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S19 Ascii Hex BIN File Generator

User Manual v2.01

Installation



Quick Start Guide

Preliminary

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1. Preface

This document describes the on-screen operation control for generating a linear Ascii Hex (S19 or Intel Hex format) or BIN formatted File; which is useful for ECU re-flashing download, although the addressing name space is 32 bits, but due to the limited PC Memory, it is divided into 256 pages of 16Mbytes each, thus each page is limited to 24 bits name space i.e. from 0x000000 to 0xFFFFF 16Mbytes.

2. Introduction

The Hex data that generated by the Compiler may not be in linear memory order, in which it creates difficulties for Flash Programming; this is because the flashing sequence is in Linear memory orders.

In order to cover many situations for different needs, this program provides option to organise the compiler's Hex codes output with the following features:

- Option to prefill the unused memory bytes with a defined value i.e. 0xFF or a Software Interrupt trap code
- Arranged the program data in to a linear ascending order
- Option to add Checksums to the program to serve as program integrity self-check.
- Convert S19 format to Intel Hex Format and vice versa

This program also supports the newly require Binary (BIN) format, in which it reduces the file size by storing the data in Binary form as well as a Custom header information that is required for the Re-Flashing tool, data such as version number, Identifier, checksums, etc, the BIN file- being a self-contained single file for ECU re-flashing makes it simpler and effective the S19 or Intel Hex formatted file

3. Terms and definition

- ☐ MCU: Micro Controller Unit
- ☐ S19: Motorola S-record is a file format with parameters from S1 to S9, created by Motorola, that conveys binary information in ASCII hex text form
- ☐ ECU: Electronic Control Unit
- ☐ UDS: Unified Diagnostic Service
- ☐ BIN: Binary For mated Files

4. System Requirement and Installation

4.1. System Requirement

- ☐ CPU Speed: Pentium 1.6GHz minimum or equivalent or higher.
- ☐ Memory: 512MB Memory or above

4.2. Operating System Requirement

The **Program** supports the followings Operating System:

- ☐ Windows 7 32-bits
- ☐ Windows 8 32-bits
- ☐ Windows 10 32-bits

This program requires Microsoft .NET Framework Version 2.0 be installed.

For more information about this, you can visit <http://www.microsoft.com/downloads/en/default.aspx>

- **NET Framework 3.5 SP1**
- **Microsoft .Net Framework4 (x86 and x64) and update for .Net Framework 4 (KB2468871)**

To install **this Program** simply clicks **Setup.exe** and follows the instruction given on the screen.

5. Main Menu Screen

Start here to load the Motorola S19 or Intel Hex code

Exit this program

Show the Dialogue display panel

Selection for Checksums type

Westpac Technology: Linear Ascii-Hex-Bin Generator V1.2.0.00503

导入 S19 Hex 数据 Load S19 Hex File

回填数据 Back Fill

无数据填写 No

填写 Fill

S19 段数据排列 S19 Segment Orders

以线性排列 Order by Linear Memory

以导入 S19 排列 Order by S19 Sequence

大小写敏感 Sig. Count From 1

导入数据 Load Data

字节存储 Memory (预留 Reserved)

显示对白 Show Dialog

退出 Quit

Program Self Checksums (Dependency)

Motorola Notation

FFFFFFFF 初始值 Initial Value (Hex)

FFFFFFFF 校验结果 Final Value: XOR (hex)

04C11DB7 多项式 Polynomial (Hex)

反转字节 Reverse Data Byte

反转字节后才加校验结果 Reverse CRC result before Final XOR

CRC16 CRC12 CRC10 CRC8

None 8-Bit Sums 16-Bit Sums CRC 8 CRC 16 CRC 32

S19-Intel Hex 文件管理 File Management BIN 文件管理 File Management

S19 information

头信息 Header Project

初始值地址 Hex

PC Start Addr 0x

Gen Ascii Hex File (Reserved)

