ATOMIC PROGRAMMING

Jennic JN5148 Support
Using the Atomic Programming Center ApPC

Introduction

This application note is designed to introduce features of the ApPC software that can be used to enhance support of Jennic JN5148 wireless microcontrollers. This includes:

- Individual Sector Programming
- Integrating Jennic License Files into ApPC
- Using the AP-114 to load Jennic encrypted applications and serialization data into FLASH memory of devices in a production environment.
- Controlling the additional output lines on the AP-114

Installing the Atomic Software

Installing ApPC
- Insert the Atomic Programming CD into the CD-ROM drive
- Your web browser should start automatically. If the HTML program does not start, double click on **welcome.htm** from the directory window for your CD-ROM drive
- Browse to the Software page
- Select the ApPC link, and select the RUN option
- Uncheck any components you do not want to install, although it is recommended that all items are installed
- Please read the License Agreement carefully and select **I Agree** to continue the installation
- The Microsoft .NET framework is automatically installed if required, in addition to the selected components

At the end of the installation, close the Setup dialog box. There is no need to reboot you PC. Ensure the CD is **NOT** removed

Installing the Drivers
- Now connect the supplied USB cable to the back of the programmer.
- Connect the other end of the USB cable to a USB port on your computer. Windows should detect the programmer, and launch the **Windows Found New Hardware Wizard**
- When asked if Windows can connect to Windows Update to search for software, select **No, not this time**
- The Hardware wizard helps install the USB Control Port drivers for the programmer. Select **Install from a list of specified location**
- Browse to the **Driver** folder on the CD and click **Next**
- Please note that the software has currently not passed Windows Logo testing, and it is completely safe to continue with the installation
- After the Control Port has been installed, the wizard will launch again, this time to install the Device Programmer drivers.
- Follow the same steps as above, again installing from the **Driver** folder on the CD
- Once completed, click on Finish. There is no need to restart the PC

Sector Programming

When using the AP-114 to program SPI Flash memories there may be cases where it is not necessary to program all sectors of the Flash memory device. This may well be the case when programming Flash memories that are intended to be used with the Jennic JN5148 wireless microcontroller. When programming devices that support this feature, then additional options will be included on the **Programming Options** window as shown below.
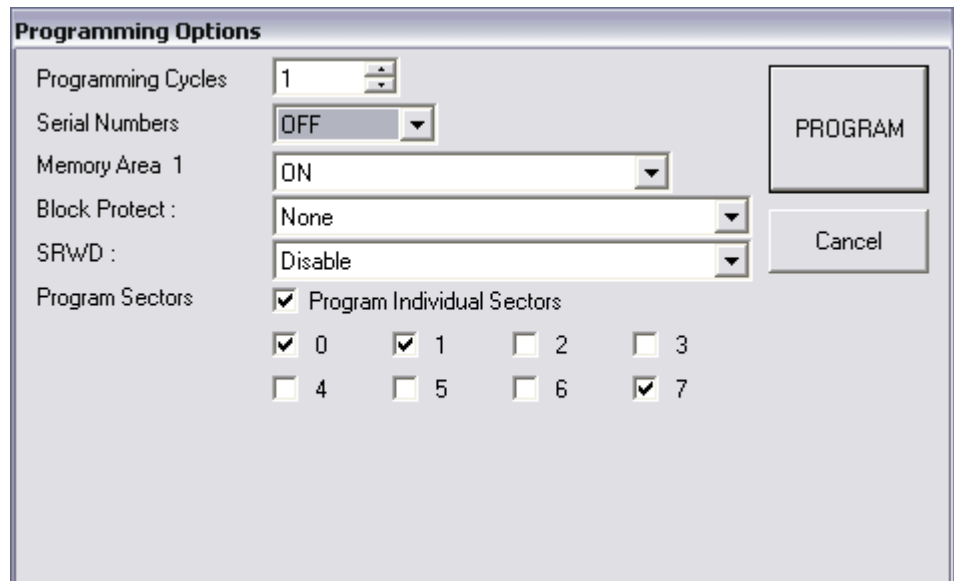
To use this feature, simply check the **Program Individual Sectors** box and select the sectors to be programmed. If a sector is not selected then no erase (if required), program or verify cycle will be performed on that sector. This approach will reduce the programming time wasted when programming sectors that are not required.

