CodeGen8

MCU Code Generator for ABOV 8051 Series

User's Manual

Version 1.0.2

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1   Overview

'CodeGen8' is a program that maximizes the development efficiency by creating bug-free basic source codes and projects in a short time for application S/W developers who use ABOV's 8051 products.

The CodeGen8 program creates the source codes and projects in a form that can be compiled using a commercial compiler of KEIL and IAR.

The CodeGen8 program only operates in S/W without a separate H/W.

1.1   System requirements

The CodeGen8 requires one of the following operating systems:

- Microsoft Windows Vista

- Microsoft Windows 7

- Microsoft Windows 8 & 8.1

- Microsoft Windows 10 & later

As software, the CodeGen8 program can run on a basic PC, and does not require special specifications.

2   Installation

2.1   Program download

Users can download the installer at ABOV's website. This is an ideal way for the users to always have the latest version of the software, as ABOV continues to add new devices and features to its website.

The setup file's name displays the version number and the date it was created. For example, when the setup file's name is "Setup_CodeGen8_V1.234.56(210912).exe", it displays the following information:

- The installer is for the CodeGen8 programmer S/W package.

- The installer's version is 1.234.56. Each number separated by a period has the following meaning:

  — Major version = 1

  — Minor version = 234,

  — Patch version = 56

- It was released on September 12, 2021.

Once the CodeGen8 application is launched, it searches for a newer version from the ABOV website. When the CodeGen8 program finds a newer version, it informs to users.

2.2   Program installation

Once the program installation is finished, users see the message shown in Figure 1. The users can run the installer without receiving a request for a software license nor a driver.

Figure 1 Run Downloaded Installer

3 How to use CodeGen8 program

3.1 Introduction

With just a few mouse clicks, the CodeGen8 program creates source codes and S/W projects, which could be created through a variety of time-consuming processes such as knowing device specification, understanding each peripheral's operation, SFR structure and control methods, and specifying the I/O pins.

While using the CodeGen8 program, developers can directly obtain the optimized project for a compiler they are using (e.g. KEIL, IAR). Besides, the users need to remember the things below when using the CodeGen8 program:

- The CodeGen8 program does not include any compiler. Therefore users should ask the corresponding company about the compiler.

- The CodeGen8 program is very intuitive and easy for users to use, even if the users do not read this document.

3.1.1   Program start

When starting the program, users can see a dialog box as shown in Figure 2.

In the initial state, most buttons in the dialog box are disabled and remain in that state until users create projects. If there are projects created previously, the users can import or erase the projects.

The procedure for creating a project is as follows:

