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SuperCard Pro

Setup & Usage Manual

Firmware v0.9 / Software v1.07

Manual v1.4

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Introduction

Thank you for purchasing the SuperCard Pro! This is device will let you backup your retro computing disks to either new disks or image files for later retrieval. Future features include the ability for the SuperCard Pro board to be a floppy drive emulator, and also be a low-level, cycle exact 1541 disk drive emulator. Please read through this **entire** manual **before** you attempt to install and use this product.

Installation Requirements

This product requires that you install software on a PC computer. The software MUST be installed while using the Administrator account and in Administrator mode. Failure to install the software in Administrator mode will render the product inoperable. **DO NOT PLUG IN THE SUPERCARD PRO BOARD BEFORE INSTALLING THE SOFTWARE!**

Warranty Information

This product carries a limited lifetime warranty. Units subject to improper installation, misuse, abuse, or modifications will not be covered under this warranty. We may at our discretion either repair or replace the unit covered under warranty. The customer will pay all freight charges to and from our facility. cbmstuff.com must be contacted to obtain a return authorization. Any product returned without authorization will be returned without repair or replacement.

Liability

By using this product, you agree to hold cbmstuff.com and Jim Drew free from any type of liability either directly or indirectly while using this product. Duplication of software you do not own is a crime. DMCA law allows any software no longer being produced to be duplicated for archival purposes only.

SECTION 1 – SOFTWARE INSTALLATION

DO NOT PLUG IN THE SUPERCARD PRO BOARD BEFORE INSTALLING THE SOFTWARE!

Step 1 – Download the latest software

Locate the latest software installer by going to this link:

http://www.cbmstuff.com/downloads.htm

Select the latest installer for SuperCard Pro and download it.

Step 2 – Running the installer

The installer MUST be launched in Administrator mode. This can be accomplished by either being logged into the Administrator account (the primary account) or by right-clicking on the **scp_setup.exe** program and selecting **RUN AS ADMINISTRATOR**.

The installer has two parts. First, is the installation of the SCP.exe program itself, which is what is used to control the SuperCard Pro board. Second, is the USB driver for the SuperCard Pro board. Make sure that you proceed with the second installer after completing the first. The two installers will run consecutively automatically if you follow the on-screen instructions.

NOTE: Please see our forum area for information about resolving issues installing under Windows 8.

SECTION 2 – SETTING UP THE HARDWARE

Connecting the SuperCard Pro board to a USB port

The SuperCard Pro uses as USB mini-B interface. You will need a Type-A to Mini-B cable (not included). This is a cable commonly used with digital cameras, smart phones, and other USB devices.

Plug the proper end of the cable into your PC and the other end into the SuperCard Pro board. If this is the first time you have plugged the SuperCard Pro into your PC then Windows will need to install the device driver software for it. After Windows recognizes the SuperCard Pro board and finishes the driver installation, it will be ready to use.

Note: the driver is a **signed Windows driver**, which means that it has been certified by Microsoft to work with all versions of Windows.

Connecting a floppy drive to the SuperCard Pro board

The SuperCard Pro uses a standard 34 pin (17 x 2, .100” x .100”) floppy drive interface. You will need the proper cable (not included) to use either a 5.25” or 3.5” PC floppy drive.

Even if you are using cables that have connectors with “keys” (which prevents the connector from being installed backwards) please **pay close attention** to the orientation of the red stripe on the edge of the cable! The red stripe indicates where pin 1 on the cable will be. SuperCard Pro's pin 1 is located at the same end as the SD media socket (opposite of the LEDs).

***** WARNING *** - Plugging the cable connector in backwards can damage the SuperCard Pro board!**

Please see figures 1 through 3 for details on the proper installation of the cable - noting the position of the red stripe!

Figure 1 – Floppy connector orientation

Figure 2 – Floppy connector inserted into SuperCard Pro

Figure 3 – Floppy cable ready for a PC floppy drive

Most floppy drive cables have two types of connectors, a 34 pin dual row (17x2) commonly used for 3.5” disk drives (and SuperCard Pro), and a 34 pin IDC style (designed to slip over circuit board “fingers”) commonly used for 5.25” disk drives. If there are two sets of connectors, the last set will have “twist” in several of of wires. This is done so that the drive selection can be made by hardware without having to change device ID jumpers on the drive(s). The connector pair closest to the main connector (the one plugged into the SuperCard Pro board) will be Drive 1, and the second (last) pair will be Drive 0. See figures 4 and 5 for details.

Figure 4 – Connectors closest to the main connector are for Drive 1

Figure 5 – Connectors at the end of the cable are for Drive 0

Connecting a 5.25” PC floppy requires that you power the drive using an external power supply having both 12v and 5v supplies. You can use a standard PC power supply, but most people are mounting 5.25” drives in an old CD-ROM case (which has standard 12v/5v power supply built in). This is the easiest way to connect and use a 5.25” PC drive with SuperCard Pro.