十六进制字节长度 Hex Byte Length

16 字节 16 Bytes

24 字节 24 Bytes

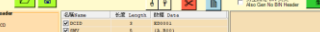
32 字节 32 Bytes

生成摩托罗拉 S19 文件 Generate Motorola S19 File

生成英特尔十六进制文件 Generate Intel Hex File

分割输出 Split Output

有效期至 2022 年 12 月 联系: info@westpac-hk.com.hk

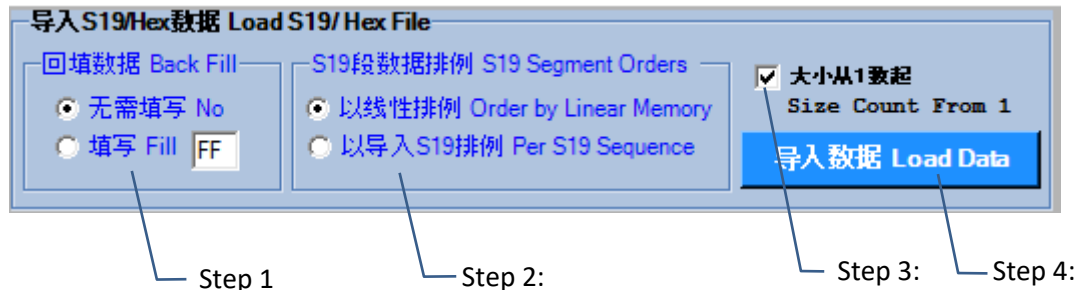


The screenshot shows the 'Hosts' tab in Wireshark. The 'Hosts' pane on the left lists several hosts with checkboxes for 'Selected' and 'Follow'. The main pane displays a table of hosts with columns for Name, IP, and Length. The table lists several hosts, including 192.168.1.1, 192.168.1.2, and 192.168.1.3. The 'Hosts' pane also shows a list of hosts with checkboxes for 'Selected' and 'Follow'.

[illegible]

6. Load Ascii Hex File

Before loading the Compiler generated Hex codes, you have the options to tailor to your needs, follows the steps below:



Step 1: Some compiler generated Hex code could be in broken sections and between sections will be a gap of undefined data, thus it is a good practise to have the unused space to be filled with a known or predefined value, so that for example of CRC calculation, it would be accurate and consistence.

Step 2: For S19 formatted input file, there are option to select the loading of code segment to be in the Order of Linear Memory or as per the sequence order of the S19 input file sequence.

- Order of Linear Memory: This option will have the page data 1st placed in to the 16M Byte Memory buffer in any orders than it scans the loaded data from low to high, a blank memory data will be deemed as a termination of a segment or separation between segments, however, if Back Fill has been selected, then it will treat the scan from low to high address as a single segment block, another word; this option will arrange the unorderly input data into orderly segments from low to High.
- Order of the S19 input file sequence: this will ignore the Back-fill option, the result of the segments scan will be the same order as per the original S19 data order sequence.

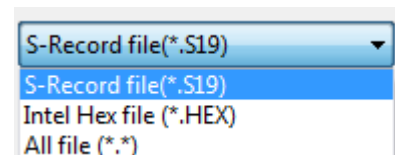
Note: for input file is in Intel Hex format, Order by Linear Memory will be used.

Step 3: This Check box ☒ 大小从1数起 Size Count From 1 provides an option to select the counting of memory size from zero or one, following is an example of results of counting from 0 or 1.

Example of memory range from 0x0010 to 0x0019, if it is count from 0, the result is 9, but if it is count from 1, the result is 10.

Note: This is purely for better human communication and varies from person to person.

Step 4: Load Data: click **导入数据 Load** button to load the Ascii file, the picture on the right-hand side shows the screen options for selecting Motorola S-Record or Intel Hex files.



