User Manual

DA16200 and DA16600 Multi-Downloader Tool

UM-WI-039

Abstract

This User Manual explains how to setup and use the Multi-Downloader for DA16200 and DA16600.

Contents

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1 Terms and Definitions

AT	Attention
NVRAM	Non-volatile random-access memory
OS	Operating System.
PC	Personal Computer
RAM	Random-Access Memory
RS232	Recommended Standard 232
RTOS	Real Time Operating System
SDK	Software Development Kit
SFDP	Serial Flash Discoverable Parameter
UART	Universal Asynchronous Receiver Transmitter

2 References

[1] DA16200, Datasheet, Renesas Electronics

[2] UM-WI-046, D16200 FreeRTOS SDK Programmer Guide, User Manual, Renesas Electronics

[3] UM-WI-056, DA16200 DA16600 FreeRTOS Getting Started Guide, User Manual, Renesas Electronics

3 Introduction

The Multi-Downloader is used to write the DA16200/DA16600 images to the flash IC through the UART interface of the RS232 port between the DA16200/ DA16600 and laptop. And it can download the images to multiple devices at the same time.

4 Multi-Downloader

4.1 Requirements

The following PC environment is recommended for proper operation of the Multi-Downloader:

- Operating system: Windows 7 and Windows 10
- Minimum RAM: 8 GB
- Minimum processor: Intel Core i5
- Note: Windows does not support file path over 260 lengths. Therefore, the absolute path of all files including images and logs must be within the maximum.

4.2 Main Screen

Figure 1 shows the main screen of Multi-Downloader. It has the following menus and options:

- **Setting**: This selects the module type, images, starting address, and size
- **Read Version**: This shows SDK version after all images are downloaded
- **NVRAM Init**: This initializes NVRAM if needed
- **Terminal Number**: This value activates the terminal box by the number. The maximum value is 16
- **Download**: This initiates the download for downloading the images to the device
- **Console**: This opens a console with basic functions
- **Elapse Time**: This shows the running time from start to end while downloading
- **Count**: This shows a count of the download operation
- **Terminal Box**: This is activated according to the value of the terminal number. The check box and port must be selected to download. The status and progress are shown while downloading

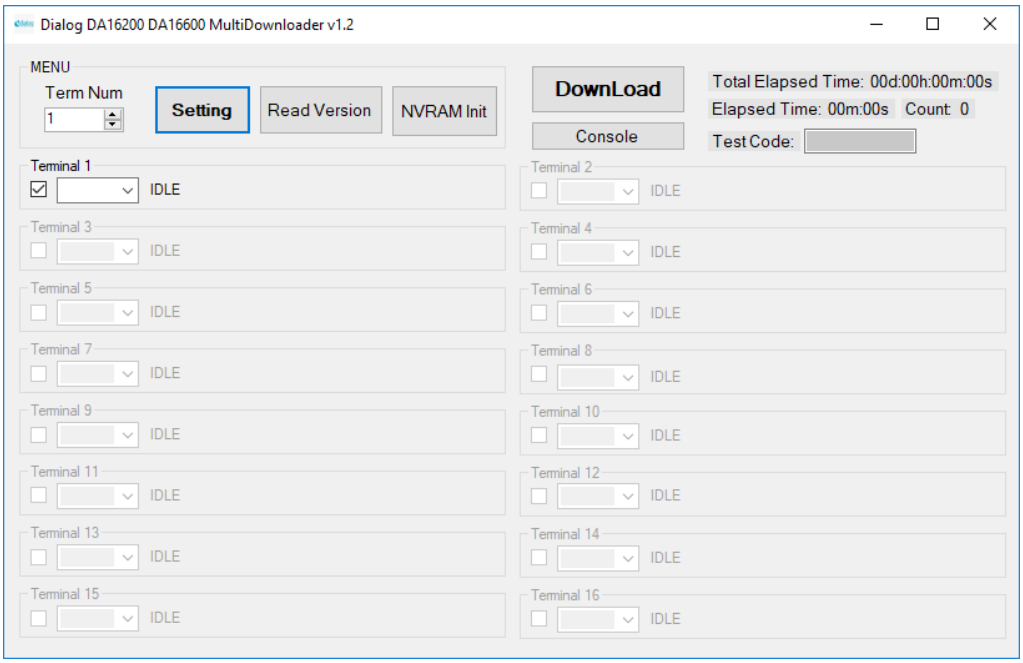

Figure 1: Main Screen

The images can be downloaded by drag-and-drop to the main screen. The string "BOOT", "RTOS", "SLIB", "DATA1" and "DATA2" of file name would identify the image type automatically at drag-and-drop operation which does not support RTOS2 and SLIB2 image type.