1. Set the target device for developing an application.

    A. Set the series name.

    B. Set the device name.

    C. Set the package type.

2. Enter project name, then the 'NEW project' button is activated.

3. Click on the 'NEW project' button to start a new project.

A project is automatically saved when the target project changes during the CodeGen8 operation or when the program completes the operation. The saved project can be loaded for the following tasks.
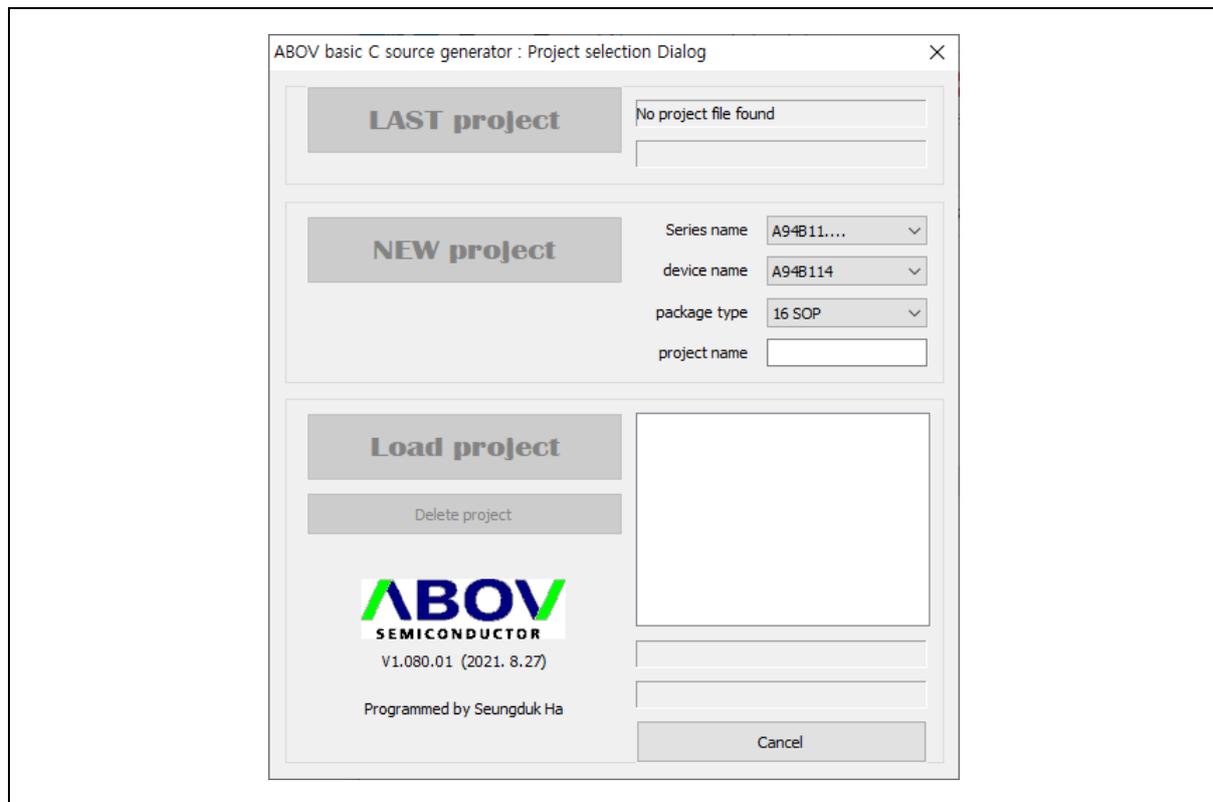
Figure 2 Project Selection Dialog Box

3.1.2   Project creation

If the user selects a project, the user can set the functions of the corresponding device on the changed screen.

