

ICP Family Programmers

Command Line Interface

IMPORTANT NOTE:

- Starting from Mar-2019 Softlog Systems provides "Advanced Command Line" (IcpWin**Advanced**ComLine.exe) additionally to existing (legacy) "Command Line" (IcpWinComLine.exe)
- "Advanced Command Line" is supposed to be down-compatible with the existing "Command Line"
- "Advanced Command Line" additionally supports secure programming operations and multiple parameters in INI file

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1 Known Issues

	Issue	Workaround
1	G3 programmers: errorcode 110 will be reported for environment file (PJ2) with size more than 1.3MByte when /q switch is not specified	Use switch /q as shown in example 7.5

2 Installation

- Run DLL installation file "IcpDll_setup_dll_XXX.exe".

3 Files

- IcpWinComLine.exe
- IcpWinAdvancedComLine.exe
- IcpDll.dll
- GetDllVersion.bat: run it to check versions of "IcpWinComLine.exe" and "IcpDll.dll"
- GetDllAdvancedVersion.bat: run it to check versions of "IcpWinAdvancedComLine.exe" and "IcpDll.dll"
- c_icpexp.h (not required for command line)
- fr_exp.h (not required for command line)
- fr_ftb9.h (not required for command line)
- SenFromHexTemplate1.ini: template INI file for SEN generation from HEX
- SenFromPJ2Template2.ini: template INI file for SEN generation from PJ2

4 ICP Firmware Options

DLL/Command Line Support (D) should be activated in order to use ICP family command line interface

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5 Command Line Switches

Note: all switches are **not** case sensitive

###	Switch	Description	Example	Minimum DLL version	Comments
1.	/c	Load configuration file	/cicp01.cfg	-	Mandatory excluding /n,/h,/? ,/k
2.	No switch	Hex file to be loaded	Hex1.hex	-	-
3.	/s	Serialization file to be loaded	/sser1.ser	-	-
4.	/i	Programming (standalone mode)	/i	4.4.1	Always use for multi-channel parallel programming
5.	/n<channel>	Get result from selected GANG channel	/n1	4.4.2	Use after GANG programming is done
6.	/a<space>	Programming (PC-driven mode), <space> is a sum (decimal) of the following memory spaces: 1 - PM (program memory) 2 - ID 4 - DM (EEPROM) 8 - reserved 16 - CB (configuration bits) 32 - BOOT memory 64 - OTP	/a23	-	23 means "all spaces" for the most devices. PC-driven mode is not available for GANG multi-channel programming
7.	/r<space>	Read (PC-driven mode only)	/r23	-	-
8.	/v<space>	Verify (PC-driven mode only)	/v23	-	-
9.	/l<space>	Blank check (PC-driven mode only)	/l23	-	-
10.	/f<filename>	File to be saved after read	/fRead1.hex	-	-
11.	/g<value>	Save errorcode(s) in file "auto01.res"	/g0 - disable /g, /g1-enable /g2-extended	4.4.2 for /g2	Always set to /g2 for ICP2-GANG/COMBO
12.	/b<value>	PM beginning (hex), valid if both /b and /e are specified	/b50	-	-
13.	/e<value>	PM end (hex), valid if both /b and /e are specified	/e1FFE	-	-
14.	/d<value>	Enable/disable debug message box after an operation	/d0 (disable) /d1 (enable) /d2 (on error)	4.4.1 for /d1	Default: disabled
15.	/w<value>	Enable/disable progress window	/w0 (disable) /w1 (enable)	-	Default: enabled
16.	/h /?	Display command line and DLL version string	/h	-	Use with /d0 to disable message box
17.	/t<filename>	Transfer environment file to programmer	/tenv1.pj2	4.4.1	-
18.	/u<filename>	Transfer secure environment file to a single channel of programmer	/usecenv1.sen	4.8.2	-
19.	/x	Enable/disable PC "sleep" NOTE: - 0: faster ICP operation in PC-driven mode - 1: less PC load	/x0 (faster ICP operation)		Default: 1 (less PC load)
20.	/o	Enable/disable gap eliminator for: 1 - PM (program memory) 4 - DM (EEPROM)	/o5 (enable for PM and DM) /o0 (disable)	4.12.1	Default: disabled
21.	/q	Select environment (use with /l, /t or /u)	/q6 (select environment 6 for ICP2-COMBO)	4.13.1	Default: last used
22.	/y	Load security bit to programming buffer (PC-driven mode) which is not a part of HEX file. Valid for ATSAMC21 and similar families	/y1 (enable)	8.1.3a	Default: 0 (no security or taken from HEX file)
23.	/k	Advanced Command Line only : Load INI file	/kMyIni.ini	8.11.1a	-
24.	/m	Advanced Command Line only : Generate secure environment file (SEN)	/m0 (delete/counter) /m1 (from HEX) /m2 (from PJ2)	8.11.1a	-