4.3 Setting

Figure 2 shows the setting of the Multi-Downloader. It has image selection and operation with the setting file.

4.3.1 Image Selection

The images can be selected by double clicking the box of each image path or drag-and-drop. The string "BOOT", "RTOS", "SLIB", "DATA1" and "DATA2" of file name would identify the image type automatically at drag-and-drop operation which does not support RTOS2 and SLIB2 image type.

- **OS**: This selects OS version of the images.
- **Module**: This selects module type. The address and size are changed automatically according to this selection. But all values can be changed manually. The predefined bootloader image is used in case of DA16600. The default is non-module type.
- **Flash type**: This selects the actual flash size used in the image. This changes the address and size automatically according to the selection. But it can also be changed manually.
- **Erase Flash**: This erases the flash from start address to end address.
- **SFLASH_#0 image**: This selects image files and checkbox for downloading to boot index 0.
  - **BOOT**: This selects the bootloader image including SFDP - the flash memory type information. This image must be loaded before successfully downloading the other images. The name is like DA16200_BOOT_GEN01-01-XXXX-000000_ W25Q32JW.img.
  - **RTOS1**: This selects the main image. The name is like DA16200_RTOS_GEN01-XX-YYYY-ZZZZZZ.img.
  - **SLIB1**: This selects system library image. The name is like DA16200_SLIB_GEN01-XX-YYYY-ZZZZZZ.img.

- **SFLASH_#1 image**: This selects image files and checkbox for downloading to boot index 1. It may not be needed necessarily if normal operation with #0 image is enough. RTOS2 and SLIB2 images can be selected.
- **BLE image**: This selects BLE image for DA14531 in DA16600 module. The name is like da14531_multi_part_proxr.img
- **DATA image**: This selects any data image with any address and size.
- **Options**
  - Reboot After Download: This will reboot the devices automatically after download is complete.
  - Change BOOT index (0 or 1): This will change the boot index of the device.

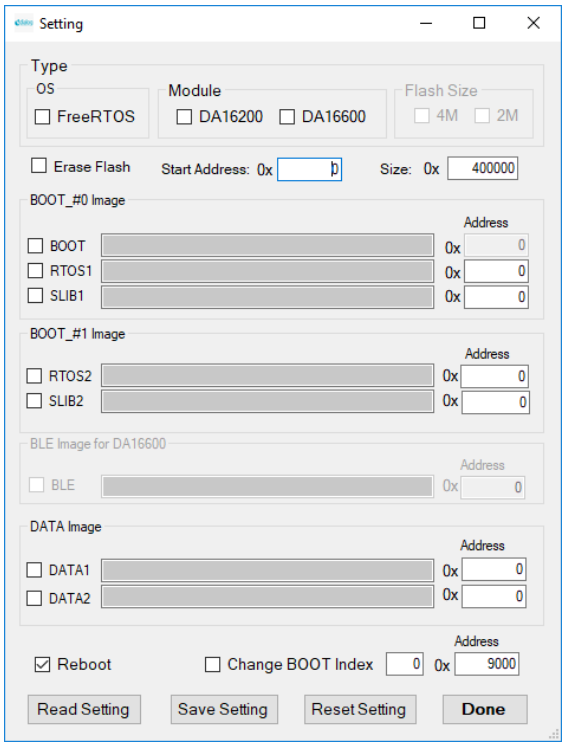

Figure 2: Setting

4.3.2 Setting File

Predefined setting values can be read and saved. Figure 3 shows an example file. Each content is separated with '|'. The setting file (settings.txt) must be located on the same folder of multi-downloader executable file. The setting values in the file are as follows

