

GigaDevice Semiconductor Inc.

Arm[®] Cortex[®]-M3/4/33 32-bit MCU

应用笔记

AN034

目录

目录.....	2
图索引.....	3
表索引.....	4
1. 简介.....	5
2. USB Host IAP 描述	6
2.1. 文件介绍.....	6
2.2. 使用说明.....	6
3. 用户定义.....	8
4. USB Host IAP 操作选项	10
4.1. 下载.....	11
4.2. 上传.....	12
4.3. 跳转.....	13
5. 历史版本.....	14

图索引

图 2-1. IAP 执行流程.....	6
图 3-1. APP 的 Flash 起始地址.....	8
图 3-2. 芯片的 Flash 分配.....	8
图 4-1. IAP 识别到 U 盘.....	10
图 4-2. IAP 选项.....	10
图 4-3. IAP 下载流程.....	11
图 4-4. IAP 上传流程.....	12
图 4-5. IAP 跳转流程.....	13

表索引

表 2-1. USB Host IAP 包含的文件.....	6
表 5-1. 版本历史	14

1. 简介

在许多应用场景中，都需要使用程序的更新升级，以此来更新功能或者修复已知的问题。一般的通信协议都可以用来实现 IAP (in-application programming) 升级，USB 既可以作为设备，也可以作为主机，并且都可以用来实现 IAP 的升级。而 USB 作为主机进行 IAP 升级拥有一个其他通信协议不具有的优势，即 USB Host IAP 可以不需要电脑上位机的协助，仅需要一个移动存储设备（如 U 盘）就可以实现。

2. USB Host IAP 描述

2.1. 文件介绍

除了库包含的文件之外，USB Host IAP 例程包含如下几个文件：

表 2-1. USB Host IAP 包含的文件

文件名称	功能描述
main.c	包含 USB 主机的初始化、主机状态机执行、判断是否进入 IAP 模式
usbh_usr.c	包含用户回调接口和 LCD 显示数据
gd32f4xx_it.c	包含中断服务程序
command.c	包含 IAP 实现的命令（下载、上传、跳转）
flash_layer.c	用来操作 GD32 的 Flash

2.2. 使用说明

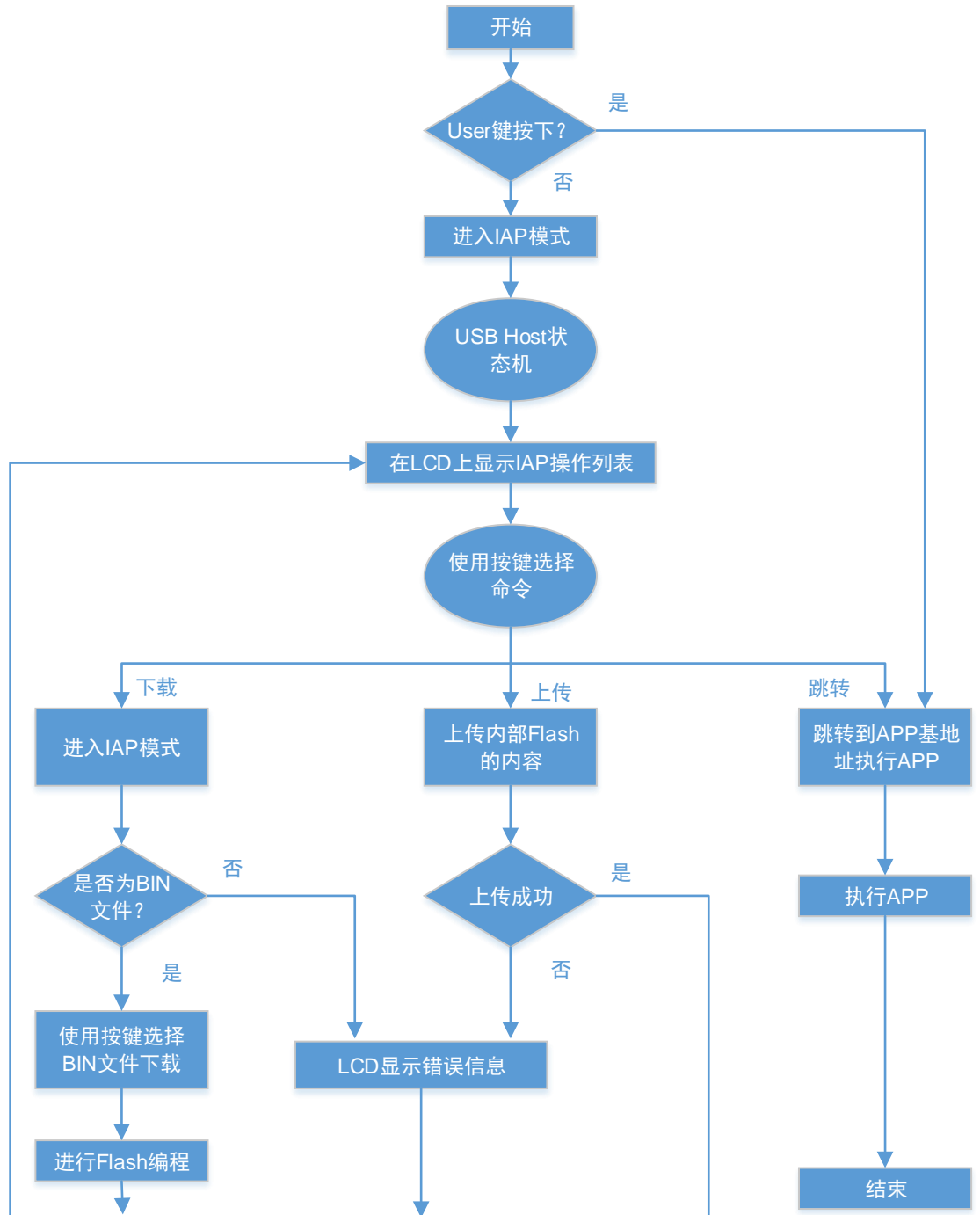
使用我们 GD 配套的 USB Host IAP 例程，编译之后，可以通过 Jlink 或者 GDLink 下载到对应的开发板上，也可以生成 BIN 文件后，通过 ISP 下载。