6 Return Values (Errorcodes)

See document "[DLL Description.pdf](#)" for a list of error codes

7 Examples

7.1 Program Device in PC-driven Mode

- Configuration file: icp01.cfg
- Hex file: hex1.hex
- Space for programming: all memories (PM, EEPROM, ID, Configuration bits)

```
<path to IcpWinComLine.exe> /C icp01.cfg hex1.hex /a23
```

7.2 Program Device in PC-driven Mode + Serialization + Message Box

- Configuration file: icp01.cfg
- Hex file: hex1.hex
- Serialization file: ser1.ser
- Space for programming: all memories (PM, EEPROM, ID, Configuration bits)

```
<path to IcpWinComLine.exe> /C icp01.cfg hex1.hex /S ser1.ser /a23 /d1
```

7.3 Erase Device (Using Program Operation)

- Configuration file: icp01.cfg
- Hex file: Blank1.hex (file contains blank values only)
- Space for programming: all memories (PM, EEPROM, ID, Configuration bits)
- PM start: 0
- PM end: 3E (valid for any PIC10/12/16/18)

```
<path to IcpWinComLine.exe> /C icp01.cfg Blank1.hex /a23 /b0 /e3E
```

7.4 Program 4 Devices using ICP2-GANG (Standalone Mode)

- Configuration file: icp01.cfg, contains GANG channels 1-4

```
Step 1 - gang programming: <path to IcpWinComLine.exe> /C icp01.cfg /i /g2
Step 2 - get result for channel 1: <path to IcpWinComLine.exe> /n1 /g
Step 3 - get result for channel 2: <path to IcpWinComLine.exe> /n2 /g
Step 4 - get result for channel 3: <path to IcpWinComLine.exe> /n3 /g
Step 5 - get result for channel 4: <path to IcpWinComLine.exe> /n4 /g
```

Note: steps 2-5 are not required if return code for step 1 is zero (all channels passed)

7.5 Transfer Environment File to Programmer

- Configuration file: icp01.cfg
- Destination environment: 2
- Environment file: env1.pj2

```
<path to IcpWinComLine.exe> /C icp01.cfg /q2 /t env1.pj2
```

IMPORTANT: Environment is saved in non-volatile flash memory of ICP2 programmer; therefore avoid multiple transfers of the same environment to keep endurance of the flash memory

8 Getting Started

8.1 *Create a folder with your project*

- Create a folder for your project, for example: C:\Projects\Project1
- Place your hex file into the folder above, for example: C:\Projects\Project1\Hex1.hex

8.2 *Install ICP GUI software*

- Install ICP GUI software by running setup file "IcpWin_setup_X_XX.exe"

8.3 *Create ICP GUI shortcut to your project*

- Copy created shortcut "ICP for Windows" and rename the copy, for example to "My ICP Project"
- Open the shortcut properties and change "Start in:" directory to "C:\Projects\Project1"

8.4 *Run ICP GUI software*

- Press on "My ICP Project" to run ICP GUI software
- Configure ICP family programmer for operation with your device
- Create serialization file in the project directory (if required), for example "ser1.ser"
- Save configuration: select "File/Save Configuration" and exit the software
- In the project directory rename "icp01.cfg" to "MyProject.cfg"

8.5 *Create command line shortcut (PC-driven programming)*

- Create shortcut to "IcpWinComLine.exe"
- Open the shortcut properties and edit as follows:
Target: "...\IcpWinComLine.exe" /cMyProject.cfg Hex1.hex /sSer1.ser /a23 /d1
Start in: "C:\Projects\Project1"
- Press on the created shortcut to validate the operation

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9 Advanced Command Line (Beta Version)

9.1 Secure Programming

- Read "Secure Programming Utility User's Manual.pdf" to be familiar with secure programming

9.2 Advanced Command Line Examples

- Generate SEN file from HEX (/d1 is optional): `lcpWinAdvancedComLine.exe /kSenFromHexTemplate1.ini /m1 /d1`
- Generate SEN file from PJ2 (/d1 is optional): `lcpWinAdvancedComLine.exe /kSenFromPj2Template2.ini /m2 /d1`
- Legacy operation: all legacy command line operations are supported