- Port setting: The port name of main screen is selected automatically if the defined name in the setting file exists in the device manager of Windows. The name of 16 ports can be defined.
- OS type: FreeRTOS or ThreadX can be set.
- Module type: NONE, DA16200, or DA16600 can be set.
- Flash size: 4M or 2M can be set.
- Each image path, start address, and size: The information of the images can be set.

```
|COM48|||||||||||||||
|FreeRTOS| //OS : FreeRTOS, ThreadX
|DA16600| //Module : NONE, DA16200, DA16600
|4M| //Flash Size : NONE, 4M, 2M
|D:\Project\WIFI\sdk\FreeRTOS\DA16600_SDK_FreeRTOS_v3.1.0.0\img\DA16600_FBOOT-GEN01-01-14128-000000_W25Q32JW.img|0| // |PATH|START ADDR| for SFLASH_#0_BOOT
|D:\Project\WIFI\sdk\FreeRTOS\DA16600_SDK_FreeRTOS_v3.1.0.0\img\DA16600_FRTOS-GEN01-01-14587-000000.img|23000| // |PATH|START ADDR| for SFLASH_#0_RTOS
||18a000| // |PATH|START ADDR| for SFLASH_#0_SLIB
||1e2000| // |PATH|START ADDR| for SFLASH_#1_RTOS
||380000| // |PATH|START ADDR| for SFLASH_#1_SLIB
|D:\Project\WIFI\sdk\FreeRTOS\DA16600_SDK_FreeRTOS_v3.1.0.0\img\da14531_multi_part_proxr.img|3ad000| // |PATH|START ADDR|forBLE
||3bd000| // |PATH|START ADDR| for DATA1
||3bd000| // |PATH|START ADDR| for DATA2
```

Figure 3: Setting File

4.3.3 Menu Selection

- Read Setting: This reads values from setting file and fills the values to the forms.
- Save Setting: This saves all values of the forms to the setting file.
- Reset Setting: This resets all values to default values.
- DONE: All information is kept and used for download.

4.4 Run Multi-Downloader

4.4.1 Select Port Number

The number of connected devices must be selected. Figure 4 shows three ports selected, and three terminal boxes activated.

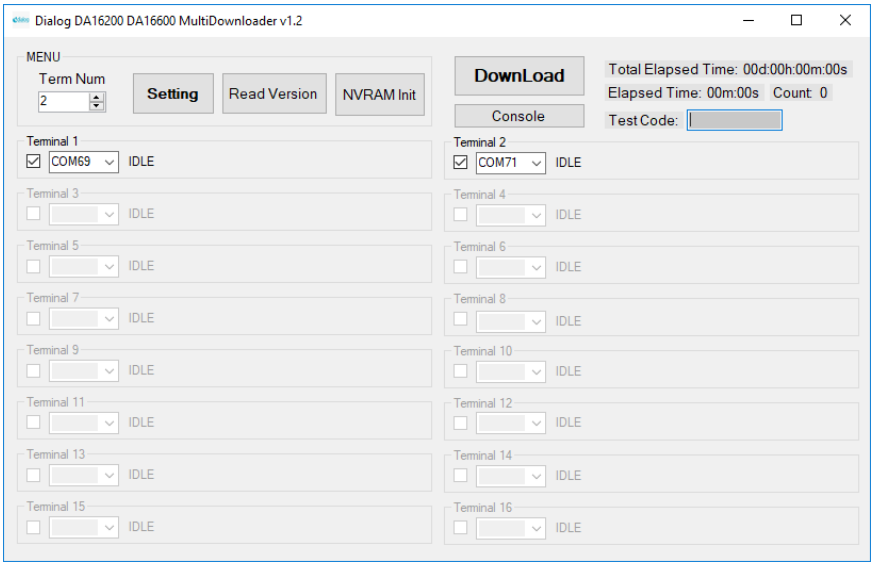

Figure 4: Port Selection

4.4.2 Select Images, Address, and Size

The images, address and size are selected in “Setting”. Figure 5, Figure 6, and Figure 7 show examples of image selection of DA16600, DA16200 and a non-module type. These values could be also set by reading the information from the “Setting” file.