Connecting a 3.5” drive requires only 5v to power the drive. If you are using the SuperCard Pro with a USB interface that has at least 500mA of current capability (from a high current port or externally powered USB hub), you can power the drive directly from the SuperCard Pro's on-board connector (labeled as **3.5” Floppy Power**). You will need a 3.5” drive-to-drive power cable, which are common on PC setups and sometimes called a dual 3.5” splitter. See figures 6 through 10 for details on connecting a 3.5” floppy drive to the SuperCard Pro board.

Figure 6 – 3.5” floppy power interface

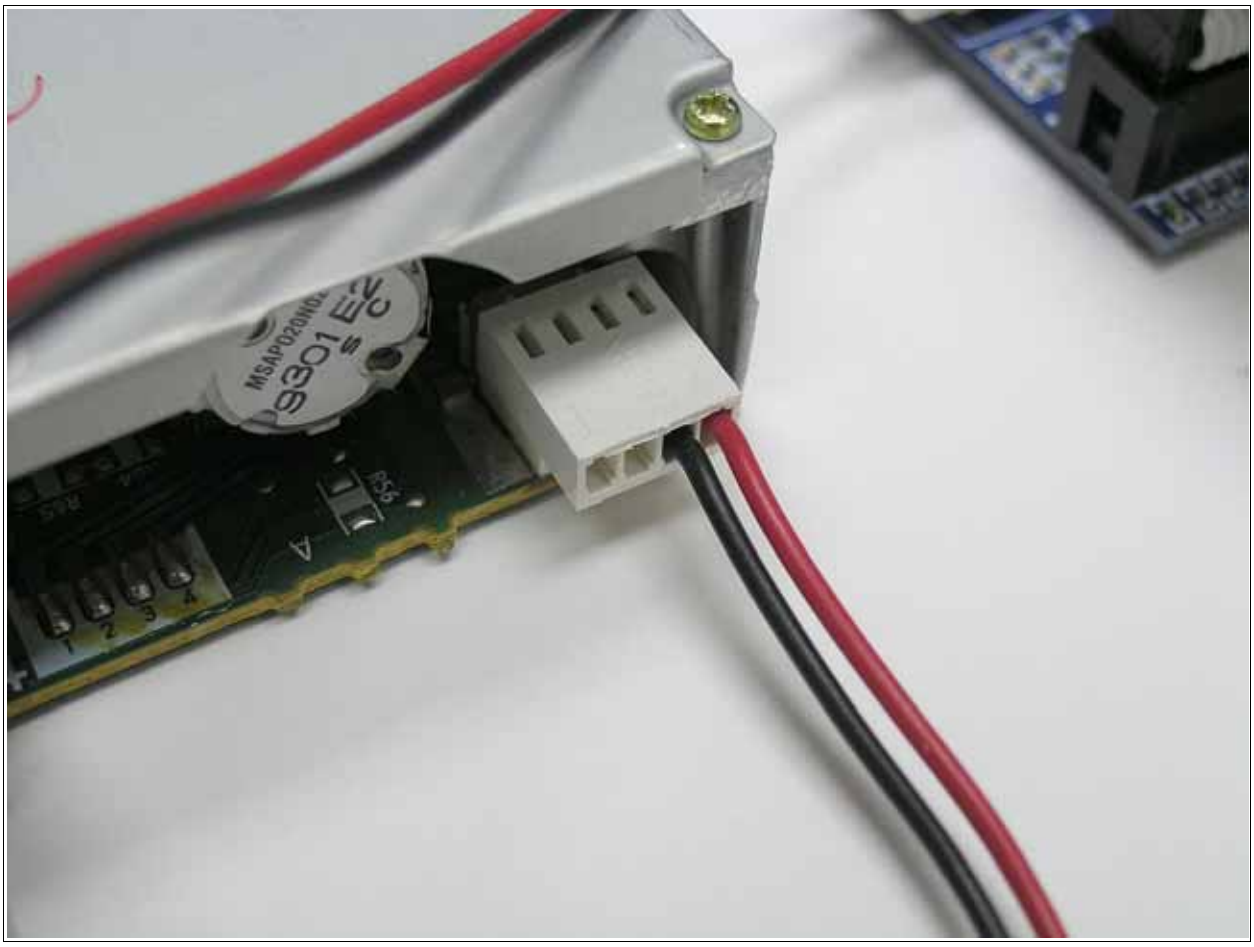

Figure 7 – Power interface on 3.5” floppy drive

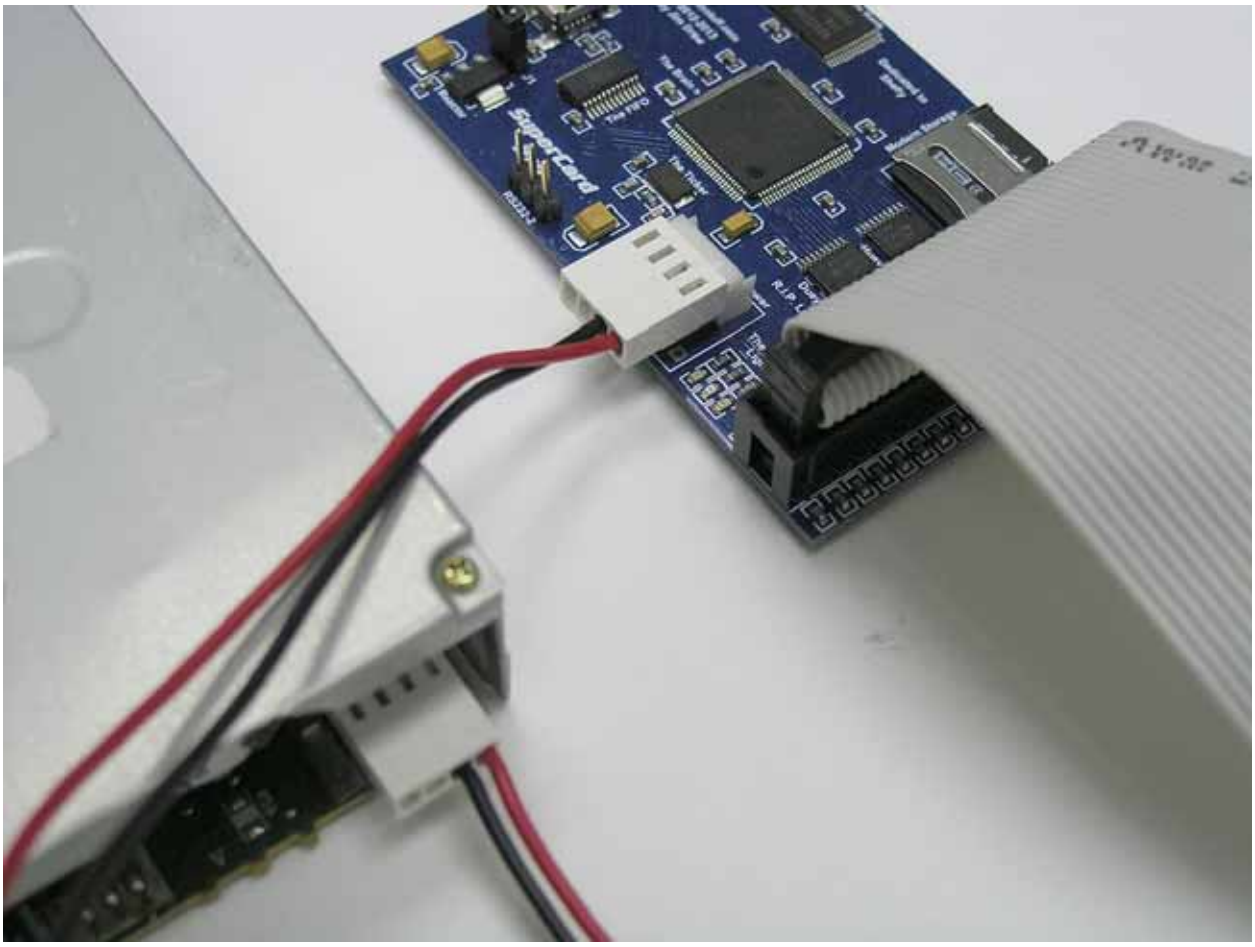

Figure 8 – Power connections between drive and SuperCard Pro

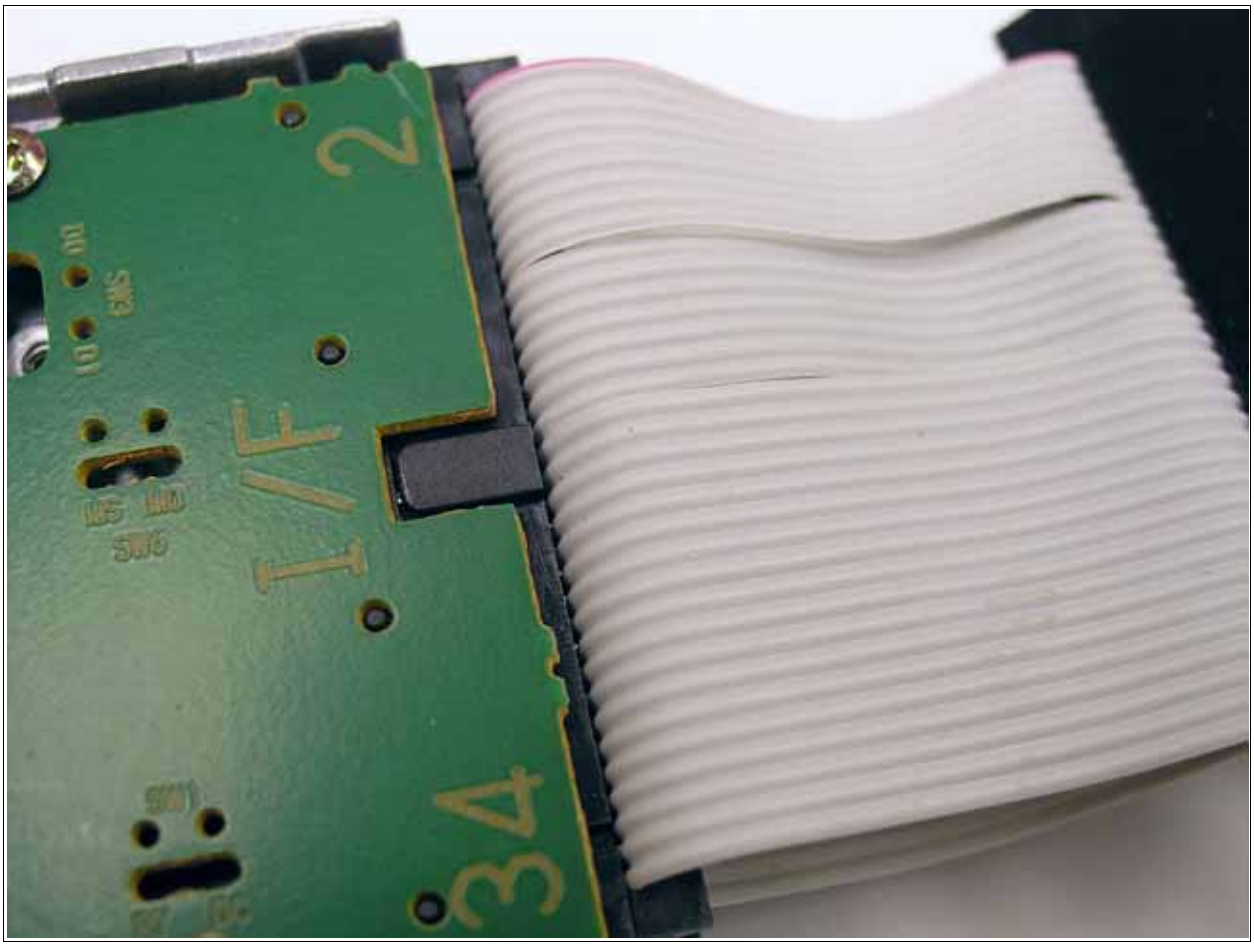

Figure 9 – 3.5” drive plugged into cable (note key & red stripe)

Figure 10 – 3.5” drive setup and ready to use

Updating the SuperCard Pro firmware

Periodically there will be firmware updates for the SuperCard Pro board. These updates will re-flash the microcontroller. Included with your SuperCard Pro board is a **flash jumper**. This jumper is only to be used when there is a new flash update available.

To setup the SuperCard Pro board for a firmware update:

- Attach the SuperCard Pro to a PC system's USB port.
- Remove jumper J1.
- Insert the flash jumper so that GND and Rx/Tx on port RS232-1 is jumpered (see figure 11 for details).
- Re-insert jumper J1.

At this point, a single blue LED (located in the series of LEDs labeled "The Pretty Lights") should be ON. This means that the board is in flash mode.

Download and run the latest updater program from the www.cbmstuff.com website.

Once the update has finished, remove jumper J1, remove the flash jumper, then re-insert jumper J1.