This feature is also available through the ApPC COM Object. Property **SectorProgramming** is of type byte. Each bit specifies whether that sector should be programmed. Once set up, use the **ProgramDevice** function as normal.
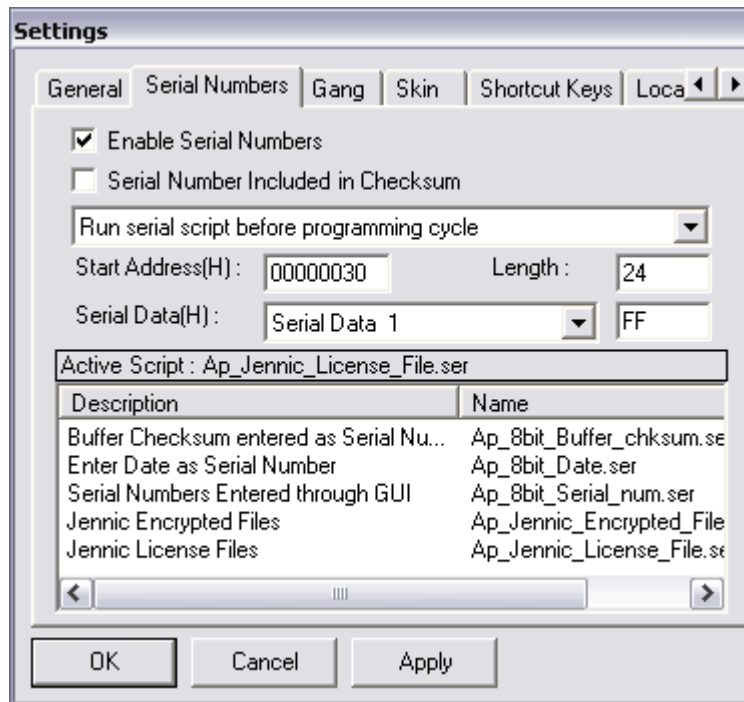
Integrating Jennic Licence files

The AP-114 can be used in a production environment to load Jennic application data into the device Flash memory. This includes the Jennic License files needed to add a MAC address to the completed binary.
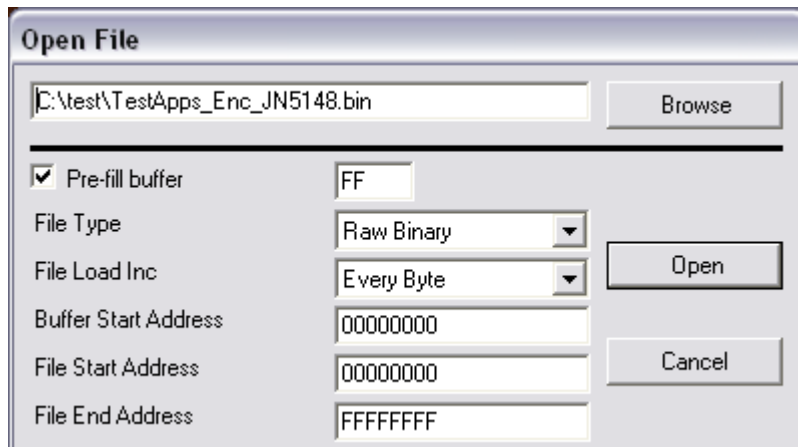
Writing to the Flash Device

1. Start ApPC, first making sure that the AP-114 programmer is connected to the PC. The ApPC main window will appear.

2. Select the correct Flash device (this will probably be a Numonix M25P10A or M25P40) and select the package as ISP (this is because the target platform is self-powered).

3. Enable the serial numbers as follows (and as indicated in the screenshot below):

   a. Click **Settings** and then, in the **Settings** window, select the **Serial Numbers** tab.

   b. Ensure that the **Enable Serial Numbers** checkbox is ticked, select the option **Run serial script before programming cycle** from the drop-down menu and then select **Jennic License Files** from the list.