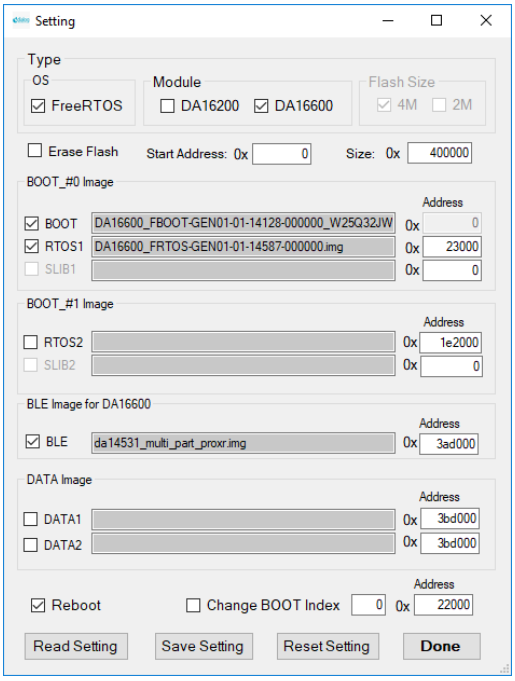

Figure 5: Setting for DA16600 Module

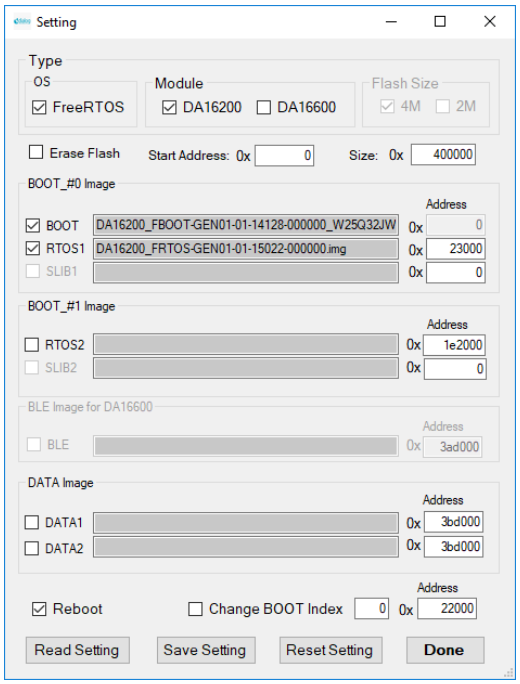

Figure 6: Setting for DA16200 Module

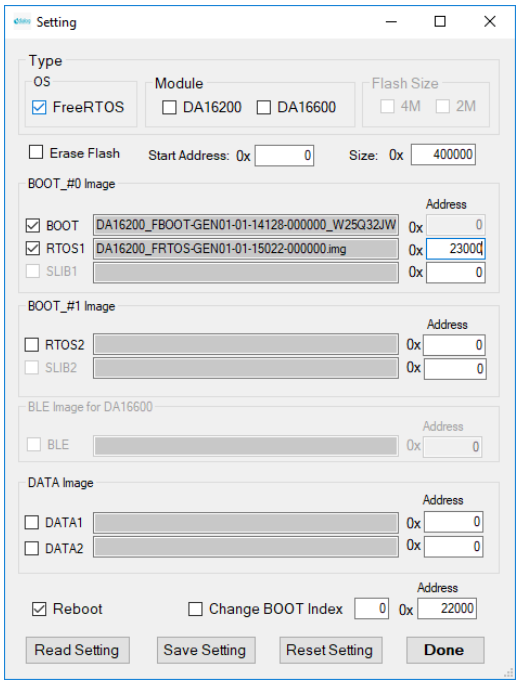

Figure 7: Setting for Non-module Type

4.4.3 Download

The download button initiates download. The status and progress of each terminal for downloading is shown in Figure 8. Figure 9 shows a successful download without any error. If there is any error, the failure number is shown as in Figure 10. The status of the device or connection should be checked in case of failure.

