Card Duplicator

User Guide

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Revision 1.1

Document History

Revision	Date	By	Description	Released
1.0	10/08/2023	BM	First Release	Released
1.1	01/11/2023	BM	Replaced UPPER with LOWER on Page 6, List Item 4. Fixed minor formatting issues.	Released

Notices

Definition

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Table of Contents

1 Objective

This document describes the features of the Solid State Disks Ltd. (SSDL) Disk Duplicator and the user interaction required to control the duplication process.

The Card Duplicator allows the contents of a CF card used in a SSDL emulator to be copied, block-for-block and requiring only a single button press to operate.

There are two options for the number of blocks copied, either the full capacity of the Master CF card, or the number of blocks of the emulation that the Card Duplicator is set to.

This second option is not recommended unless the operator is familiar with setting and checking the emulation that the CopyStation is set to and can ensure that it matches that of the original Solid State Disks supplied emulator that the Target CF card was used in.

While some information on using this option is included in Section 4 on page 10, full instructions are beyond the scope of this document.

1.1 Prerequisites

There are several required and optional parts required to successfully use the Card Duplicator. These are listed below.

1.1.1 Required Parts

- SSDL Card Duplicator.
- 110/240V Power cord.
- 1x CF card containing the Master Copy of the data.
- 1x or more Target CF cards.

Note: This is a data destructive process that will overwrite the Target CF card contents.

Note: The Target CF card (the one in the upper slot) must have the same or greater number of blocks than the Master CF card. Be aware that different models of CF card that claim to be a particular GB capacity may differ in capacity by several MB.

It is highly recommended that only SSDL supplied CF cards are used as other card types are not guaranteed to operate correctly in the Card Duplicator or in an SSDL emulator.

1.1.2 Optional Parts

- PC or Laptop with the Tera Term terminal emulator program loaded.

- This requires adjusting the terminal emulator settings to match those of the Card Duplicator. To assist with this SSDL can supply a .INI file to load when Tera Term is started.

- USB cable to connect the PC/Laptop to the Card Duplicator's Type-A USC Connection.
  - The cable must have a USB Type-A connector on one end and a USB connector that matches the PC/Laptop on the other.

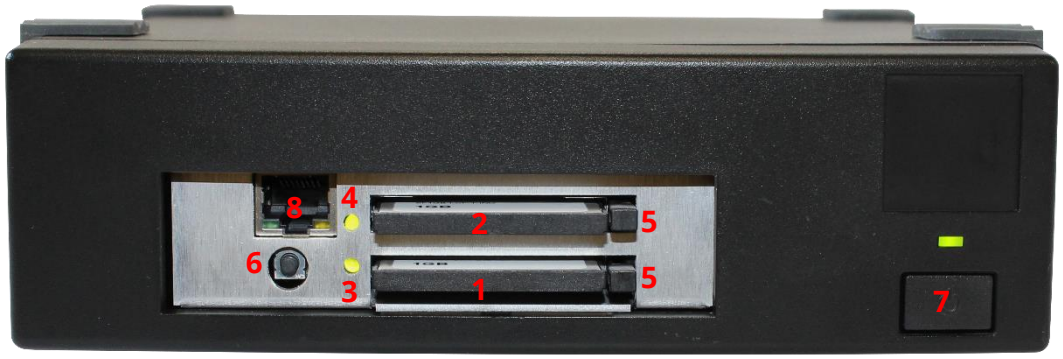
The optional parts allow the progress of the duplication process to be monitored and the emulation that the unit is set as to be modified. For normal operation it is recommended to that only the required parts are used.

2 Card Duplicator Features

The images below show the front and rear of a Card Duplicator unit, highlighting the main features, not all of which are used during the CF card duplication process.

The unit has 2 CF card slots, each with an associated indicator LED. Both slots are fitted with a CF card ejector.