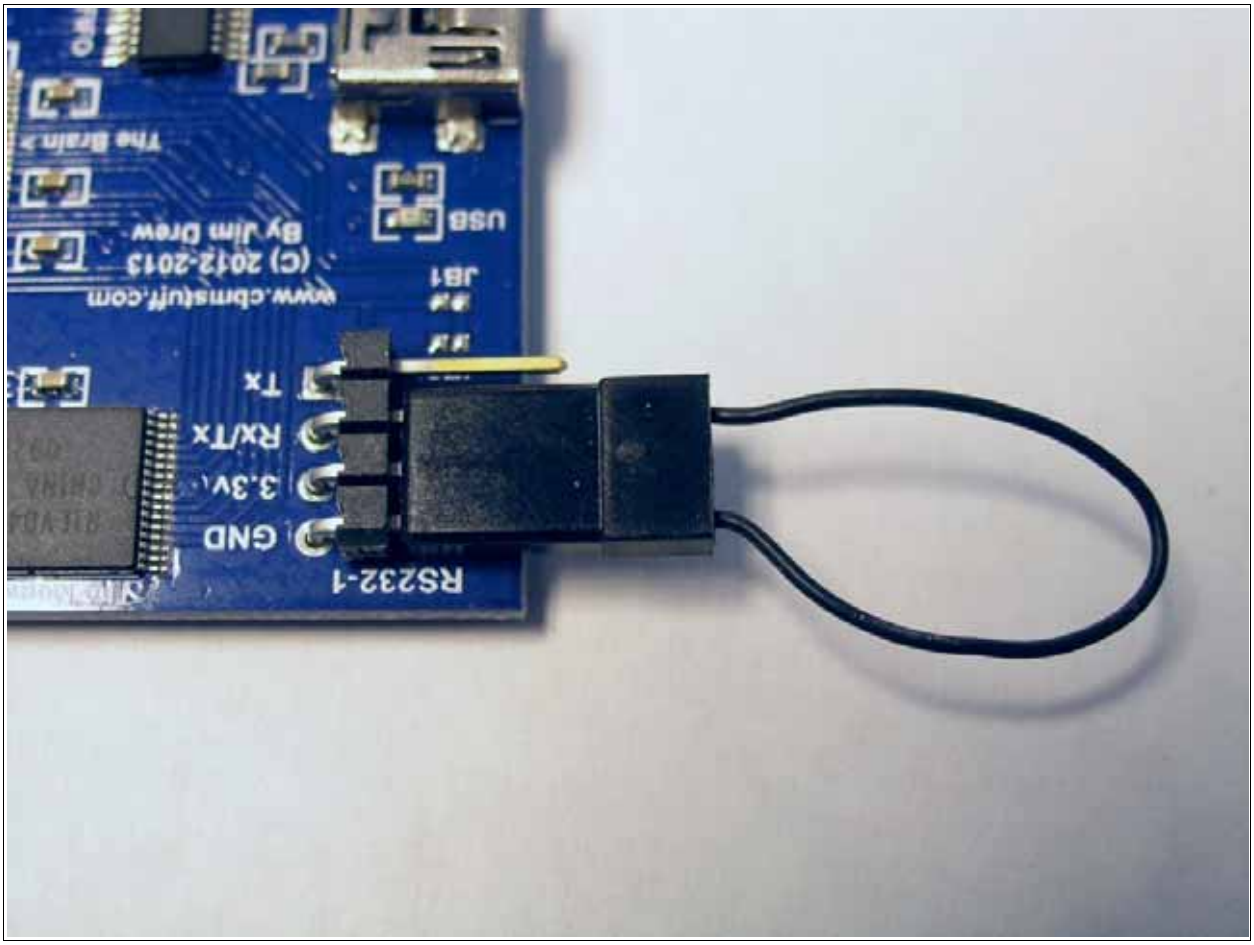

Figure 11 – Flash jumper installed on SuperCard Pro board

Setting up a PC drive for use with SuperCard Pro

The SuperCard Pro board can use either 5.25” or 3.5” disk drives. Although you should be able to also use 8” drives, that has not been specifically tested at this time.

There are numerous jumpers on 5.25” and 3.5” PC drives, and some must be setup correctly for proper operation. See our website forum for detailed information on various drives, their jumper settings, and compatibility.

The most important jumpers are the drive selection jumpers. These are typically labeled as DS0, DS1, DS2, and DS3. These can also be labeled D1, D2, D3, and D4. Usually, you want your drive select jumper set to DS1(or D2). When the SuperCard Pro software runs it will scan the floppy bus and show you the drives that are available. So, if you don't see any drives in the list, try changing your drive select jumper.

The RDY and DC jumper positions do not matter. These Ready and Disk Change lines are not currently used by the SuperCard Pro software. These lines really are not required for accessing the drive.

Termination is necessary, and provided by the SuperCard Pro board itself. If you have the TM jumper on with your drive, that is fine. Termination resistor packs can be left in place or removed, but you should try to make the last drive in the chain (furthest from the SuperCard Pro board) the one that has active termination should you leave termination in place.

Some drives operate normally at low density and some drives don't. It's not uncommon to have the density selection jumpers backwards so that it requires the software to be set to high density in order to read/write data correctly. Try to set your jumpers so that low density is low density mode. Some drives have dual jumpers for density, controlling both the density selection and drive speed. 360K/48 TPI 5.25” drives typically run at 300 RPMs in low density mode and don't actually have a high density mode available. 1.2M/96 TPI drives have a low density and a high density mode. Typically, the drive will run at 300 RPMs in low density mode, and 360 RPMs in high density mode. However, the drive could run at either speed depending on the jumper settings. It will be very important to know the jumper settings for your drive. See the forum area for details.

SECTION 3 – USING THE SOFTWARE

There are multiple functions available in the SuperCard Pro software – the copier and the analyzer will be the most commonly used. You can switch between functions by using the pull-down menu and selecting the function you want to use. Pull-down menu options are the same between the Disk Copier/Imager and the Analyzer/Editor:

Pull-down Menu Options

Functions

The SuperCard Pro software can perform many different functions. The **Functions** pull-down menu is how you switch between these functions.

Disk Copier/Imager

The Disk Copier/Imager function is what lets you make copies and images of disks.

Analyzer/Editor

The Analyzer/Editor function allows you to examine, copy, and alter individual track data at the flux level.

Disk/Drive Utilities

The Disk/Drive Utilities offer a variety of options for determining the usability of a drive and disk media for copying.

Image Verifier/Analyzer

The Image Verifier/Analyzer is a utility for integrity creating a working disk from a disk that has errors. **This feature is not currently implemented.**

Drive Settings

The options under the Drive Settings pull-down menu are for setting up SuperCard Pro to use your disk drive.

Drive Type

The Drive Type is the physical type of drive you are using when a 5.25” drive is used. Options are either 48 TPI (40 track) or 96 TPI (80 track) drives.