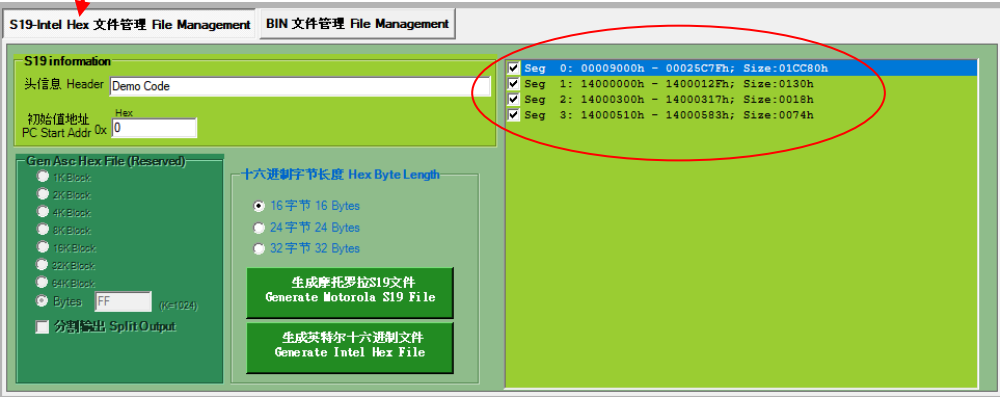
Hex shot

Example: Following illustrates the sample of hex code of 4 segments is loaded

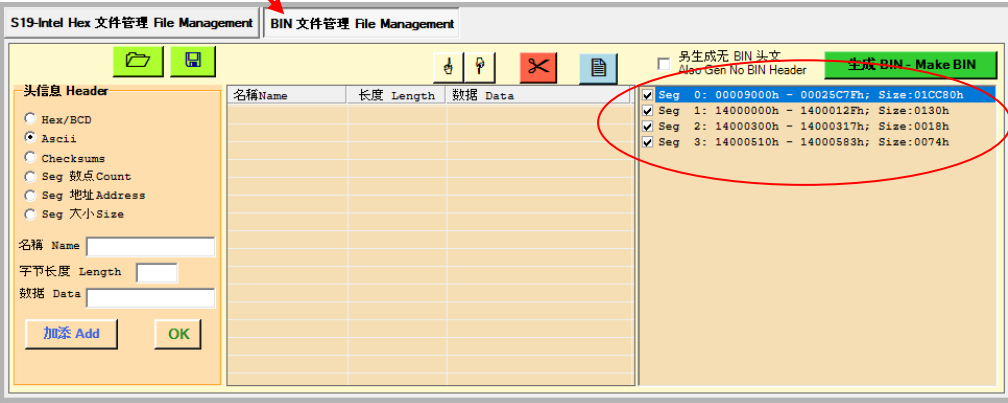
- Seg 0: 00009000h - 00025C7Fh; Size:01CC80h (117888) [115.1250K]
- Seg 1: 14000000h - 1400012Fh; Size:0130h (304)
- Seg 2: 14000300h - 14000317h; Size:0018h (24)
- Seg 3: 14000510h - 14000583h; Size:0074h (116)

The loaded segment information will be in both control panels i.e.

the S19-Intel Hex File Management; and



BIN File management



7. File management control panels

As briefly mentioned in section 6, the S19 or Intel hex codes will be loaded into both the control panels ready for your action as follows:

7.1. Control panel for S19-Intel Hex File Management

This control panel allow the loaded data to be regenerated in to Motorola S19 or Intel Hex formatted Ascii file.

Program start address to be included in the S19 file

Project title to be included in the S19 file

Loaded segment details. The checkbox option allows the selection of segments to be included in to the new output file

This option to select the number of data bytes to be in each line of the Hex, either 16, 24 or 32 bytes

Button to start the generation of a Motorola S19 formatted file

Button to start the generation of an Intel Hex formatted file

S19-Intel Hex 文件管理 File/Management BIN 文件管理 File Management

S19 information

头信息 Header Demo Code

初始值地址 Hex
PC Start Addr 0x 0

Gen Asc Hex File (Reserved)

☐ 1KBlock
☐ 2KBlock
☐ 4KBlock
☐ 8KBlock
☐ 16KBlock
☐ 32KBlock
☐ 64KBlock
☒ Bytes FF (K=1024)

☐ 分割输出 Split Output

十六进制字节长度 Hex Byte Length

☒ 16 字节 16 Bytes
☐ 24 字节 24 Bytes
☐ 32 字节 32 Bytes

生成摩托罗拉S19文件
Generate Motorola S19 File

生成英特尔十六进制文件
Generate Intel Hex File

<input checked="" type="checkbox"/>	Seg 0:	00009000h - 00025C7Fh;	Size: 01CC80h
<input checked="" type="checkbox"/>	Seg 1:	14000000h - 1400012Fh;	Size: 0130h
<input checked="" type="checkbox"/>	Seg 2:	14000300h - 14000317h;	Size: 0018h
<input checked="" type="checkbox"/>	Seg 3:	14000510h - 14000583h;	Size: 0074h

This control panel is to generate a BIN data file with the provided header information.