9.3 File Path/Name

- INI file in `/k` switch: name of the INI file should be either **absolute** or **relative** to the current working directory
- File names specified inside INI file should be either absolute or relative to the current working directory

9.4 INI File Parameters

- INI file is primarily intended for secure programming operations (SEN file generation)
- SEN file can be generated from 3 sources (none, HEX or PJ2):
 - none (neither HEX nor PJ2): applicable to "update counter only" or "delete secure environment and counter inside programmer"
 - from HEX file. Note: intermediate PJ2 file is generated
 - from PJ2 file

	Section/Name	Value	Description	Default Value	Usage: Source = HEX (/m1)	Usage: Source = PJ2 (/m2)	Usage: Source = None (/m0)
	[Input]						
1.	CfgFileIn	Path/name	ICP CFG file	-		Mandatory	
2.	SidFileIn	Path/name	Security ID file (SID), created by ICP Secure Programming Utility	-		Mandatory	
3.	Pj2FileIn	Path/name	Environment file (PJ2)	-	-	Not required if counter only is updated	-
4.	HexFileIn	Path/name	Original HEX file	-	Mandatory	-	-
5.	SecurityBit	0=no security 1=with security	Security bit settings for devices like ATSAMC/D	0	Required for ATSAMC/D	-	-
6.	SerFileIn	Path/name	Serialization file (SER)	-	Optional	-	-
7.	ExtractSecBufFromHex	0=don't modify HEX, 1=fill secure buffer area with random values 2=fill with SecBufReplaceVal	Replace data in PM or DM area according to SID file settings	0	Optional	-	-
8.	SecBufReplaceVal	Value 0-FF	Fixed value to fill secure buffer area	-	Required if ExtractSecBufFromHex=2	-	-
9.	GapEliminator	Sum of memory spaces: 0=no gap eliminator 1=PM(flash),2=DM(EEPROM)	Enable/disable Gap Eliminator. Note: gap eliminator settings are not got from icp01.cfg	0	Optional	-	-
10.	MemorySpace	Sum of spaces: 1=PM, 2=User ID, 4=DM, 16=FU, 32=boot, 64=OTP Usual value: 23	Memory areas to be programmed. Note: ICP DLL removes unexisting spaces	-	Mandatory	-	-
	[Operation]						
11.	BatchNumber	0=[use value+1] from SID 1...65535=use this value	Batch number value. Note: SID file is always updated with used batch value	-		Mandatory	
12.	UpdateMask	SEN properties: <ul style="list-style-type: none"> 0x28=update environment and counter 0x08=update counter only 0x20=update environment only 0x40=delete secure environment and counter inside programmer. Note: use with /m0 only 	Sum of properties as in enum SEC_ID_UPD_MASK in "c_icpexp.h" file: maskCNT maskENV maskDEL_ENV_CNT Other masks are unused	-		Mandatory <ul style="list-style-type: none"> One of 4 combinations should present If "Delete secure environment and counter" is set, then other masks are ignored IMPORTANT: in order to use permanent batch control without counter (unlimited counter) set as follows: UpdateMask=0x08 (update counter) and CounterValue= 0xFFFF (unlimited)	
13.	CounterValue	Counter value: ICP2-Portable: 1-9999(dec) Other: 1-999999(dec) 0xFFFF=unlimited	Counter value	-	Mandatory if mask "update counter" is set	-	-
	[Output]						
14.	SenFileOut	Path/name	Generated SEN file			Mandatory	
15.	Pj2FileOut	Path/name	Generated PJ2 file (from HEX)		Mandatory	-	-
16.	HexFileUnchangedOut	Path/name	Original HEX file saved by ICP DLL		Optional	-	-
17.	HexFileChangedOut	Path/name	Modified HEX file saved by ICP DLL		Optional	-	-

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	Section/Name	Value	Description	Default Value	Usage: Source = HEX (/m1)	Usage: Source = PJ2 (/m2)	Usage: Source = None (/m0)
	[Portable]						
18.	PortableCntLimitEnv1	1...9999, 0xFFFF=unlimited	Non-secure counter value for ICP2-Portable, used during environment file (PJ2) transfer. Not applicable to secure programming	0xFFFF (unlimited)	N/A	N/A	N/A
19.	PortableCntLimitEnv2						
20.	PortableCntLimitEnv3						
21.	PortableCntLimitEnv4						
22.	PortableCntLimitEnv5						
23.	PortableCntLimitEnv6						
24.	PortableButLockEnv	0=not locked, 1=locked	Defines state of ENV button used during environment file (PJ2) transfer. Not applicable to secure programming	0 (not locked)	N/A	N/A	N/A