   The 'Active Script' should change to **Ap_Jennic_License_File.ser**.

c. Setting the Serial Data is not important in this case because the data will be reloaded at the beginning of each programming cycle from the License File.
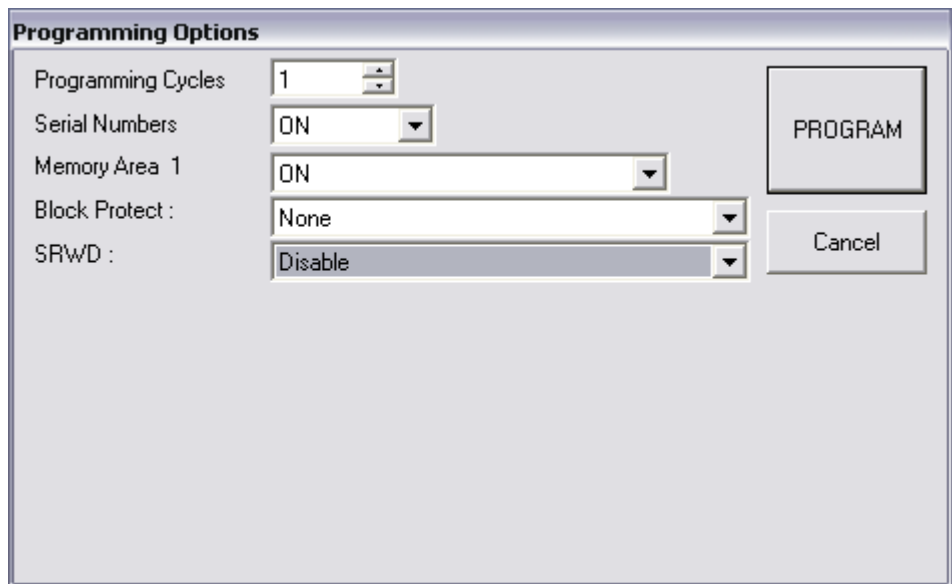
d. Click **OK**.

4. Click **File** in the main window and then click **Open**. Use the **Browse** button to select the binary file to be loaded, leaving the other options as shown in the screenshot below.

5. Click **Open** to load this data into the programmer tool.

Note that the data buffer can be viewed/edited using the Buffer window, if required.

6. Follow the path **Action > Program** to display the following **Programming Options** window:

Note: In this application, the protection features in the Flash device are not required and have been set to 'Block Protect: None' and 'SRWD: Disable'.

Programming Options

Programming Cycles	1
Serial Numbers	ON
Memory Area 1	ON
Block Protect :	None
SRWD :	Disable

PROGRAM

Cancel

7. Click **Program** to load the binary file into the target Flash device.

   Note: When exiting the software, the above settings will all be saved.

Jennic Encrypted Algorithms

The AP-114 can be used to load encrypted applications and serialisation data into Flash memory of devices in a production environment. These files are generated using the Jennic JET encryption Tool.

Programming the Flash

This section explains how to set up the ApPC software and program a Flash device. This procedure requires that the AP-114 is connected to the PC, and to the target board that carries the JN5148 module and associated Flash device.

Setting up the Data Serialisation File

Before you start the ApPC software, you must edit the ***Ap_Jennic_Encrypted _File.ser*** file. This can be found in the ***C:\Program Files\Atomic Programming\ApPC\Scripts*** folder

It needs to point to the ***encrypted output text file*** from the Jennic Encryption Tool. Change line 21 from:

```
Const FILENAME = "c:\Programmer\output.txt"
```

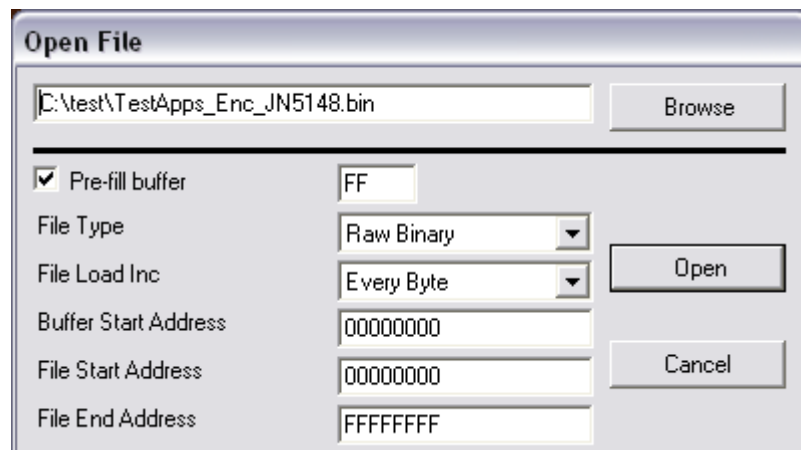to point to the required new location.