S19-Intel Hex 文件管理 File Management | BIN 文件管理 File Management

头信息 Header

- ☐ Hex/BCD
- ☒ Ascii
- ☐ Checksums
- ☐ Seg 断点 Count
- ☐ Seg 地址 Address
- ☐ Seg 大小 Size

名称 Name:

字节长度 Length:

数据 Data:

名称 Name	长度 Length	数据 Data
Seg 0: 00009000h - 00025C7Fh; Size: 01CC80h		
Seg 1: 14000000h - 1400012Fh; Size: 0130h		
Seg 2: 14000300h - 14000317h; Size: 0018h		
Seg 3: 14000510h - 14000583h; Size: 0074h		

☐ 另生成无 BIN 头文
Also Gen No BIN Header

- Editing control to add or amend a header item to the collection of the Header information

Following is an example of the Header information for illustration:

- To update the selected

- To add a new selected item

7.3.1. Header Item Line 1: DCID (Data Control ID)

Click this option ☒ Hex/BCD to enter the name DCID for Hex or BCD number code, for 3 bytes long of Hex or BCD code 0xED0001

7.3.2. Header Item Line 2: SMV (Software Modification Version)

Click this option ☐ Ascii to enter this name of SMV with 5 bytes long Ascii code i.e. "A.B00"

7.3.3. Header Item Line 3: SWPN (Software Part Number)

Click this option ☐ Ascii to enter this name of SWPM with 14 bytes long Ascii code i.e. "9020013ABC1234"

7.3.4. Header Item Line 4: AWV/CWV (Amendment Work Version)

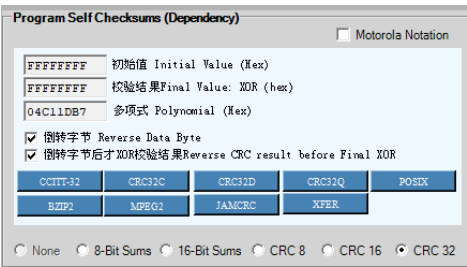
Click this option ☐ Ascii to enter this name of SWV/CWV with 5 bytes long Ascii code i.e. "B.C00"

7.3.5. Header Item Line 5: Header Ver. (Header Version)

Click this option ☒ Hex/BCD to enter this name of Header Ver. with 1 byte long Hex number i.e. 01

7.3.6. Header Item Line 6: CRC32 (CRC32 Checksums)

Click this option ☐ Checksums for Checksums code Checksums option type i.e 8-Bit Sums, 16-Bit Sums, 8, CRC 16 or CRC 32 as shown on the Right Hand picture need to be selected, in this example CRC32 selected, then click button for system to fill in the CRC type, Byte Length and the Checksums.



The CRC Side is

7.3.7. Header Item Line 7: NOAR (Number of Address Record byte length)

Click this option ☐ Seg 数点 Count for setting the number of segments to be included in the BIN file, simply enter the name i.e. NOAR and the byte length for this item, the BIN generator will automatically fill in the number after scanning the number of segments to be included.

7.3.8. Header Item Line 8: AR (Segment Address byte length)

Click this option ☐ Seg 地址 Address to inform the BIN system the byte length of the Segment address, enter 4 for 32 bits address

7.3.9. Header Item Line 9: SZ (Segment Size)

Click this option ☐ Seg 大小 Size to inform the BIN system the byte length of the Segment size, enter 4 for 32 bits size. Please also see section 6 on for ☒ 大小从1数起 Size Count From 1 size counting from 0 or 1.

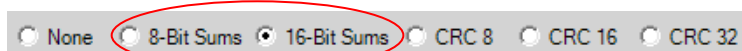
8. Checksums calculation

When the particular Checksums type is selected, the calculated Checksums will be added to the specified location per the caller function.

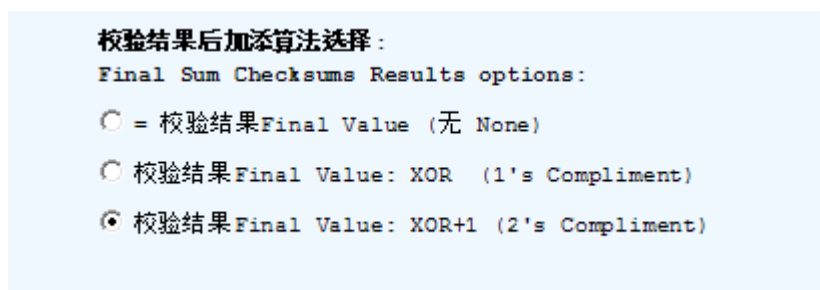
There are 5 types of Checksums available for selection; they are as follows:

- 8 Bit Sums;
- 16 Bit Sums;
- CRC-8;
- CRC-16; and
- CRC-32

8.1. 8- and 16-bit Sums



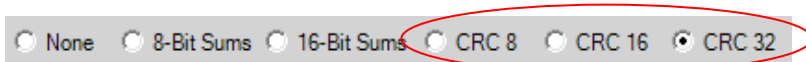
When either 8 or 16 bit Sums is selected, a panel for Sum checksums operation will be shown as follows:



You can choose one of the extra operations to produce the final Checksums results

- “校验结果 Final Value (无 None)”
 - No extra add on is required
- “校验结果 Final Value: XOR (1's Complement)”
 - Final Checksums = Inverted Checksums; same as
 - Same as Final Checksums = Checksums XOR FFFFh
- “校验结果 Final Value: XOR+1 (2's Complement)”
 - Final Checksums = Inverted Checksums +1; same as
 - Same as Final Checksums = (Checksums XOR FFFFh) +1

8.2. CRC-8, CRC-16 and CRC-32



When CRC 8, CRC 16 or CRC 32 is selected, a panel for CRC operational options will be show as follows:


FFFFFFFF	初始值 Initial Value (Hex)			
FFFFFFFF	校验结果 Final XOR Value (hex)			
04C11DB7	多项式 Polynomial (Hex)			
<input checked="" type="checkbox"/> 倒转字节 Reverse Data Byte				
<input checked="" type="checkbox"/> 倒转字节后才 XOR 校验结果 Reverse CRC result before Final XOR				
CCITT-32	CRC32C	CRC32D	CRC32Q	POSIX
BZIP2	MPEG2	JAMCRC	XFER	

There are selection buttons provided for commonly used CRC parameters, but you can change the parameters directly to suit your particular needs.

8.3. Motorola or Intel Format selection

☒ **Motorola Notation** Checked this box for Motorola data byte format, unchecked it for Intel data byte format.

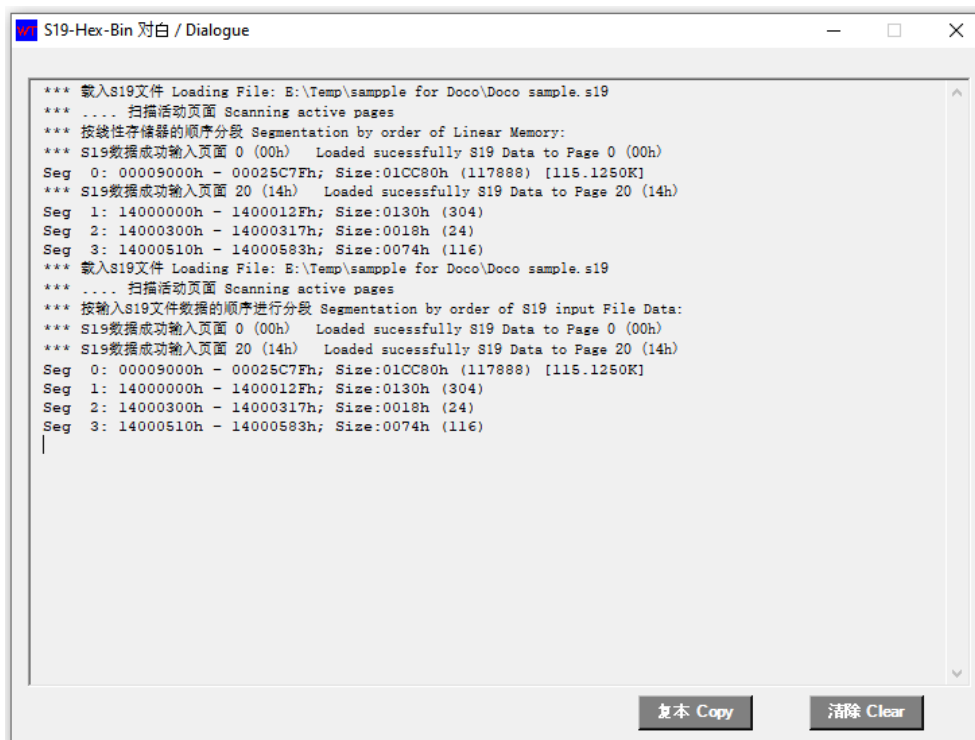
9. Dialogue Display Panel

This Dialogue Display Panel is to provide more activity information on each operation for better analysis, click this button to  show the dialogue panel. Following is some example of the dialogue activities:

The information on the display panel can be copied for reference and documentation.