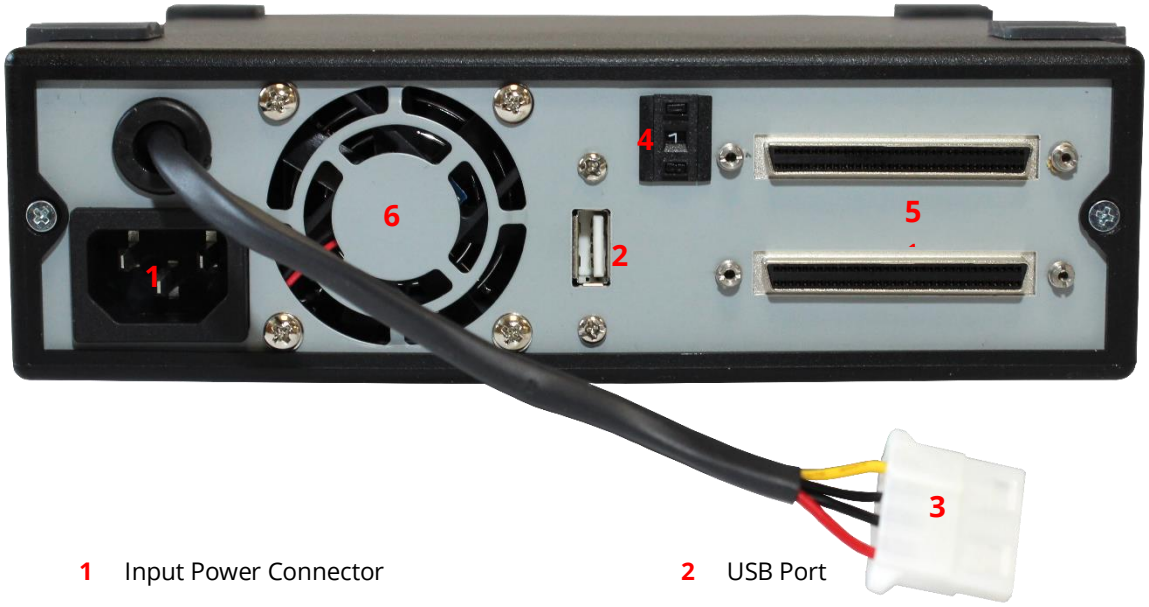
The image below shows the front panel of the unit. The key parts are numbered and described in the table below the image.



1	Lower CF (Master) card slot	2	Upper CF (Target) card slot
3	Lower LED Indicator	4	Upper LED Indicator
5	CF card Ejectors	6	Control Push Button
7	Power Button	8	Ethernet Port (not used)

FIGURE 1 CARD DUPLICATOR FRONT

Error! Reference source not found. The image below shows the rear panel of the unit. T he key parts are numbered and described in the table below the image.



1	Input Power Connector	2	USB Port
3	5/12V Output Supply (not used)	4	SCSI ID Selector (not used)
5	2x 68-way HD SCSI Connectors (not used)	6	Internal Cooling Fan

FIGURE 2 CARD DUPLICATOR REAR

3 Operation

This section details how to operate the Card Duplicator to create block-for-block copies of a Master Image stored on a CF card onto another, Target, CF card. Refer to Figure 1 above to identify which slot is the Master and which is the Target.

The Target CF card should have an equivalent or larger storage capacity than the Master CF card. The only exception to this is if an emulation, rather than the full media backup is being performed. In this case the Target CF card has to match or be greater than the emulation size.

While the procedure is simple, as this operation will destroy the data on the Target CF card. It is important to have read and understood the instructions fully before proceeding.

1. Remove any CF cards inserted in the two CF card slots.
2. The unit should be placed on a flat stable surface and connected via the power cord to a suitable 110/240V outlet (autosensing).
3. Press the power button on the front of the unit to turn it on.
    1. Both LEDS -> Flashing RED (1Hz).
4. Insert the CF card containing the MASTER copy of the data into the LOWER CF card slot.

1. Lower LED -> Solid GREEN

5. Insert a TARGET blank CF card of sufficient capacity into the UPPER CF card slot.
    1. Upper LED -> Solid AMBER

The Card Duplicator is now ready to start a duplication operation.

