# **Building the Protego Images**

## Introduction

This document describes the builds required for a complete Protego system.

## Processor images built for the Protego system:

There are seven build images created for a complete Protego system.

The following build images are unique for each Collar, Tube, and Missile set and the keys must match:

- 1) **P1.X.production.hex**
- 2) **P2.X.production.hex**
- 3) **P3.X.production.hex**

The following are used on the *Deployment Box* for configuration control of any Protego system:

- 4) **P4.X.production.hex**
- 5) **P5.X.production.hex**

The following build images are used when reprogramming the MP processor:

- 6) **P1\_S.X.production.hex**
- 7) P2\_ Maintenance.production.hex

## Locations of images:

- 1) P1 Master Processor (MP), Master Processor on PWA
- 2) P1\_S Master Processor (MP), Slave Processor on PWA
- 3) P2 Tube Smart Switch (TSS) Processor
- 4) P3 Missile Smart Switch (MSS) Processor
- 5) P4 Deployment Box Slave Processor on PWA
- 6) P5 Deployment Box Master Processor on PWA
- 7) P2\_Maintenace Tube Smart Switch (TSS) Processor

## **Processor images descriptions:**

An example of build images for a complete system with key number 3002 would be:

- **3002\_P1.X.production.hex** (MP Master uC image)
- **3002\_P2.X.production.hex** (TSS uC image)
- **3002\_P3.X.production.hex** (MSS uC image)

Since the *Deployment Box* does not contain any keys, the images for the *Deployment Box* would be:

- **P4.X.production.hex** (Deployment Box Master uC image)
- **P5.X.production.hex** (Deployment Slave uC image)

For reprogramming the MP master processor, the P1\_S.X (P1 Slave) and maintenance image P2\_Maintenace are created using an engineering maintenance key located within the images. They would be:

- P1\_S.X. production.hex (MP Slave uC image)
- **P2\_Maintenace.production.hex** (TSS reprogramming P2 uC image)

These two images are used on any Protego system, regardless of key, to reprogram the MP master processor

# **Step 1:** Building the Initial Protego Images (No Keys)

Open the C:\RMS\_Programs directory in the command line prompt and execute the *build\_protego.bat* script. This will build files for each image which consist of *.hex, .elf*, and *.map* files. These files will be located in a new time stamped \_*build* directory within the RMS\_Programs directory.

Only P1, P2, and P3 images need keys added to their images.

## **File descriptions:**

*.hex file* - Build image in Intel hex format that conveys binary information in the ASCII text form. This file is used when loading the image on the processor.

*.elf file* - Executable and Linkable Format is a common standard file format for description of executables, object code, and shared libraries.

*.map file -* The map file shows information relating to where objects were positioned in memory. It

is useful for confirming if user-defined linker options were correctly processed, and for

determining the exact placement of objects and functions.

# **Step 2: Generating Keys:**

#### Note:

To aid in keeping the key numbers grouped, the Devil Snare Keys numbers start at 1000 and Protego Keys numbers start at 2000

Keys are generated by the *KeyGen* application. If there is not a shortcut, open the *keyGen* application in the folder "*C*:\*RMS\_Programs*\*keygen*\*keygen*\*bin*\*Release*".

📍 KeyGen	C regenerated	
Starting Key Number		
Number of Keys		
Output Directory		Browse
		Generate

Create a folder where you want the key files to be placed. Enter the starting key number and the number of keys. Click "Generate". The Keys will be placed in the folder defined.

📍 KeyGen		
Starting Key Number	3000	
Number of Keys	10	
Output Directory	C:\RMS_Programs\TEST	Browse
	Complete	
		Generate

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rograms I	TEST			
- New	v folder			
		Name 3000.dat 3001.dat 3002.dat 3003.dat 3004.dat 3005.dat 3006.dat 3006.dat 3008.dat 3008.dat 3008.dat	*	

# **Step 3: Setting the Keys into the image:**

**Note:** To run the required MPLAB applications you may have to create a user ID path to "C:\Program Files (x86)\Microchip\MPLABX\mplab\_ide\bin". See "Creating user ID path:" at the end of the document for an example.

P1, P2, and P3 are the only images that will contain unique keys. Use the *setd.exe* app to set the keys into the images.

Copy the new key xxxx.dat files created in *Step 2* into the *\_build directory* created in *Step 1*.

To build the image with a specific key:

1) Open a DOS command line prompt

2) In the command prompt window change directories into the new \_build directory

Example: > cd C:\RMS\_Programs\20140925115118\_build

3) Move the setd.exe into the new \_build directory

located at: C:\RMS\_Programs\setd\Release

4) To build an image with a specific key, execute the *setd.exe application* with the proper arguments.

Example: > setd -k 3002.dat -i P1.X.production.hex -e P1.X.production.elf

5) The example in step 4, will only create the hex file for P1. An image for P2, and P3 must also be created for a complete system.

Example for P1: > setd -k 3002.dat -i P1.X.production.hex -e P1.X.production.elf

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Example for P2: > setd -k 3002.dat -i P2.X.production.hex -e P2.X.production.elf

Example for P3: > setd -k 3002.dat -i P3.X.production.hex -e P3.X.production.elf

Repeat building the P1, P2, and P3 key files as needed.

6) After all builds are completed and tested, capture the *date stamp \_build* directory with files into the software repository tag "file:///P:/18\_0\_Software"

Example: 20150109115839\_build

Repository

/SVN/Task\_1\_Protego/tags/PROTEGO\_RELEASE\_BUILDS/20150109115839\_build.



# **Creating user ID path:**

1) Click Start , type Accounts in the Start search box, and then click User Accounts under Programs.

2) In the User Accounts dialog box, click Change my environmental variables.

3) Add a new variable, **PATH** with the address **C:\Program Files** (x86)\Microchip\MPLABX\mplab\_ide\bin.

Variable name: PATH Variable value: C:\Program Files (x86)\Microchip\MPLABX\		
Variable value: C:\Program Files (x86)\Microchip\MPLABX	Variable name:	PATH
	Variable value:	C:\Program Files (x86)\Microchip\MPLABX\m

Variable	Value
PATH	C:\Program Files (x86)\Microchip\MPLAB
TEMP	%USERPROFILE%\AppData\Local\Temp
TMP	%USERPROFILE%\AppData\Local\Temp
	New Edit Delete
vstem variables	New Edit Delete
ystem variables	New Edit Delete
ystem variables Variable	New Edit Delete
ystem variables Variable ComSpec	New     Edit     Delete       Value
vstem variables Variable ComSpec FP_NO_HOST_C	New     Edit     Delete       Value         C:\windows\system32\cmd.exe
ystem variables Variable ComSpec FP_NO_HOST_C NUMBER_OF_P.	New     Edit     Delete       Value         C:\windows\system32\cmd.exe        C     NO        12
vstem variables Variable ComSpec FP_NO_HOST_C NUMBER_OF_P. OS	New     Edit     Delete       Value        C:\windows\system32\cmd.exe       C     NO        12       Windows_NT