DLP® Products Technical Advisory

1 DMD Block Lock Issue With DLPC900

Reference Documents:

- DLPC900 Digital Controller
- DLPC900 Programmers Guide
- DLPR900 - DLPC900 Configuration and Support Firmware

1.1 Purpose

The purpose of this technical advisory is to inform DLPC900 Controller customers that DLP6500B and DLP9000B DMDs (Revision B DMDs only) may, at very small occurrence rates, incur one or more reset blocks of micromirrors unable to change states during operation. The "locked block" of micromirrors is only recoverable by Parking and un-Parking the DMD.

1.2 Statement of Issue

When using the DLPC900 controller with the DLP6500B(FYE & FLQ) or the DLP9000B DMD, occasionally a block may be observed on the DMD that becomes unresponsive to further image data loads and mirror resets after switching between different display modes or from Standby mode to Normal mode. This can occur after any of the following operations:

- Switch from any Display Mode to any other Display Mode (Video Mode, Pre-stored Pattern Mode, Video Pattern Mode, & Pattern On-the-Fly Mode)
- Power-up and HW Reset Initialization (PWRGOOD low-high transition) if the batch file stored in the firmware contains a Display Mode switch command.
- Software reset (Power Mode = 2) if the batch file stored in the firmware contains a Display Mode switch command.
- Standby (Power Mode =1) to Normal (Power Mode = 0)

At very small occurrence rates, the above operations may cause one or more DMD reset block(s) to be internally hardware parked by the DMD with the resulting block remaining unresponsive to further image data loads and mirror resets.

1.3 Facts

DLPC900 firmware (DLPR900) versions 4.0, 4,1, 4,2, and 5.0.0 are affected. TI has been able to reproduce this issue in the ways listed in the Statement of Issue. This issue is NOT a DMD issue. This issue is generated by the DLPC900. When the issue occurs, it can be seen on :

- Any single reset block on the DMD.

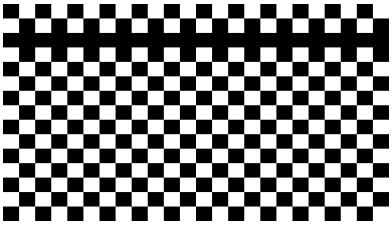

Figure 1. Example of Single Block Issue

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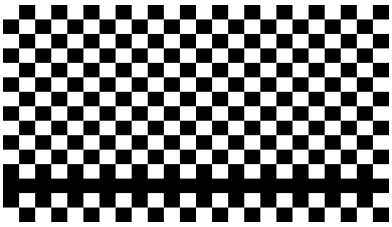

Figure 2. Example of Different Single Block

- Multiple blocks on the DMD. This affects blocks in “quad” reset groups. It can occur on one or more of the “quad” reset groups (i.e. ¼, ½, ¾, or all of the DMD).

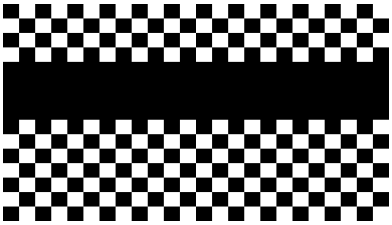

Figure 3. Example of Single Quad Block Issue

Figure 4. Example of Multiple Quad Blocks

1.4 Affected Products

Table 1. Controllers, DMDs, and Software Versions

Controller	DMD used with the Controller	Affected DLPC900 Firmware Versions
DLPC900	DLP6500BFYE	v4.0, v4.1, v4.2, and v5.0.0
DLPC900	DLP6500BFLQ	v4.0, v4.1, v4.2, and v5.0.0
DLPC900	DLP9000B	v4.0, v4.1, v4.2, and v5.0.0

2 Recommended Customer Action

At this time, TI is recommending a workaround to remedy this issue through customer software changes.

2.1 Workaround Instructions

Here are the instructions to ensure proper operation after any of these four operations:

- **Any Display Mode Change**: After any display mode change using the DISP_MODE command, the DMD must **immediately** be Parked and then unParked. An example is shown as:
  - DISP_MODE = 0x01 or 0x02 or 0x03
  - PARK = 0x01
  - PARK = 0x00

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- Power-up and HW Reset **(PWRGOOD low-high transition)**: After a Power-up and/or HW Reset, when changing the Display mode either through batch file or through external SW command, the DMD must **immediately** be Parked and then unParked. An example is shown as:
  - DISP_MODE = 0x01 or 0x02 or 0x03
  - PARK = 0x01
  - PARK = 0x00

- Software Reset **(Power Mode = 2)**: After a Software Reset, when changing the Display mode either through batch file or through external SW command, the DMD must **immediately** be Parked and then unParked. An example is shown as:
  - DISP_MODE = 0x01 or 0x02 or 0x03
  - PARK = 0x01
  - PARK = 0x00

- Standby to Normal Transition **(Power Mode = 1** followed by **Power Mode = 0)** : After a Standby to Normal transition, the DMD must **immediately** be Parked and then unParked. An example is shown as:
  - PARK = 0x01
  - PARK = 0x00

NOTE: The software Park command does not exist on version 4.0 - therefore, this workaround cannot work on version 4.0.

This workaround requires DLPC900 firmware version 4.1 or greater. Version 4.2 or higher is strongly recommended.

2.2 Workaround Batch File example

Pre-stored Pattern Mode (embedded in firmware)

- DISP_MODE: 0x01 */ switch to pre-stored pattern mode
- DMD_PARK: 0x01 */ send the DMD Park command
- DMD_PARK: 0x00 */ send the DMD Unpark command

These commands must be followed by the MBOX_DATA, PAT_CONFIG commands that correspond to the pattern set stored in flash memory followed by the PAT_START_STOP: 0x2 to start the pattern sequence running.

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