6. There are 2 options for the duplication operation
    a. To duplicate the **complete media** of the Master CF card in the lower slot, press then quickly Release the Push-Button.
        - Botton LED -> Flashing GREEN
        - Upper LED -> Solid GREEN, with regular very short flashes of AMBER.
    b. To duplicate only the **capacity of the DEVICE** that the Card Duplicator is set to emulate, Press and hold the Push-Button for greater than 5s before releasing it.
        - Both LEDS -> Solid AMBER while the button is pressed and after 5s:
            - Lower LED -> Solid GREEN and after the Push-Button is released:
                - Lower LED -> Flashing GREEN
                - Upper LED -> Solid GREEN, with regular flashes of AMBER.
7. When the duplication operation is completed both the Lower and Upper LEDs will be solid GREEN to indicate the operation completed successfully.
    a. If there was an error during the duplication, the Upper LED will instead be RED'

Note: Option 6.b is only recommended for advanced users who understand how to adjust SSDL emulator settings using Tera Term serial commands.

When the duplication operation is completed, remove the target CF card by pushing on the upper CF slot Ejector. The upper LED will flash RED when this is done.

It is recommended that the CF card is marked to indicate the contents and placed into a CF card case.

Another copy can be made in the same manner by inserting a new Target CF card and repeating step 6 above.

3.1 LED Behaviour

This table shows the what LED states will display when the SSDL Duplicator is in each of the possible operational states.

The table on the next page shows the behaviour of the LEDs in the various conditions that the unit can be in.

Some LED States are highlighted in either light Green or light Orange. The meaning of these are:

- LED States highlighted in light Green are ones that indicate a valid copy command was requested and is executing.
- LED States highlighted in light Orange are ones that result from attempting an invalid copy command.

Legend

LED State	Description
A	Solid Amber
G	Solid Green
FA	Flashing Amber
FG	Flashing Green
FR	Flashing Red
FAR	Flashing Amber/Red
FGA	Flashing Green/Amber 50/50
FGAF	Flashing Green/Amber 90/10

State	Button Press	CF Bottom	CF Top	Emulation Size	LED State Bottom	LED State Top	Comment
0	X	Not Fitted	Not Fitted	X	FR	FR	
1	X	Fitted	X	X	G	FR	
2	X	X	Fitted	X	FR	A	
3	X	4GB	4GB	4.5GB	G	FA	Possible to copy Bottom Card capacity, but not Emulation capacity
3a	Short				FG	FGA	Copy of **Bottom Card** starts
3b	Long				G	FR->FA	No copy activity occurs
3c	End				G	G	Successful completion. Button disabled till CF card removed and replaced
4	X	4GB	8GB	4.5GB	G	FA	Possible to copy Bottom Card capacity, but not Emulation capacity
4a	Short				FG	FGA	Copy of **Bottom Card** starts
4b	Long				G	FR->FA	No copy activity occurs
4c	End				G	G	Successful completion. Button disabled till CF card removed and replaced
5	X	8GB	4GB	2.1GB	G	FA	Possible to copy Emulation capacity, but not Bottom Card capacity
5a	Short				G	FR->FA	No copy activity occurs
5b	Long				FG	FGAF	Copy of **Emulation** starts
5c	End				G	G	Successful completion. Button disabled till CF card removed and replaced
6	X	8GB	4GB	4.5GB	G	FAR	No copy operation possible - can copy NEITHER CF nor Emulation capacity
6a	Short				G	FAR	No copy activity occurs
6b	Long				G	FAR	No copy activity occurs
6c	End				X	X	No copy operation is started, so can not end
7	X	8GB	8GB	4.5GB	G	A	Possible to copy both Bottom Card and Emulation capacity
7a	Short				FG	FGA	Copy of **Bottom Card** starts
7b	Long				FG	FAGF	Copy of **Emulation** capacity starts
7c	End				G	G	Successful completion. Button disabled till CF card removed and replaced

4 Advanced Operation

This section describes how to use the optional items listed in Section 1.1.2 on Page 4. This is only recommended for these with prior experience of adjusting SSDL emulator settings.