As shown in Figure 3, the screen displays not only source file names to be created in the project folder, but also header files and pin maps of the selected device and a pane where the user can set the built-in peripherals.
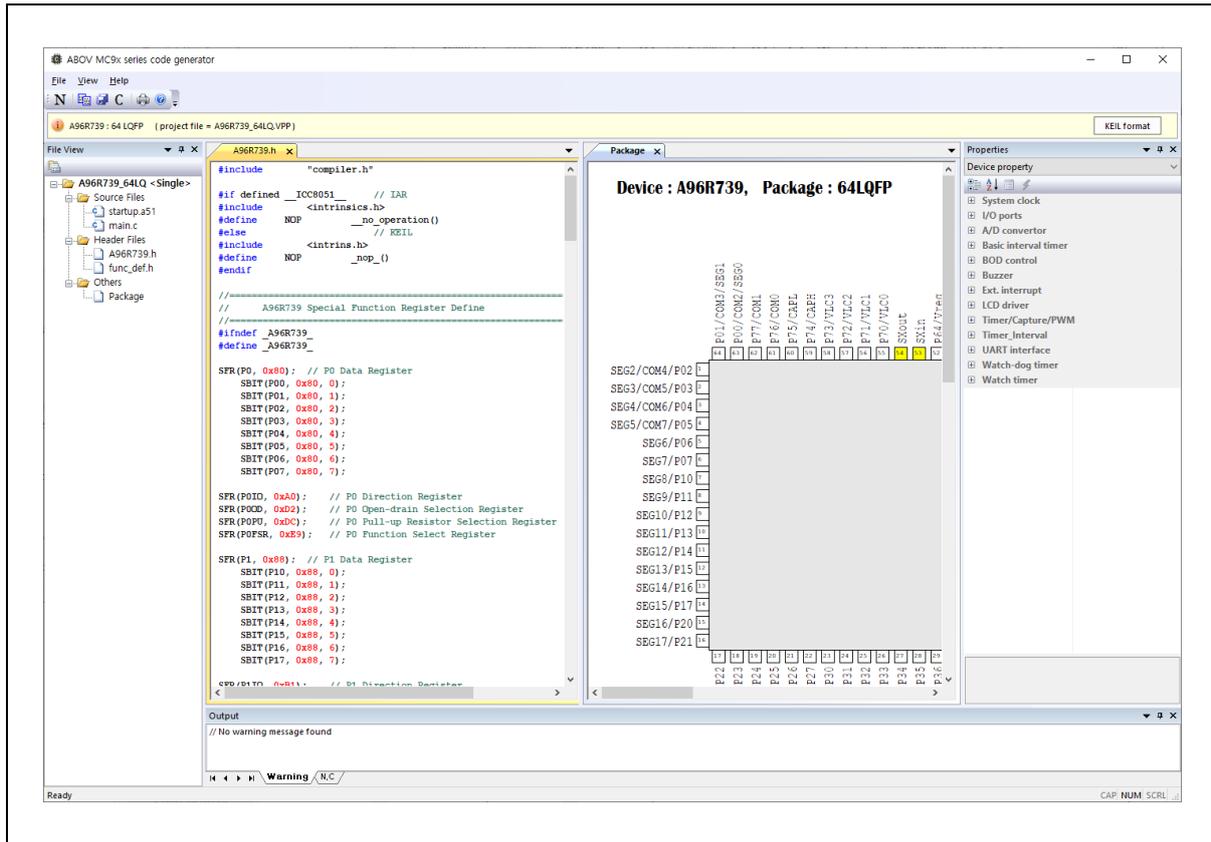
Figure 3 CodeGen8 Program

3.2   Menus

There are three menus in the ribbon menu: File, View, and Help.

3.2.1   File

Figure 4 shows a ribbon menu when the 'File' menu is selected. Using the File menu, the users can select a function regarding files and options of a project.
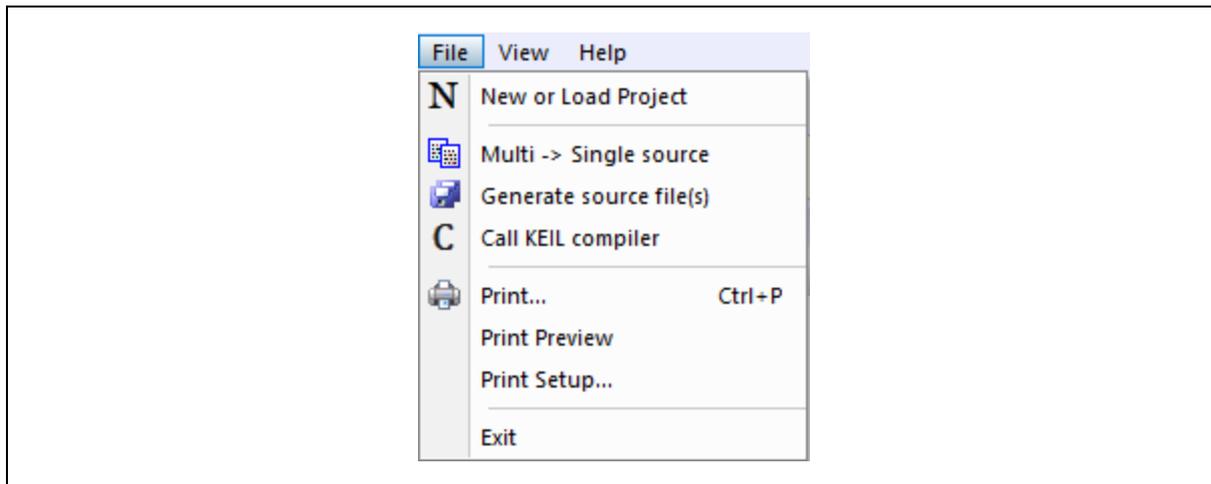
Figure 4 File Menu