Weakbits

Weakbits (not to be confused with “fuzzy bits”) are invalid bit cells times caused by either the lack of a magnetic flux transition or flux transitions too close to be usable. Typically when a weakbit is encountered, the drive will return at least four 0 bits in a row (which constitutes a weakbit). However, some drives do not return any 0 bits. When you read a section of weakbits on a track, the data will appear mostly different on every read. To duplicate this type of protection you have to write back 0 bits. The Weakbits setting can be either Raw or Fixed. Raw keeps the original data, and Fixed changes the weakbit data to 0 bits. Note that this setting only affects the creation of certain image files (like .g64) and does not affect the duplicating of disks.

Density

Some disks are low density, and others are high density. Sometimes drive jumpers are backwards from what is expected. You have the ability to change both the read and the write density using this option.

Index Sensor

All copying and imaging methods use the index pulse as a reference for the position of each track relative to one another. It is possible to duplicate a disk that does not have an index hole for both sides (flipped over). If you get the error message “Index Pulse Not Found” then it means that the disk you are using does not have the index pulse hole present for the side of the disk you have in the drive. In these cases you can change the Index Sensor setting for reading or writing modes so the index pulse is not required to start the reading or writing of a track.

This option lets you write to the back side of a disk that does not have a second index hole, providing your drive supports it (see our forum area for specific information on drive capabilities).

Backside Control

Double-sided PC floppy drives do not have the drive heads placed over top of one another. Instead, the heads are offset by 4 tracks. There are two possible modifications, one that places the track zero sensor on track 0 of the bottom head, and the other places the track zero sensor on track 0 of the top head. This option is for selecting which type of No-Flip ("flippy") modified drive you might have. The option of None should be used for a non-modified drive. If you have a Teac brand drive that has been modified then select the No-Flip (+4 tracks) option. This means that the front side of the disk is +4 tracks compared to the backside. The most common modification is for the Panasonic drives in which case you would select the No-Flip (-4 tracks) option. This means that the front side is normal, and the backside starts at 4 tracks backwards.

Config

The options under the Config pull-down menu are for loading, saving, and resetting the config options. When you close the SuperCard Pro software, all of the main settings are saved to a config file. That file is loaded every time you launch the SuperCard Pro application. The default config file is called 'scp.ini', and is located in the Local\AppData folder.

Load Config

You can load a config file from any folder. This is handy if you have a custom setup you use occasionally.

Save Config

You can save a config file to any folder. This is handy if you have a custom setup you like. You can name the config anything you like. If you use the default path and name (scp.ini), the current settings will replace the default config file that is loaded when the SuperCard Pro application is launched.

Reset to Defaults

Using this option will restore all of the settings to the recommended defaults, and erase any paths that have been saved. This is handy when you have many different settings set incorrectly and just want to start over with your setup.

Save Window Positions

If you select this option (a check mark will be next to the option when selected), the positions of every window will be saved when you quit the SuperCard Pro application. When you launch the application again, the windows will be shown at their last saved positions.

Software Updates

The SuperCard Pro software has the ability to check for new updates when you launch the application. You can manually check for updates or enable/disable the auto update feature.

Check for Update

Selecting this option will ping the CBMSTUFF.COM server, looking for a new update. A message will be displayed about your current version and if an update is available you will have the option of downloading and installing it.

Auto Update

Selecting this option will toggle the auto update feature. A check mark next to Auto Update indicates that the auto update is active.

Help

The Help option gives you a quick link to the CBMSTUFF.COM support forum, and a way to determine the current version number you are using.

SuperCard Pro Help Forum

Selecting this option will invoke your default web browser and go to www.cbmstuff.com/forum.

About

Selecting this option will bring up a window containing information about the SuperCard Pro system, hardware firmware version/revision, software version/revision, and copyright information.

Function: Disk Copier / Imager

The disk copier / imager can perform the following tasks: disk to disk copy, image to disk copy, disk to image file, and image file to image file conversions.

Most disks can be duplicated/imaged using the Blind Mode. This is the first mode you should try. If that does not work, then try with the Blind Mode turned off (non-Blind Mode).

The keys for successful copying are:

Use a known good disk! – All too often we have found problems with a copy being the result of a bad disk. If you are in doubt of the disk's quality try formatting that disk or just use a different disk.

Write protect your copy! – just about every commercially produced disk that did not have a protect notch checks to see if the disk can be written and if so, doesn't load. Sometimes the copy protection will even try to wipe out the data on the disk!

Clean your disk! - Floppy disks are old. They are prone to growing mold and mildew inside of the disk jacket in high humidity environments. This can reduce the magnetic signal to the head by raising the head slightly off the surface of the disk. Carefully clean your disks with rubbing alcohol and cotton swabs. Rotate the disk in its jacket, cleaning the surface until no more residue is found on a clean cotton swab.

Clean your disk head! - After reading disks that are dirty, the head will have accumulated a lot of that debris and it sticks to it due to the friction. Clean your head with a commercial head cleaner or by using the same rubbing alcohol and cotton swab technique used to clean your disks.