9.5 INI File Example 1 (SenFromHexTemplate1.ini)

```
; Run command line as: IcpWinAdvancedComLine.exe /kSenFromHexTemplate1.ini /m1 /d1
; This INI file is used to generate SEN from HEX as follows:
; - file locations:
;   - c:\Softlog\Product_1: files for product "Product_1" (unsafe location)
;   - c:\Softlog\SafeLocationForSid: safe location for SID files
;   - c:\Softlog\SafeLocationForHex: safe location for HEX files
; - no serialization
; - fill secure buffer area with random values
; - enable Gap Eliminator for PM
; - program memory spaces: PM+User ID+DM+FU. Note: ICP DLL removes unexisting spaces
; - get batch number from SID file
; - update SID file with latest batch number
; - update environment and secure counter
; - unlimited counter

[Input]
CfgFileIn      = c:\Softlog\Product_1\Product_1.cfg          ; icp01.cfg file (CFG)
SidFileIn      = c:\Softlog\SafeLocationForSid\Sid_A.sid      ; Security ID file (SID)
Pj2FileIn      =                                           ; Input Environment file (PJ2)
HexFileIn      = c:\Softlog\SafeLocationForHex\Hex_1.hex     ; Original HEX file (HEX). ***IMPORTANT***-validate
                                                         ; that HEX contains code protection/security
SecurityBit    = 1 ; ATSAMC/ATSAMD ***only***: 1=set security; 0=no security
SerFileIn      =                                           ; optional serialization file (SER)

ExtractSecBufFromHex = 1 ; 0=don't modify HEX, 1=fill secure buffer area with random values,
                        ; 2=fill with SecBufReplaceVal value
SecBufReplaceVal   = 0 ; 0-255, see description above for ExtractSecBufFromHex
GapEliminator      = 1 ; 0=no gap eliminator, 1=PM(flash), 4=DM(EEPROM), 5=PM+DM
MemorySpace        = 23 ; sum of memory spaces for operation: 1=PM, 2=User ID, 4=DM, 16=FU, 32=boot, 64=OTP

[Operation]
BatchNumber        = 0 ; 0=[use value+1] from SID, 1..65535=use this value
UpdateMask         = 0x28 ; 0x28= update environment and counter, 0x20=update environment,
                        ; 0x08=update counter, 0x40=delete environments and secure counter
CounterValue       = 0xFFFFFFFF ; 0xFFFFFFFF=unlimited ; ICP2-Portable: 1-9,999 ; other programmers: 1-999,999

[Output]
SenFileOut         = c:\Softlog\Product_1\Product_1.sen      ; output SEN file
Pj2FileOut         = c:\Softlog\SafeLocationForHex\Product_1.pj2 ; output PJ2 file
HexFileUnchangedOut = c:\Softlog\SafeLocationForHex\Unchanged.hex ; original HEX file saved by ICP DLL (can be
                                                         ; used for visual compare)
HexFileChangedOut  = c:\Softlog\SafeLocationForHex\Changed.hex ; modified HEX file saved by ICP DLL (can be
                                                         ; used for visual compare)
```

9.6 Advanced Command Line Return Values (Errorcodes)

- No error: 0
- DLL-provided errorcodes: see document ["DLL Description.pdf"](#) for a list of error codes
- Advanced Command Line errorcodes:

```
enum ERROR_CODES {
    ERR_NO_RECORD_FOR_CH      = -1,    // No record for specified channel in file auto01.res
    ERR_CH_NUM_OUT_OF_RANGE   = -2,    // Channel number is out of range
    ERR_CANT_OPEN_RES_FILE    = -3,    // Can't open file auto01.res
    ERR_CANT_OPEN_CH_FILE     = -4,    // Can't open file ch_i.res
    ERR_INVALID_SID_FILE      = -5,    // Invalid or corrupted SID file
    ERR_EMPTY_SEC_BUFFER      = -6,    // Empty secure buffer in SID file
    ERR_CREATE_SEN_FILE       = -7,    // Can't create secure environment
    ERR_SAVE_SID_FILE         = -8,    // Can't save SID file
    ERR_BATCH_NUM_OVERFLOW    = -9,    // Batch number overflow
    ERR_SEC_BUF_RANGE         = -10,   // Secure buffer address range does not fit into the target buffer

    //command line
    ERR_CL_HELP               = -99,   // --> the message may vary
    ERR_CL_NOACTION           = -100,  // Command line: no action specified
    ERR_CL_MEMSPACE           = -101,  // Invalid memory space specified
```