Note: Please make sure that Programming Center (ApPC) software is version 1.3 (or above).

Writing to the Flash Device

1. Start ApPC, first making sure that the AP-114 programmer is connected to the PC. The ApPC main window will appear.

2. Select the correct Flash device (this will probably be a Numonix M25P10A or M25P40) and select the package as ISP (this is because the target platform is self-powered).

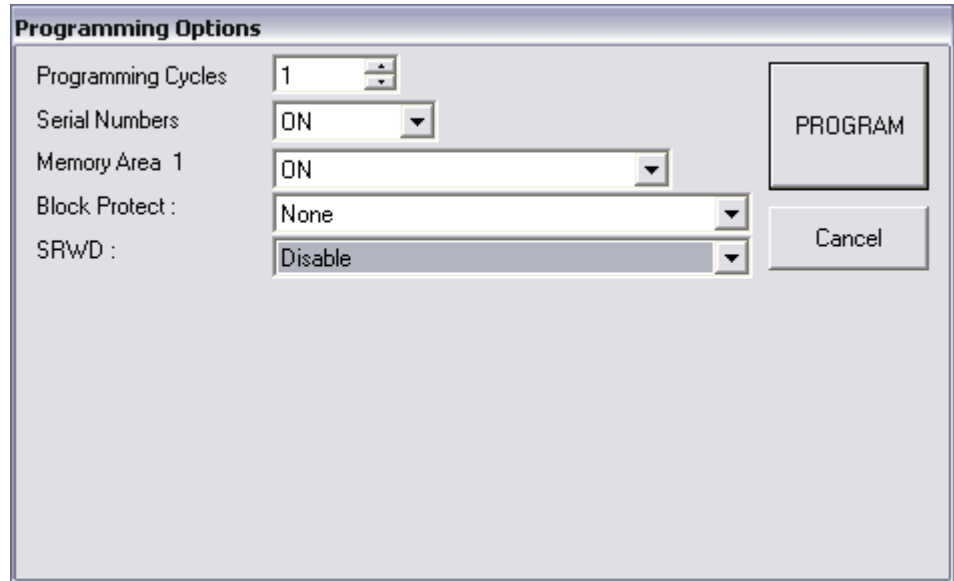3. Enable the serial numbers as follows (and as indicated in the screenshot below):
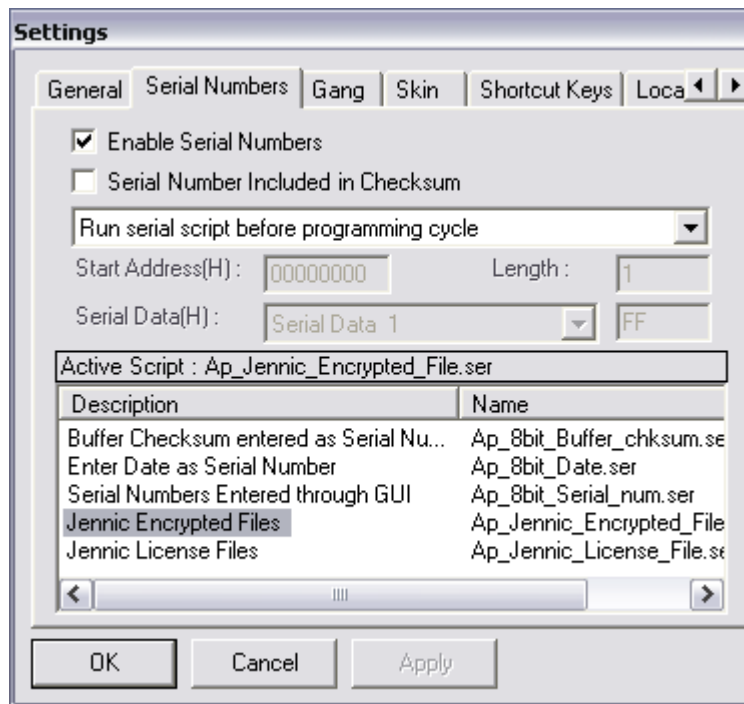
a. Click **Settings** and then, in the **Settings** window, select the **Serial Numbers** tab.

b. Ensure that the **Enable Serial Numbers** checkbox is ticked, select the option **Run serial script before programming cycle** from the drop-down menu and then select **Jennic Encrypted Files** from the list.