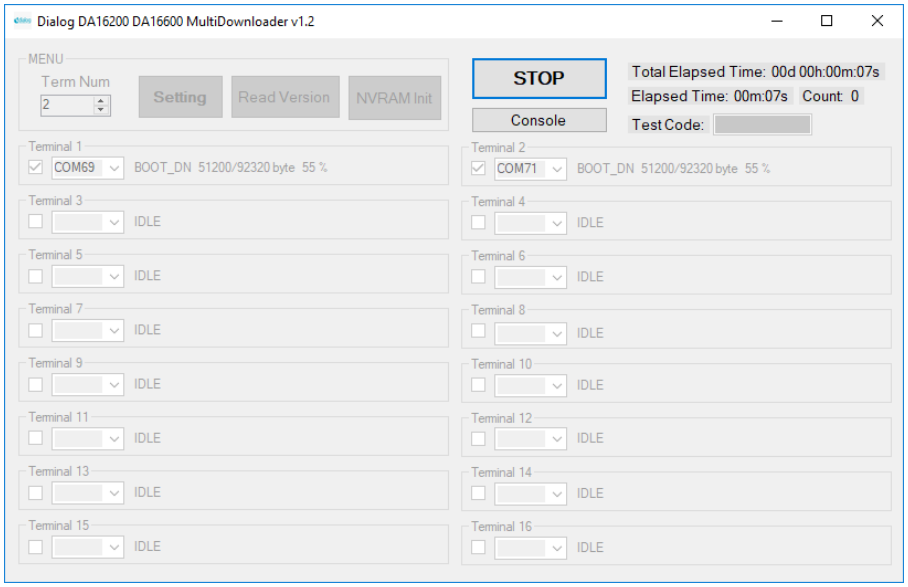

Figure 8: State and Progress While Downloading

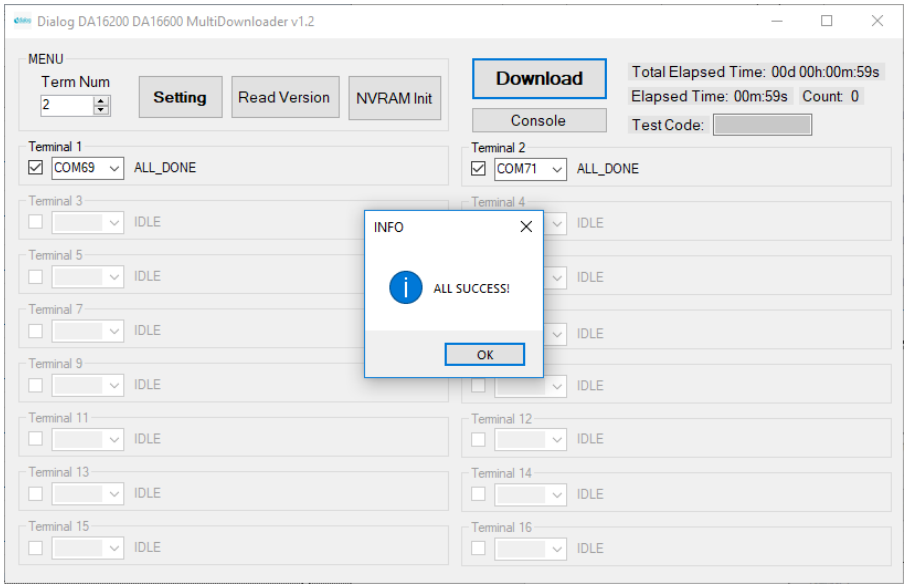

Figure 9: Completed Screen with No Error

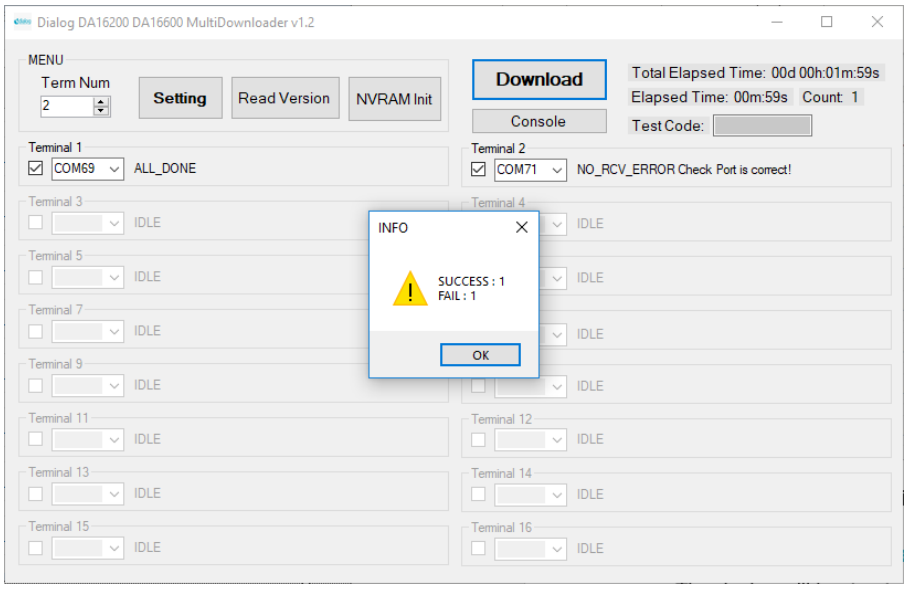

Figure 10: Completed Screen Showing One Failure

4.4.4 Read SDK Version

The device will boot automatically after download is complete. Read Version will show the SDK version of the running image through AT command communication. Figure 11 is a success case and Figure 12 is a failure case. The status of the device or connection should be checked in case of failure.