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```
ERR_CL_REP_ACTION          = -102, // Repeated specification of action
ERR_CL_FILE_NOT_SPECIFIED = -103, // File not specified
ERR_CL_FILE_NOT_FOUND     = -104, // File not found
ERR_CL_DUPL_HEX_FILE      = -105, // Duplicate HEX file specified
ERR_CL_INVALID_PM_BEGIN   = -106, // Program memory begin address not specified on invalid
ERR_CL_INVALID_PM_END     = -107, // Program memory end address not specified on invalid
ERR_CL_READ_FILE_NOT_SPEC = -108, // READ file not specified
ERR_CL_INVALID_G_PARAM    = -109, // Invalid /G parameter
ERR_CL_INVALID_M_PARAM    = -110, // Invalid or repeated /M parameter
ERR_CL_INVALID_N_PARAM    = -111, // Invalid /N parameter
ERR_CL_UNKNOWN_SWITCH     = -112, // Unrecognized switch
ERR_CL_MEMSPACE_POST      = -113, // 'MemorySpace' not specified or invalid
ERR_CL_EXTRACT_SEC_BUF    = -114, // 'ExtractSecBufFromHex' is invalid
ERR_CL_BATCH_NUMBER       = -115, // 'BatchNumber' not specified or out of range
ERR_CL_UPD_MASK_INVALID   = -116, // 'UpdateMask' not specified or invalid
ERR_CL_UPD_MASK_MISMATCH = -117, // 'UpdateMask' contains bits incompatible with the required operation
ERR_CL_COUNTER_VALUE      = -118, // 'CounterValue' not specified or invalid
ERR_CL_ENV_CNT_LIMIT      = -119, // 'PortableCntLimitEnvN' is invalid
ERR_CL_ENV_NUM_INVALID    = -120, // Invalid environment number
ERR_CL_INI_FILE_ERROR     = -121, // INI-file error
};
```

10 History

- Version 1.1.12/2.1.1 (Jun-2019):
 - Added PortableCntLimitEnv1 and PortableEnvButLock
- Version 1.1.12/2.1.0 (Mar-2019):
 - Added "Advanced Command Line"
- Version 1.1.12 (Jul-2018):
 - "IcpWinComLine.exe" provides more diagnostic messages in case of incorrect or insufficient parameters
- Version 1.1.11 (Jun-2017):
 - Added switch /y to load security bit
- Version 1.1.10 (Mar-2017):
 - Done correction: "auto01.res" is saved for all errors if /g, /g1 or /g2 is specified (previous: it was saved for programming errors only)
 - Added memory spaced: 32 = BOOT memory and 64 = OTP
- Version 1.1.8 (Jan-2015):
 - Added switch /q to switch environment
- Version 1.1.7 (Nov-2013):
 - Added switch /o to enable/disable gap eliminator for PM or/and DM
- Version 1.1.6 (Jan-2012):
 - Added switch /u to transfer secure environment to programmer
- Version 1.1.5 (Nov-2008):
 - Switch /x can be used to speed-up the ICP operation
- Version 1.1.4 (Jan-2008):
 - Switch /g can be used with switch /n in order save individual results in file "ch_i.res"
- Version 1.1.3 (July-2007):
 - Added switches /? and /h to show command line and DLL versions in message box
 - Added switch /t for environment transfer
 - Expanded support for GANG operation (expanded switch /g: g2 will save global and individual results in "auto01.res" file, added switch /n to get individual results)
 - Expanded switch /d: in case of /d2 message box will appear for bad result only
- Version March-2007: initial version

11 Warranty

Softlog Systems (2006) Ltd. warrants this product against defects in materials and workmanship for a period of 1 (one) year. This warranty will not cover programmers that, in the opinion of Softlog Systems, have been damaged due to abuse, improper use, disassembly, replacement of parts or attempted repair by anyone other than an authorized Softlog Systems service technician.

This product must be returned to the supplier for warranty service within the stated period. The buyer shall pay all shipping costs and other charges or assessments for the product by the supplier.

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