   The '**Active Script**' should change to **Ap_Jennic_Encrypted_File.ser**.

c. Click **OK**.

4. Click **File** in the main window and then click **Open**. Use the **Browse** button to select the binary file to be loaded, leaving the other options as shown in the screenshot below.

5. Click **Open** to load this data into the programmer tool.

   Note that the data buffer can be viewed/edited using the **Buffer** window, if required.

6. Follow the path **Action > Program** to display the following **Programming Options** window.

Note: In this application, the protection features in the Flash device are not required and have been set to '**Block Protect: None**' and '**SRWD: Disable**'.
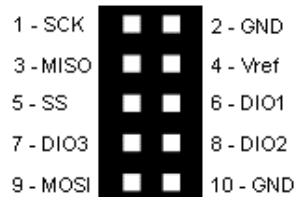

7. Click **Program** to load the binary file into the target Flash device.

Note: When exiting the software, the above settings will be saved.

Connecting to the AP-114 ISP/JTAG Programming System

To connect the AP-114 programmer directly to your hardware platform, use the 10-way Port 2 connector on the AP-114 device, shown below.

AP-114 Port 2 SPI Mode Connector

If you are using the AP-114 device with a board from a Jennic evaluation kit, such as the JN5148-EK010 ZigBee PRO Evaluation Kit, then a cable with the following mapping is required:

Signal	AP-114 Port 10-Way Header	Jennic 40-Way Expansion Header
SCK	1	22
MISO	3	23
MOSI	9	24
SS	5	25
nRESET	2**	27
Vcc (Vref)	4	39
GND	10	40

Table 1: Cable Mapping for Jennic Board

** Connect to GND to hold the JN5148 in reset during the programming cycle.

Accessing the additional I/O lines

There are three additional output lines available on the AP-114 ports. The default values of these pins are shown below.

Device Type	DIO1	DIO2	DIO3
SPI	H	H	H
Microwire	Device Dependant	Device Dependent	H
I^{2}C	L	L	L

These defaults are defined to support the additional standalone adapters that fit into the AP-114. Details of these adapters are available at

http://www.atomicprogramming.com/ap114.htm

These pins are available through the ApPC COM-Object and are repeated below

Methods

SetDIO1(*level*)

> **Arguments**
> *level*: boolean- set True to set the pin high

> **Returns**
> *boolean* - True is operation completed successfully

> **Remarks**
> Sets Pin 6 (10 way connector) and Pin 9 (14 way)

SetDIO2(*level*)

> **Arguments**
> *level*: boolean- set True to set the pin high

> **Returns**
> *boolean* - True is operation completed successfully

> **Remarks**
> Sets Pin 8 (10 way connector) and Pin 11 (14 way)

SetDIO3(*level*)

> **Arguments**
> *level*: boolean- set True to set the pin high

> **Returns**
> boolean - True is operation completed successfully

> **Remarks**
> Sets Pin 7 (10 way connector) and Pin 13 (14 way)

For details on all of the features available within the ActiveX objects please refer to the ApPC COM Object Help file.

Atomic Programming produce a range of products to support the Jennic JN5148 Wireless Microcontroller.

The AP-114 programmer, supplied with an additional cable assembly, connect s directly to the Jennic JN5148-EK010 evaluation kit Sensor and Controller boards. The cable allows the JN5148 Debugger to be run directly on the Evaluation Kit. Programming support is also available, both for the JN5148-M0x modules and the Serial Flash devices used on the modules.

The AP-300 - 802.15.4 Wireless Gateway offers a ready-made solution for developing IEEE 802.15.4, ZigBee or Jenie/JenNet wireless network applications with IPv4 connectivity. It provides an interface between a standard Ethernet LAN system and an IEEE 802.15.4-based wireless network.

For more information, see:

www.atomicprogramming.com/jennic

For latest software updates, check:

www.atomicprogramming.com/downloads

For technical support, help & advice, visit:

www.deviceprogrammers.net/forum

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