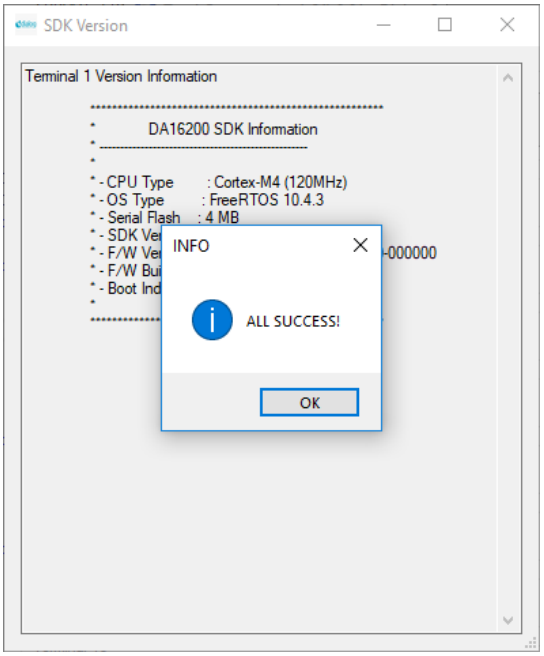

Figure 11: Read Version with Success

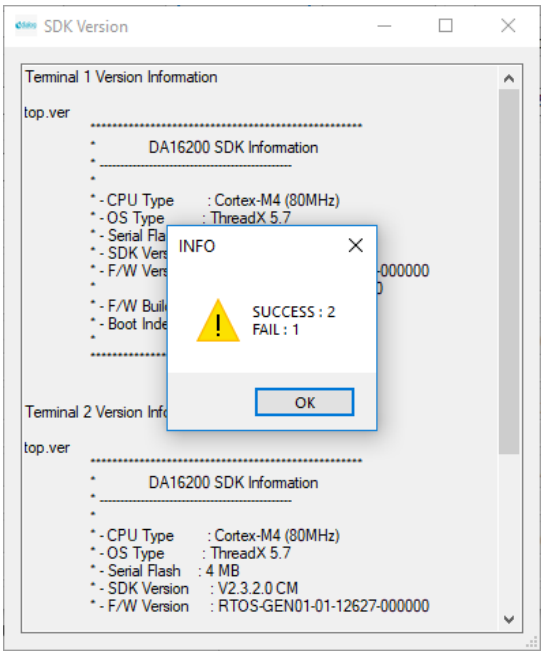

Figure 12: Read Version with Failure

4.4.5 Initialize NVRAM

NVRAM Init will initialize NVRAM through AT command communication. Figure 13 is a success case and Figure 14 is a failure case. The status of the device or connection should be checked in case of failure.