Select the Disk Copier/Imager function by using the pull-down menu under Function.

Refer to figure 12. This is the screen layout for the Disk Copier/Imager.

There are two large grids on the disk. The left side is the source and the right side is the target (destination). When copying disks, these grids will show the status and progress of the copying process.

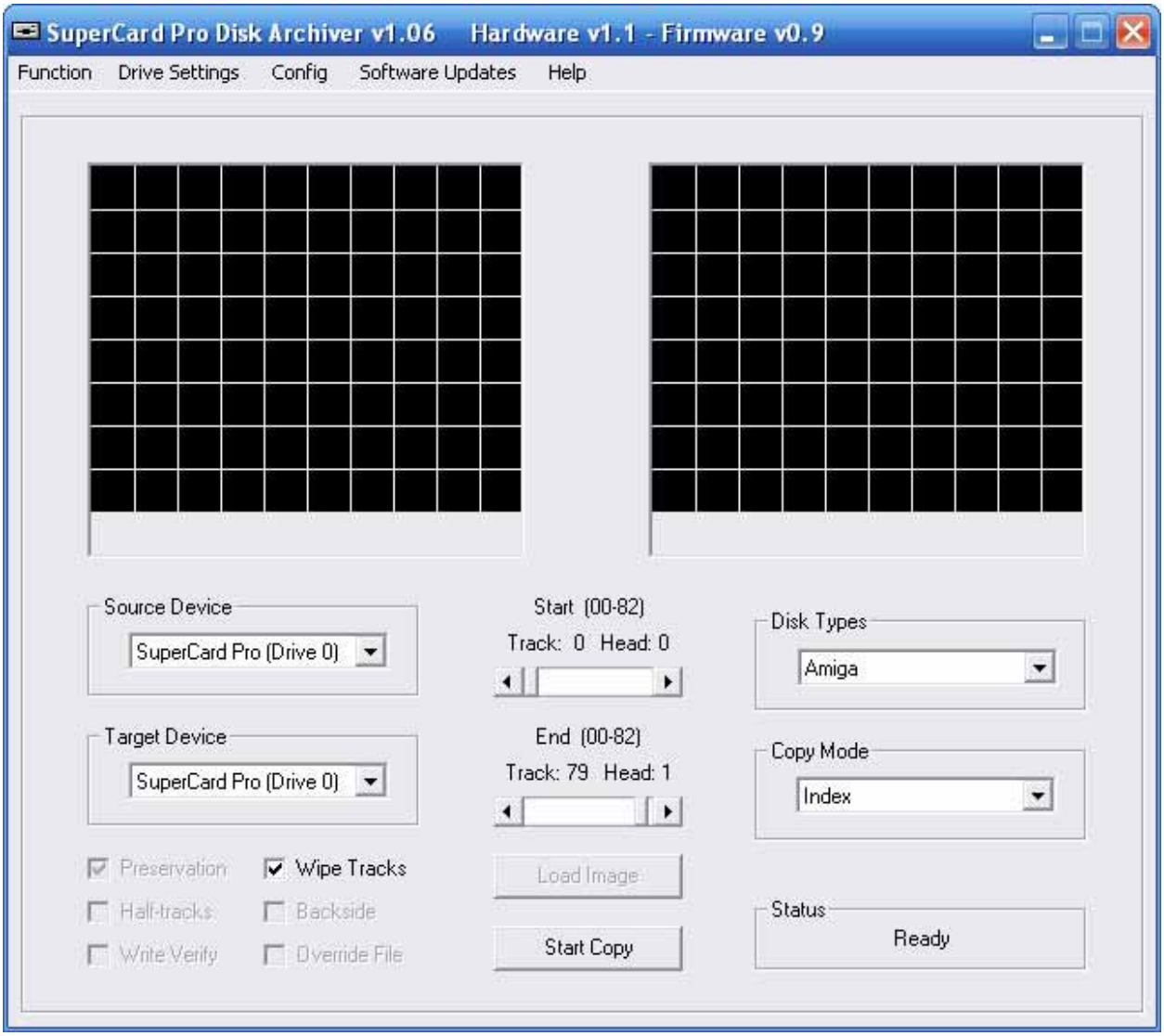

Figure 12 – Disk Copier / Imager screen

Main Display Options

A description of the various Disk Copier/Imager options are listed below.

Source Device

The Source Device is what will provide the source information. This can be either be a floppy drive for reading the original disk or an image file used to create a new disk. If you have more than one disk drive connected to the SuperCard Pro board, then there will be two possible drive options (Drive 0 and Drive 1). It is possible to have Drive 1 without Drive 0, depending on your jumper setup and where your drive is located on the ribbon cable. Based on the Disk Type you have selected, certain image file formats will be available. Flux image files will always be available.

Target Device

The Target Device is where the Source Device info will be stored. This could be a floppy disk or an image file.

Disk Types

The Disk Types is the type of disk you will be copying/imaging. Select the type that matches your disk. This auto-fills in the information about the range of tracks.

Copy Mode

The Copy Mode is the method that will be used to copy or image a disk.