下载到开发板之后，可以在开发板上的 LCD 屏幕上看到相应的信息，根据 LCD 上的提示来操作。另外需要准备一个 U 盘，将待升级的 BIN 文件复制到 U 盘中。

芯片上电后，默认执行 IAP 代码，如果已经成功下载了 APP 代码，可以通过上电时按下 User 键不放，来进入 APP 执行。在进入 IAP 代码后，同样可以通过 Jump 命令来跳转到 APP 执行。

IAP 程序执行流程如下图所示：

图 2-1. IAP 执行流程



3. 用户定义

用户可以定义 APP 的起始地址，具体配置选项如下所示：

1. 在 IAP 程序中，设置 Flash 的 page 大小、Flash 大小、IAP 空间大小和 APP 程序起始地址。

```
#define PAGE_SIZE          ((uint16_t)0x800)      /* 2K Bytes */
#define FLASH_SIZE        ((uint32_t)0x300000)   /* 3M Bytes */
#define IAP_SIZE          ((uint32_t)0x20000)    /* 128K Bytes
as IAP size */
#define APPLICATIONADDRESS ((uint32_t)0x08020000) /* User
start code space */
```

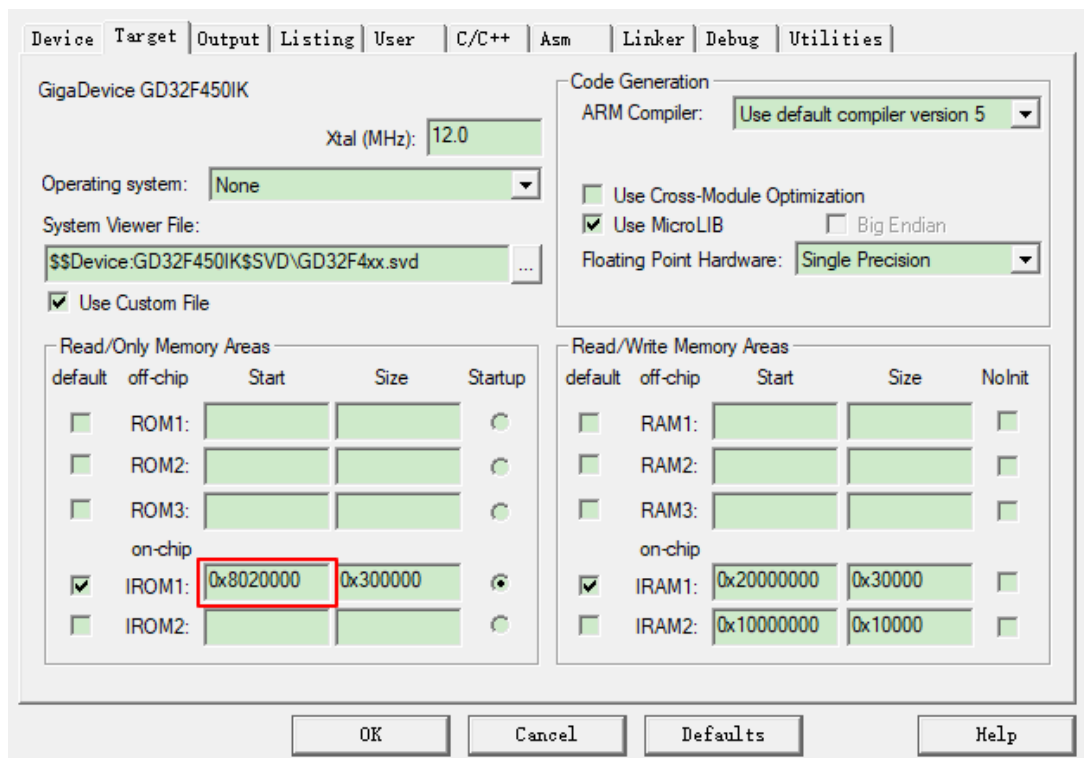
2. 在 APP 程序中设置 Flash 起始地址、中断向量偏移地址：

在 APP 程序的 main 函数开始处，添加如下所示的中断向量偏移：

```
nvic_vector_table_set(NVIC_VECTTAB_FLASH,0x20000);
```

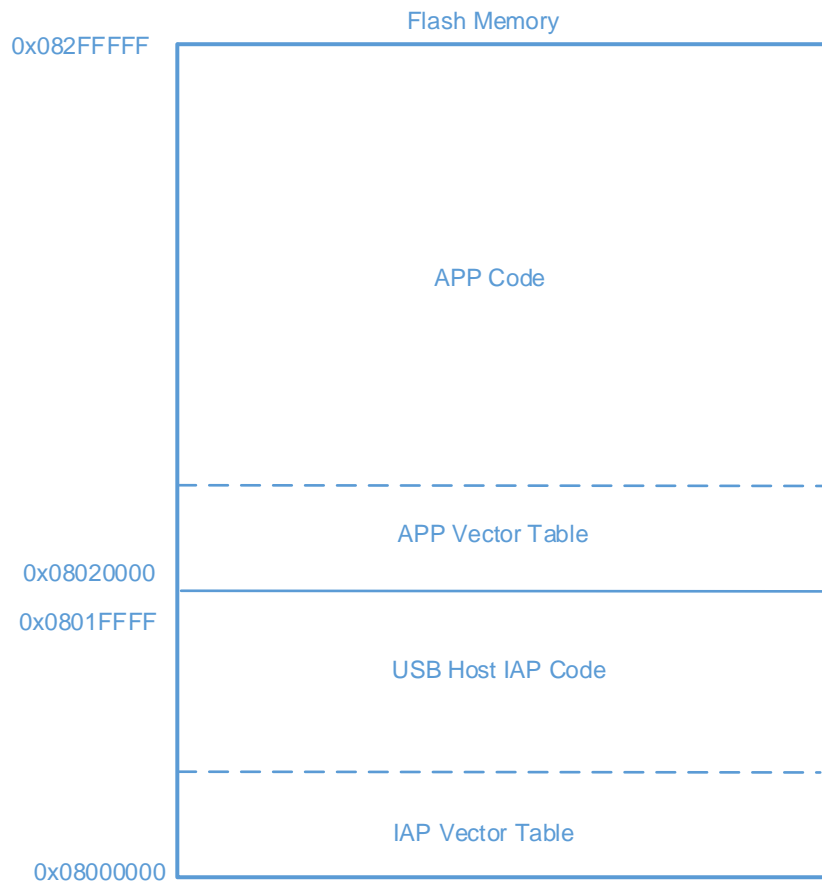
在 keil 的配置选项中，设置 APP 的 Flash 起始地址为 0x08020000：

