



## Proposed Modifications to Summit Slitmask Computers to Enable TCP/IP Transfer of Files to Mill

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### **Synopsis**

Since its inception, the summit slitmask mill has required the use of floppy disks to transfer files between the computer which generates the mill code and the slitmask mill which manufactures the slitmasks. This “sneaker-net” approach is both cumbersome and unreliable due to regular failures of floppy disks and floppy drives, which are prone to trouble in the “dirty” environment in the mill vicinity.

A goal of the summit operations group for several years has been to eliminate the reliance on magnetic media by creating a networked connection between the slitmask milling computer and the computer in the mill itself. This was recently achieved, and the only remaining barrier to implementing this transfer method is making the corresponding modifications to the software running on the slitmask milling PC to enable networked transfer instead of floppy transfer.

This document gives a brief background on the current state of the network access between slitmask computer and mill, describes the proposed modifications to automate the file transfer process, and lists the steps required to accomplish and test these modifications.

### **TCP/IP Access**

Mike Wagner and Jon Chock have configured the DOS-based computer in the slitmask mill to communicate with one of the Linux-based slitmask milling PCs via an Ethernet connection. The slitmask mill runs DOS, which apparently prevents the Linux PC from being able to access the filesystem on the mill; however, the mill is able to successfully read from and write to the Linux filesystem.

The result is that we can now transfer files from the slitmask milling PC to the mill by writing data to the **slitmaskpc:/slitmasks** directory on the slitmask milling PC and then accessing that partition from the mill. The mill operator will then be able to view the contents of the **slitmaskpc:/slitmasks** directory in a similar manner to viewing data on the mill’s floppy drive. The operator can select a file to mill and then execute the mill code in the file to produce a slitmask.



## Proposed Changes

To enable the networked file transfer method, changes will be required to both the software and the procedures associated with the slitmask mill.

## Software Changes

Software changes include modification of the user interface (**Millmasks** GUI) as well as writing, testing, and installing a new script to be invoked from the interface which will write the data to a directory on the slitmaskpc instead of to the floppy drive.

### MillMasks GUI

The **MillMasks** GUI is a Tcl/Tk-based widget written at UCO/Lick that allows the operator to select slitmasks for milling and to write the needed files to a floppy (see Figure 1). Source code can be found on the slitmask milling PC at `/usr/local/ucolick/kroot/bin/mask/MillMasks`.