Index - uses the index pulse to capture a single revolution. Most all commercially produced disks can be copied/imaged using this copy mode.

Splice - uses an intelligent method to determine where the track start/stop is located. When imaging a disk, you can choose the number of revolutions to capture. This handy for 3rd party programs that analyze the disk format and create image files from the raw flux image. This copy mode is substantially slower, but provides a solution for tracks that were not written using the index mark when created.

Start Track / End Track

The start and end track sliders allow you to change the number of tracks that will be copied/imaged. Selecting a Disk Type will automatically fill in the standard number of tracks. Some copy protection schemes use extended tracks, so keep that mind.

Preservation

When Preservation is enabled (default=checked), the copier/imager preserves the exact flux data that is read from the original disk. When this option is unchecked, the flux data is slightly modified so that BZ type compression algorithms (7 zip, WinZip, etc.) can compress the image file significantly better, often times to just 5% of the original image size. This feature was created primarily for those wanting to use the image files with emulators, such as UAE/WinUAE. These emulators allow you to use compressed image files. So, a 13MB image file might only take up 1MB of disk space when compressed. By comparison, that same image created with Preservation enabled might be 3-4 times larger in size when compressed. The only benefit to turning off the Preservation option is reduce the compressed file size.

Although most of the time non-preserved image files will produce a working real disk (when writing the image back to disk), this is not the recommended method for making working backup disks. Instead, make images with the Preservation option checked and make backup disks from those images.

Wipe Tracks

There is an age-old discussion on whether or not it matters that a track is “erased” prior to writing to it. Technically, this is not required. However, in certain cases (especially with Blind Mode off), pre-erasing can insure that any unformatted sections of data will remain that way on a copy.

Half Tracks

When using certain 5.25” floppy disks (typically Apple II and Commodore 64) there is the ability to use half tracks. Half track support requires a 96 TPI floppy drive.

Backside

If you have a No-Flip (sometimes called “flippy”) modified disk drive, you can choose to copy/image the backside of a disk without removing it from the drive and flipping it over. Selecting this option forces the backside of a disk to be copied, ignoring the front side. This option is available only with 5.25” drives. **This feature is not currently implemented.**

Write Verify

You can choose to verify the data written to the track is identical to the data that was read. This can significantly increase the copying/imaging time because numerous writes and comparison reads are required. **This feature is not currently implemented.**

Override File

This option is only available when writing an image file to a disk or converting one image file format to another. If you enable this option, the Disk Type, Copy Mode, and track settings can all be changed from what the is contained in the image file. This lets you deliberately reduce the number of tracks that are copied/converted, change the copy mode, etc.

Load Image

This button loads an image file and fills in the settings (start track, end track, disk type, copy mode, etc.) based on the image's information. starts the copying/imaging process.

Start Copy/Make Disk/Create Image

This button starts the copying/imaging process. This button will change to reflect the current operation.

Status

The status box gives you information on the progress of your disk copying/imaging.

How to Copy / Image Disks

Drive to Drive copies are just a matter of selecting the Disk Type, setting the type of drive (if you are using a 5.25” drive), selecting the source and target drives, inserting the disk, and pressing Start Copy. Just follow the on-screen prompts to change the disk if necessary.

If you plan to make images of your disks for safe keeping, the process is the same as copying, except and image is selected as the Target Device.

Copying an image file back to disk is just a matter of setting the Source Device to image and the Target Device to your floppy drive.

The image conversion process varies, depending on the type of image file you are creating, but in general you select the Source Device to be one image file type and the Target Device to be another image file type. That's it!

Function: Analyzer / Editor

The analyzer / editor is a very complete disk analyzer and editor that can show data at the flux level, decoded level (FM, MFM, GCR), and data level (actual sector data). Due to the number of features of this function, this portion of the manual is still being written and will be added when it has been completed.

Function: Drive / Disk Utilities

The utilities are handy for helping you determine if your drive hardware and floppy disks you intend to use with SuperCard Pro are actually working.

A description of the various options are listed below.

Source Device

The Source Device is the floppy drive to use.

Start Track / End Track

The start and end track sliders allow you to change the number of tracks that will be used during the various tests. During the Alignment Mode the Start Track slider turns into the “Test Track” slider.
keep that mind.

Maximum Track Test

This test will determine the number of usable tracks that your floppy drive can use. This is a test of the drive's physical limit.

Disk Media Test

This is probably the most important feature in the testing suite. This test will determine if the floppy disk you want to use is good enough to hold magnetic data. You can adjust the start/end tracks (based on the maximum track test results). When an error occurs, a message is displayed with the option of re-trying, skipping, or quitting. This test does NOT lie! If the disk is reported as having bad tracks, then the disk is bad and should not be used!

Erase Disk

This is fast way to completely erase the surface of each track. You can adjust the start/end tracks (based on the maximum track test results).

Alignment Mode

This is a handy option if you are aligning the floppy drive head or just need to spin the floppy drive motor (like for cleaning the head). Once started, you can also move the head using the Test Track slider.