WARNING: Incorrectly configuring the emulation can result in the duplication process creating non-identical images. It is highly recommended these features are only used by users familiar with configuring SSDL emulators.

4.1 Connection to Tera Term

The Card Duplicator is connected to a PC running a correctly configured Tera Term session via the USB Type-A port on the rear of the unit.

With the unit connected via USB and powered on, start the Tera Term utility on the PC/Laptop.

Load the .INI file supplied by navigating to menu item Setup->Restore Setup and navigate to the location that the .INI file supplied by SSDL was stored and select it.

To check that the connection is working, with the Tera Term window selected press the return key and a > prompt should be displayed.

4.2 Monitoring the Duplication Process

To monitor the progress of a duplication operation, simply start the duplication as described in section 3 on Page 6.

The Tera Term window should display the number of blocks being duplicated then start to display the progress of the update, showing % complete, elapsed time and estimated time to completion as shown in the image below.

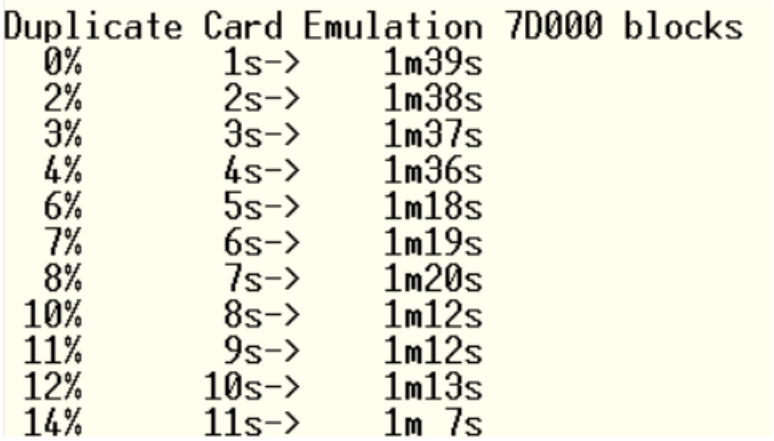


FIGURE 3 PROGRESS OF COPY OPERATION

4.3 Adjusting the Emulation

This feature is of use when the DEVICE emulation that the SSDL emulator is set to has a much smaller capacity than the CF card that the image is stored on.

The emulation set should match that of the SSDL emulator that the Master CF card was created in.

It can also allow the image to be transferred to a smaller capacity CF card, though this should be done with care.

How this is achieved is beyond the scope of this document.

4.4 SYSTEM Command Usage

There are a number of features that the SCSI Flash supports beyond simple emulation.

In addition to device emulation the firmware loaded onto the Card Duplicator has the capability of both the duplication operation documented here and to act as a SSDL CopyStation, allowing the contents of a SCSI device to be copied, block for block, to a CF card.

To switch between the Duplicator and CopyStation modes of operation, the SYSTEM command should be issued with the MCOPY parameter and ENABLE or DISABLE.

Note: Although the CopyStation and Duplicator capabilities are present in the firmware, whether they are allowed to operate is controlled by a factory setting that cannot be field upgraded. Thus the features that are required must be requested when ordering.

When the MCOPY feature is Enabled, the Duplicator mode is active, when Disabled, the CopyStation mode is active. The 4 images below show how the setting is inspected and changed.

```
>SYSTEM
HOTBACKUP Disabled
FSZERO Disabled
MCOPY Disabled
```

FIGURE 6 DISPLAYING THE OPTION SETTINGS - COPYSTATION MODE ACTIVE

```
>SYSTEM MCOPY ENABLE
MCOPY Enabled
```

FIGURE 5 ENABLING THE DUPLICATOR MODE

```
>SYSTEM
HOTBACKUP Disabled
FSZERO Disabled
MCOPY Enabled
```

FIGURE 4 DISPLAYING THE OPTION SETTINGS - DUPLICATOR MODE ACTIVE

```
>SYSTEM MCOPY DISABLE
MCOPY Disabled
```

FIGURE 7 DISABLING THE DUPLICATOR MODE