The File menu includes the sub-menus listed below:

- New or Load Project: It closes the project that the user is currently working on, and then starts new project or loads a project that was saved previously. The project selection dialog box (shown in Figure 2) is displayed again to allow the user to create a new project or load an existing project.

- Multi -> Single source/ Single -> Multi source: It changes a composition of a source file that is created by the CodeGen8 program. For detailed information on this, please refer to **3.2.1 File**.

- Generate source file(s): It saves the source code and project as a format of KEIL or IAR in a hard disk.

Users can select a format between KEIL format and IAR format by clicking on the button located top-right of the window as shown in Figure 5. This button toggles KEIL format and IAR format as the user clicks it.

Figure 5 Format Selection between KEIL and IAR

The files to be saved are as follows:

— Project files for a specified compiler.

— A device header file

— Main program

— A header file containing definitions of the initial functions of each peripheral

• Call KEIL compiler/ Call IAR compiler: It saves source codes and projects as a format of KEIL or IAR in a hard disk, and then call the corresponding compiler. Please remember that ABOV does not provide compilers.

• Print…: It prints the specified files out.

• Print Preview: It allows users to preview the corresponding files before outputting them to a printer.

• Print Setup…: It sets the printer to use.

• Exit: It terminates the CodeGen8 program. Projects users are working on are automatically saved.

3.2.2   View

Figure 6 shows a ribbon menu when the 'View' menu is selected. Using the View menu, the users can set the menu configuration and colors of the CodeGen8 program on the screen. Therefore, this menu does not affect the code creation function even if it is not set.
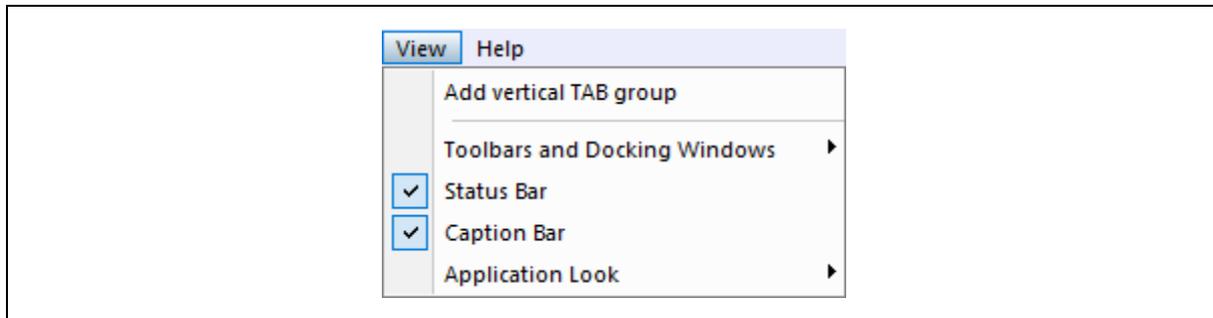
Figure 6 View Menu

The View menu includes the sub-menus listed below:

- Add vertical TAB group: It provides functionality for a tab control. The tab control displays a dockable window with flat or three-dimensional tabs at its top or bottom. The tabs can display text and an image and can change color when active.