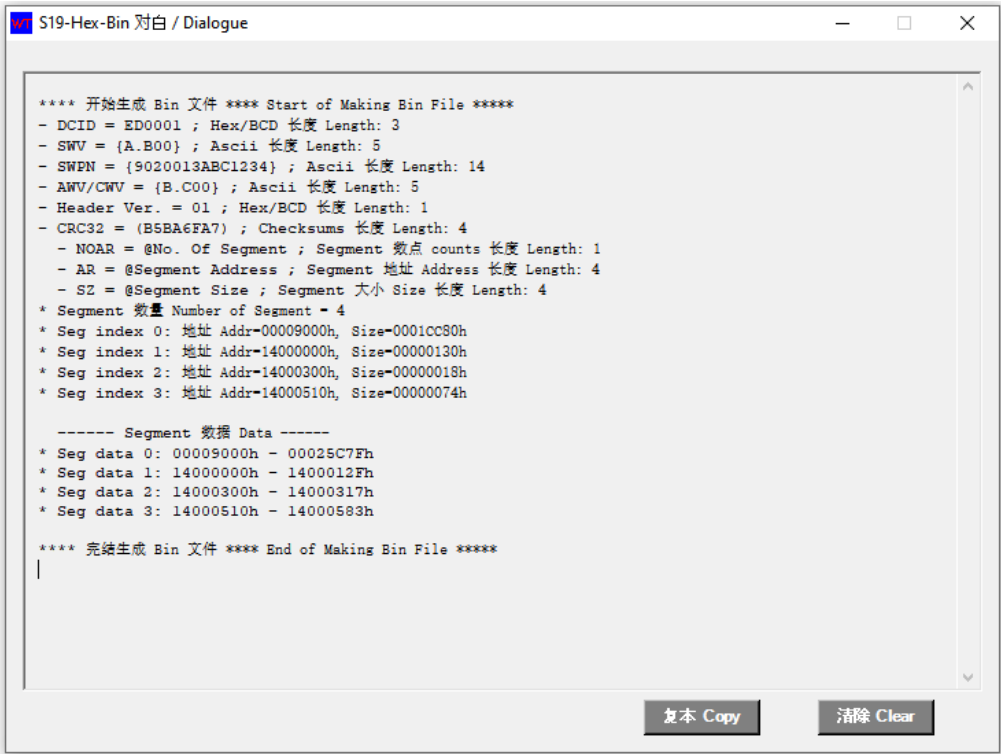
9.1. Loading a S19 data file

Two data loading has been performed, 1st is Segment by order of Linear Memory and the latter is segment by order of S19 input File Data. Memory back-fill option has not been selected.



9.2. Generating a BIN file

Following example shows the Header detail of the BIN file and the segment data.



10. A Quick 4 Steps Guide to convert the S19 in to BIN formatted file

Step 1: Select "BIN 文件管理 File Management"

Step 2: Load the S19 File

Step 3: Load the ".bfmt" (Bin Format configuration File)

Step 4: Generate/Make the BIN File

The software interface shows the following details:

- Program Self Checksums (Dependency):** Includes options for Initial Value (Hex), Final Value (hex), and Polynomial (Hex). Checksums listed include CCITT-32, CRC32C, CRC32D, CRC32Q, POXIX, BZIP2, MPEG2, JAMCRC, and XFER.
- S19-Intel Hex 文件管理 File Management:** Includes a table for S19 information with columns for Name, Length, and Data.
- 生成 BIN - Make BIN:** A button to generate the final BIN file.

Revision History

Version	Date	Description	Edited by
1.00	2018.07.30	First Draft Released	PC
1.01	2018.09.17	Added options for Program Self Checksums	PC
2.00	2020.05.02	Overall update and added a BIN panel control to generate BIN File	PC
		Set memory page to 0x000000-0xFFFFFFFF up to 256 pages	
		to allow 32 bits name space processing range	
		0x00000000 – 0xFFFFFFFF	
2.01	2020.05.16	General clean up of paragraphs	PC