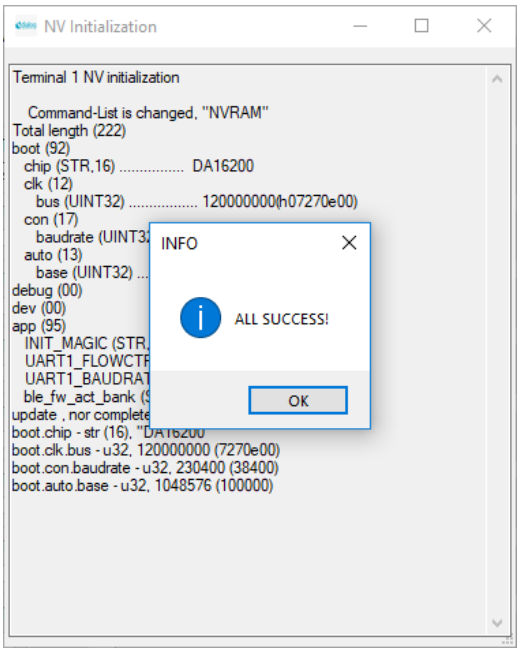

Figure 13: NVRAM Initialization with Success

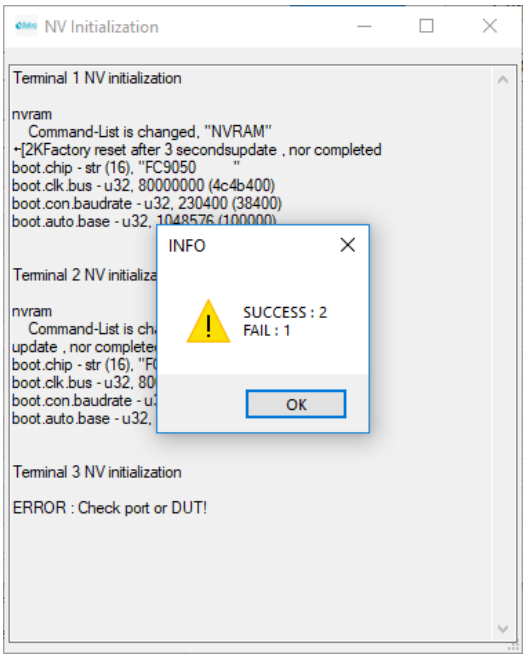

Figure 14: NVRAM Initialization with Failure

Appendix A Log Option

If there is any problem with this tool, log could help to fix it. The log is activated with input "logon" to the text box of version information as shown in Figure 15. A log file for each terminal is generated in the same folder of the multi-downloader executable file. The file name is MD_Log_<terminal number>.txt. The log is deactivated with input "logoff". The letter 'L' to the right of the text box means the log is enabled (see Figure 15).

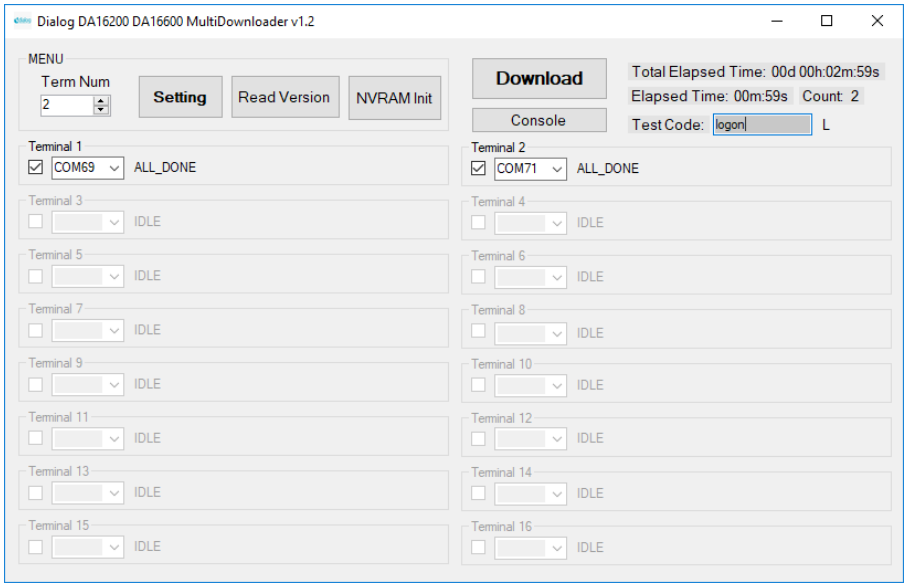

Figure 15: Log Activation

Appendix B Console Functionality

There is a console function in the multi-downloader. The “Console” screen can be shown to maximum 16 independent windows. Figure 16 is an activated console window. The port must be selected and opened. Then command can be input and any message from the connected device is shown. Figure 17 is the screen with messages from the device. The text box on the right of the window is a command history. The function of each button for the command history is as follows:

- **Add**: Add command of input box to the command history.
- **Delete**: Delete the selected command in the command history.
- **Delete all**: Delete all commands in the command history.
- **Copy all**: Copy all commands to Windows clipboard.
- **Load**: Load the commands from the file which have predefined commands.
- **Save**: Save the command history to a file.