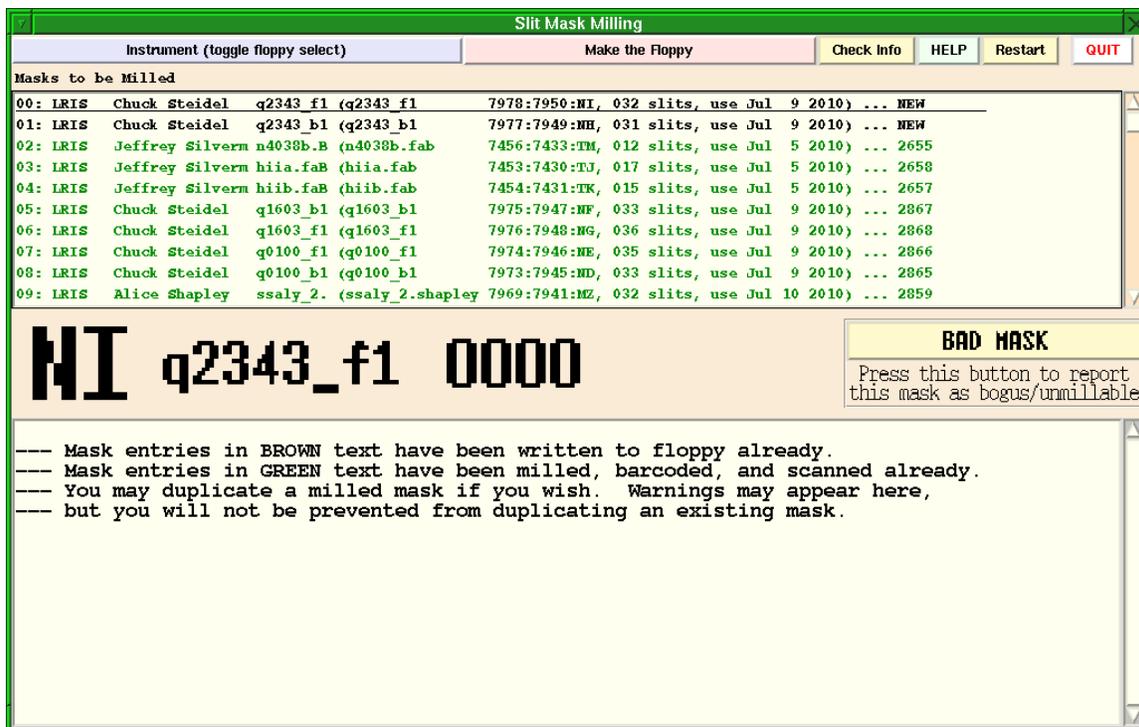


Figure 1: Existing MillMasks GUI interface

In its current incarnation, the GUI will either automatically select the next 10 unmilled masks or will allow the operator to select as many masks as desired. The operator then clicks the **"Make the Floppy"** button at the top of the screen to write the mill code for the selected files to disk. This involves the following steps:



- Extracting blueprint files for the corresponding masks from the slitmask database using a program called **dbMaskOut**.
- Converting the FITS-format blueprints into NCC mill code using a program called **fits2ncc**.
- Writing the NCC files to floppy using a program called **mkMaskFloppy**.

The contents of the floppy disk currently in the **A:** drive are deleted, and the new files are then written to disk. If the disk does not have enough free space to hold all of the selected files, then only the first N are written to disk and the remainder are not. We propose only the following two, minor changes to the GUI interface:

- Change the title of the top button from "**Make the Floppy**" to "**Send Files to Mill**"
- Change the command bound to this button from **mkMaskFloppy** to the name of the new script described below (possibly entitled **sendToMill**).

### *Script to Write Data*

The **MillMasks** GUI currently invokes an external script called **mkMaskFloppy** which lives in the directory `/usr/local/ucolick/kroot/bin/mask`. This Bourne-shell script simply locates all files in the current directory and writes them to the floppy in the **A:** drive. We propose to write a new script called **sendToMill** which will do the following:

- Delete the current contents of the **slitmaskpc:/slitmasks** directory;
- Copy the files in the current directory into **slitmaskpc:/slitmasks**;
- Verify that all files were copied successfully;
- Return an appropriate exit status indicating success or failure.

This script can be implemented in any language, but for ease of maintainability a shell scripting language such as **sh** or **cs** is recommended.

### **Procedural Changes**

Because there are two slitmask milling PCs (known as **slitmaskpc** and **slitmaskpc2**) which can be used to generate the mill code, and because the mill must perform the file retrieval, the mill operator will now need to select the "source" computer when preparing to mill masks. It is not yet clear whether this step will be performed when the mill is "booted up" or whether this will be selectable at the time of milling. Either way, the summit operations group will be responsible for determining the appropriate steps for the mill operator take in order to select the "source" computer and updating the existing slitmask milling documentation accordingly.



### **Action Summary**

The following list shows the actions which must be completed in order to implement network-based transfer of slitmask mill code files to the mill. Each action is preceded by a word indicating who will take primary responsibility for completing the task. Here, "OID" indicates the WMKO Operations and Infrastructure Group, "Software" indicates a software engineer in OID, and "Lick" indicates a software engineer in the UCO/Lick Scientific Programming Group.

<b>Person</b>	<b>Task</b>
OID	Identify a Keck person to coordinate this effort
Software	Write and test <b>sendToMill</b> script to copy data to <b>/slitmasks</b> directory on <b>slitmaskpc</b> .
Lick	Update <b>MillMasks</b> code to change name of button from <b>"Make a Floppy"</b> to <b>"Send Files To Mill"</b>
Lick	Modify <b>MillMasks</b> to change the command invoked by the button from <b>"mkMaskFloppy"</b> to <b>"sendToMill"</b>
Software	Work with SPG to install <b>sendToMill</b> script and revised <b>MillMasks</b> GUI in <b>/kroot</b> on <b>slitmaskpc</b> and <b>slitmaskpc2</b> .
Software	Test revised <b>MillMasks</b> GUI to verify proper operation on <b>slitmaskpc</b> .
OID	Define and document procedures for selecting source PC on mill.
OID	Test milling of slitmasks from both <b>slitmaskpc</b> and <b>slitmaskpc2</b> .