图 3-1. APP 的 Flash 起始地址



3. 整个芯片的 Fash 分配如下图所示：

图 3-2. 芯片的 Flash 分配



4. USB Host IAP 操作选项

芯片上电后，如果没有按下 User 键，则默认运行 IAP 程序。这时将含有 BIN 文件的 U 盘接入 USB 口，即可进行 IAP 的相关操作。IAP 识别到 U 盘后见[图 4-1. IAP 识别到 U 盘](#)，IAP 的具体操作选项见[图 4-2. IAP 选项](#)。

图 4-1. IAP 识别到 U 盘

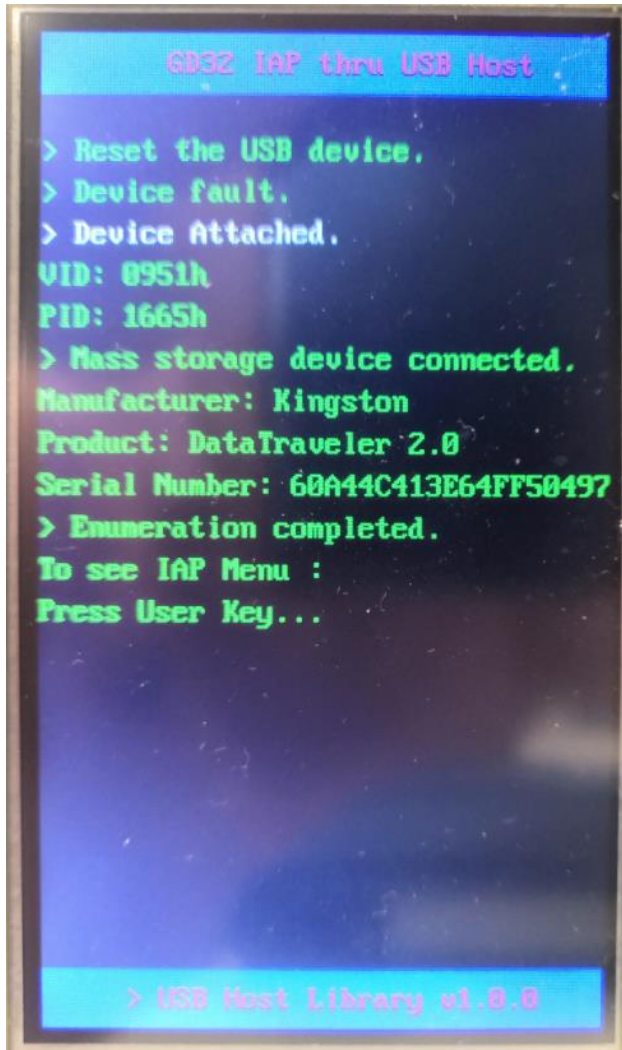
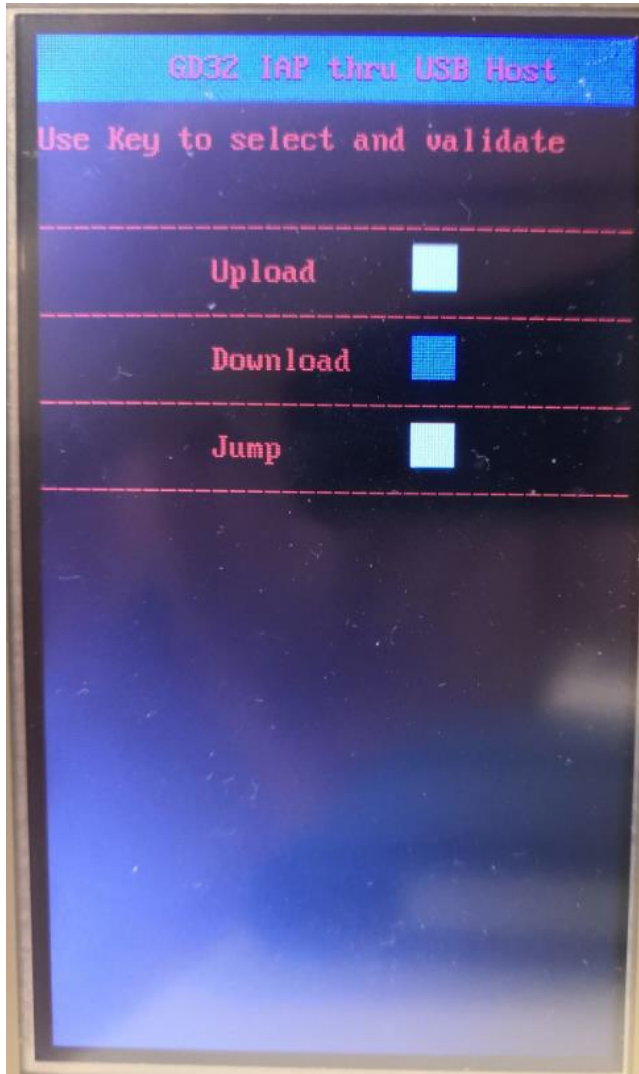


