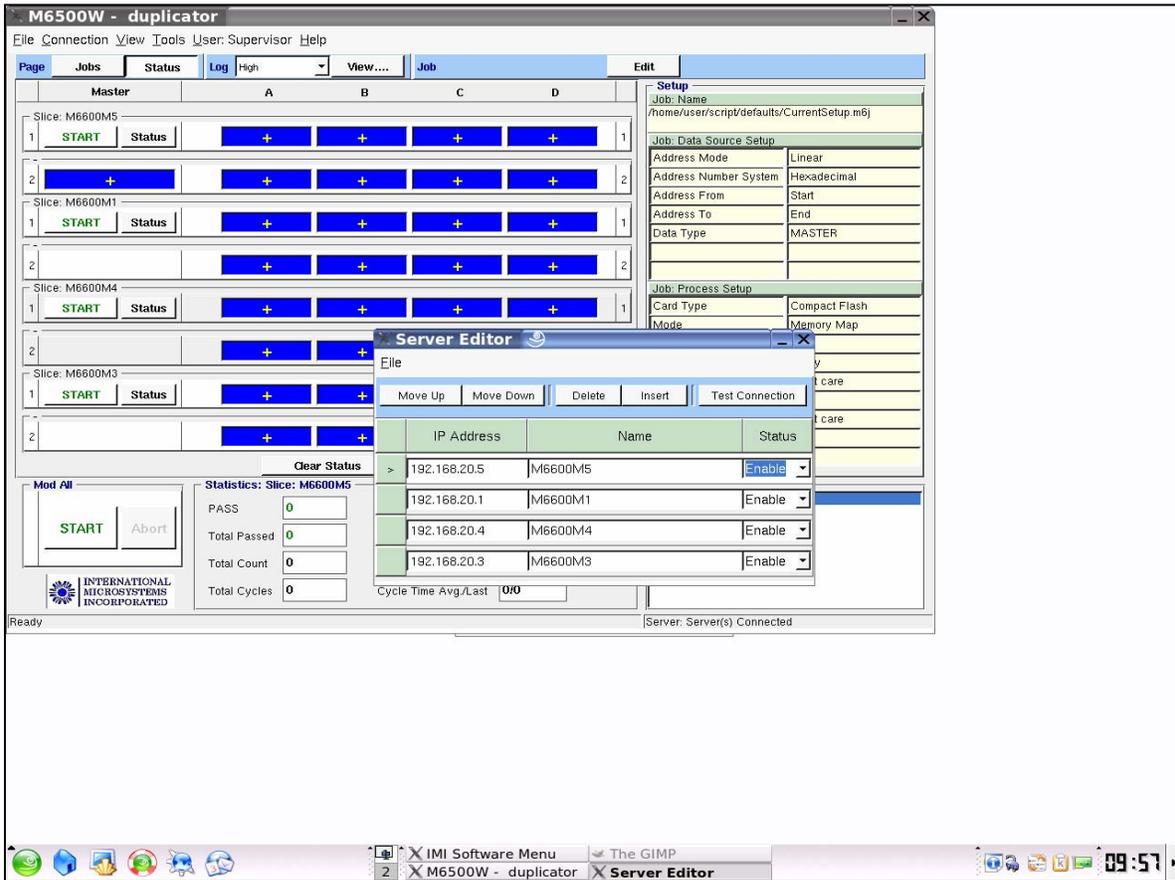


Figure 4-10: Configuring M6650 Slices