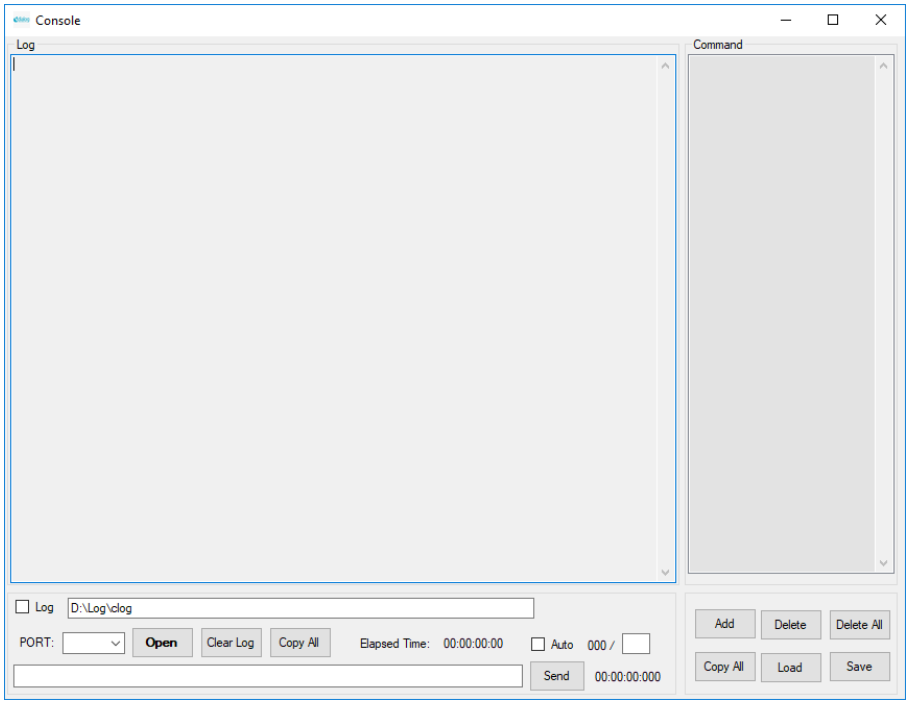

Figure 16: Console Screen

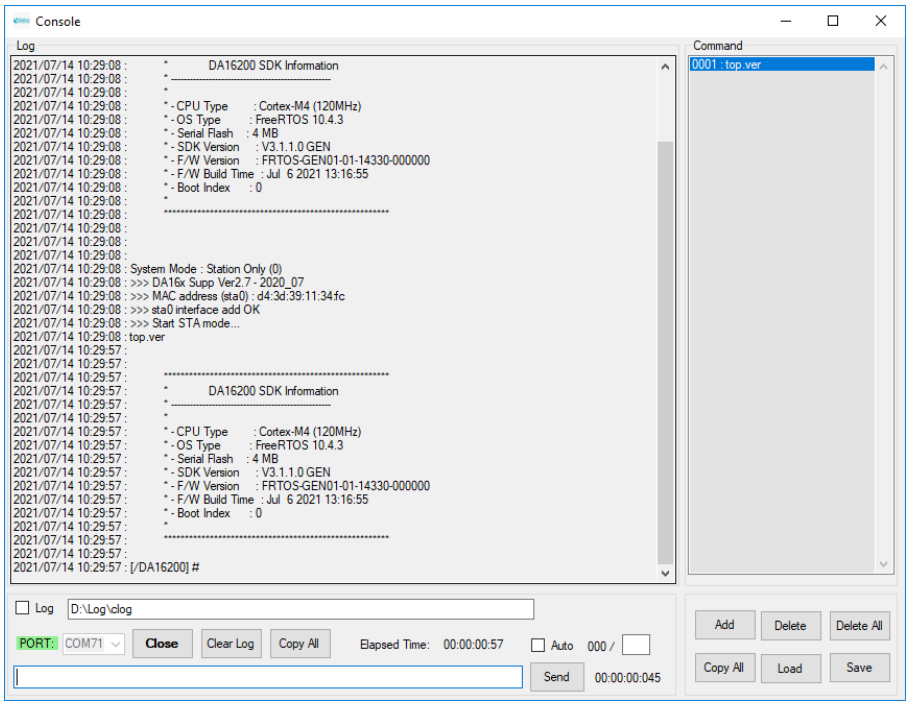

Figure 17: Screen with Messages

Revision History

Revision	Date	Description
1.3	30-Jun-2023	Updated reference and styles
1.2	26-Oct-2022	● Support FreeRTOS SDK ● Support flash erase ● Removed auto selection of bootloader for DA16600 module ● Added a detection function of flash ID in flash IC, bootloader and SFDP of RAM
1.1	28-Mar-2022	Updated logo, disclaimer, and copyright.
1.0	05-Jan-2020	First Release

Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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