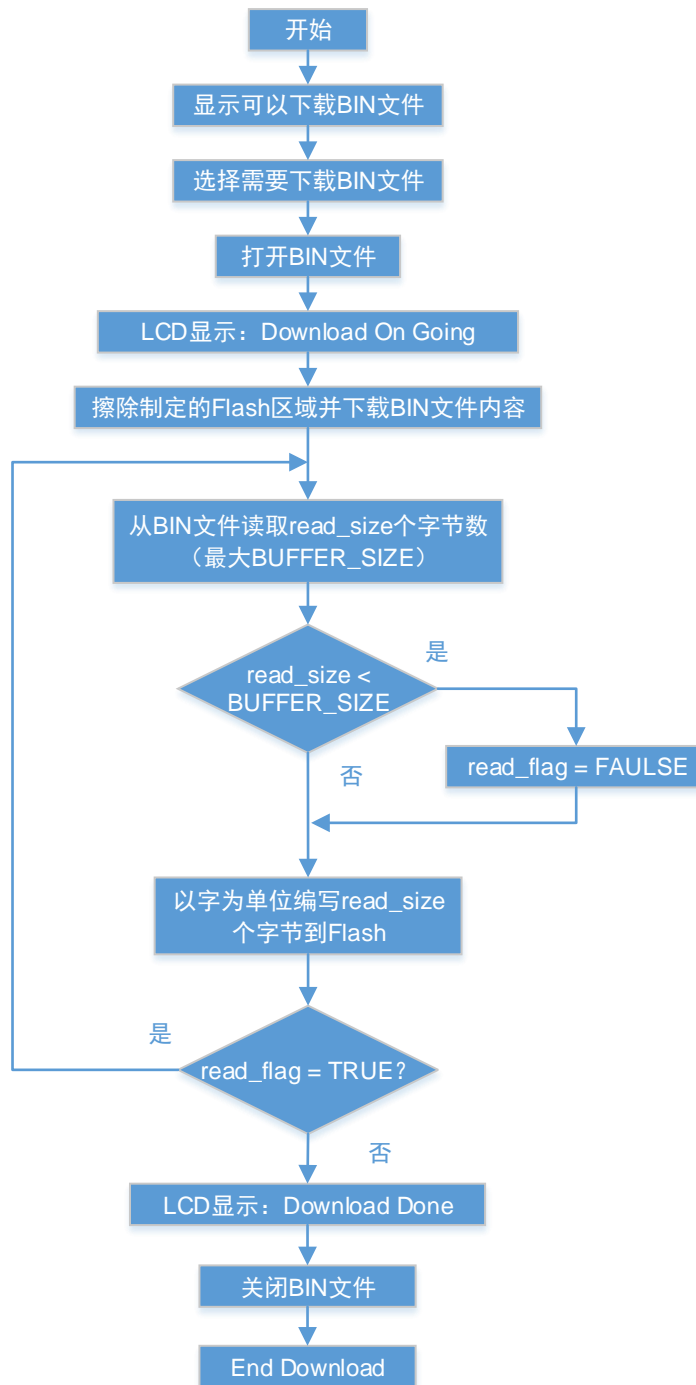
图 4-2. IAP 选项



4.1. 下载

下载一个 BIN 文件到指定的 Flash 地址，具体流程如下所示：

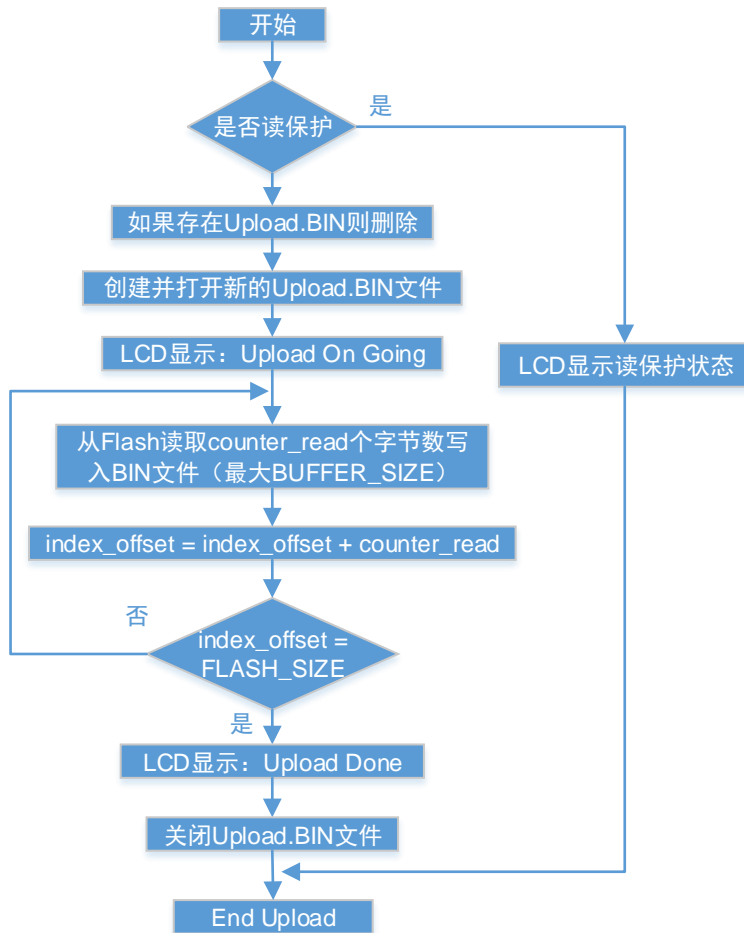
图 4-3. IAP 下载流程



4.2. 上传

上传指定 Flash 的内容到 U 盘的 BIN 文件，具体流程如下所示：

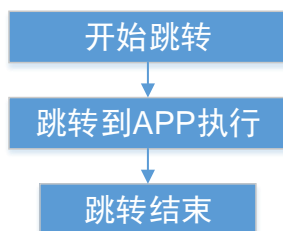
图 4-4. IAP 上传流程



4.3. 跳转

当 APP 程序更新完成，用户可以执行跳转命令来跳转到 APP 代码区域执行。跳转流程如下：

图 4-5. IAP 跳转流程



5. 版本历史

表 5-1. 版本历史

版本号.	描述	日期
1.0	首次发布	2021 年 09 月 6 日

Important Notice

This document is the property of GigaDevice Semiconductor Inc. and its subsidiaries (the "Company"). This document, including any product of the Company described in this document (the "Product"), is owned by the Company under the intellectual property laws and treaties of the People's Republic of China and other jurisdictions worldwide. The Company reserves all rights under such laws and treaties and does not grant any license under its patents, copyrights, trademarks, or other intellectual property rights. The names and brands of third party referred thereto (if any) are the property of their respective owner and referred to for identification purposes only.

The Company makes no warranty of any kind, express or implied, with regard to this document or any Product, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The Company does not assume any liability arising out of the application or use of any Product described in this document. Any information provided in this document is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Except for customized products which has been expressly identified in the applicable agreement, the Products are designed, developed, and/or manufactured for ordinary business, industrial, personal, and/or household applications only. The Products are not designed, intended, or authorized for use as components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, atomic energy control instruments, combustion control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or Product could cause personal injury, death, property or environmental damage ("Unintended Uses"). Customers shall take any and all actions to ensure using and selling the Products in accordance with the applicable laws and regulations. The Company is not liable, in whole or in part, and customers shall and hereby do release the Company as well as its suppliers and/or distributors from any claim, damage, or other liability arising from or related to all Unintended Uses of the Products. Customers shall indemnify and hold the Company as well as its suppliers and/or distributors harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of the Products.

Information in this document is provided solely in connection with the Products. The Company reserves the right to make changes, corrections, modifications or improvements to this document and Products and services described herein at any time, without notice.