- Toolbars and Docking Windows: It shows or hides various child views. If the users select child views as shown in Figure 7, the selected child views open.
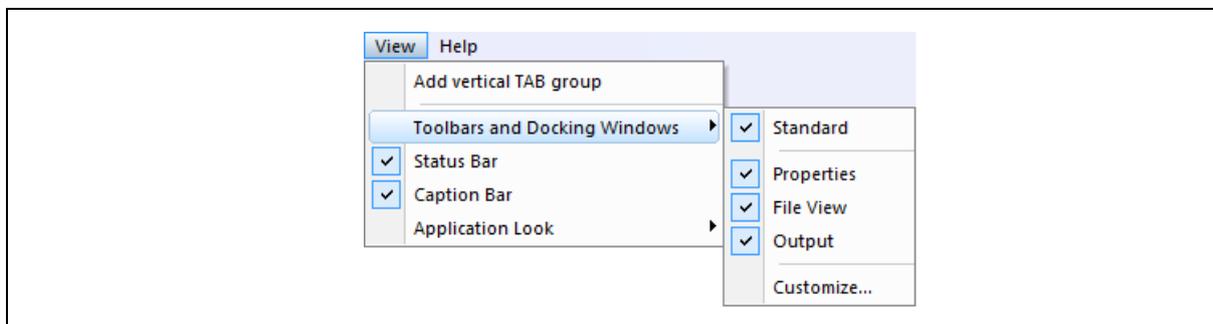
Figure 7 Child View Selection

- Status Bar: It turns the Status bar on or off.

- Caption Bar: It turns the Caption bar on or off.

- Application Look: It changes the CodeGen8 software's GUI style at once.
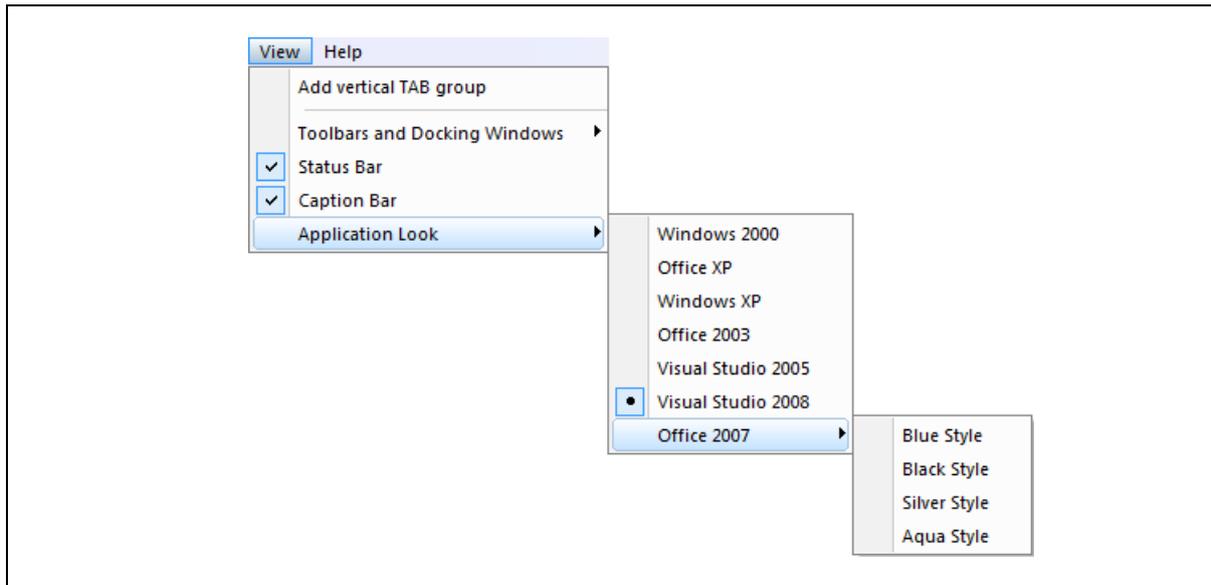
Figure 8 Menu Extension

3.2.3   Help

Figure 9 shows a ribbon menu when the 'Help' menu is selected. Using the Help menu, the users can identify the CodeGen8 version and check copyright, generated data, and programmer.
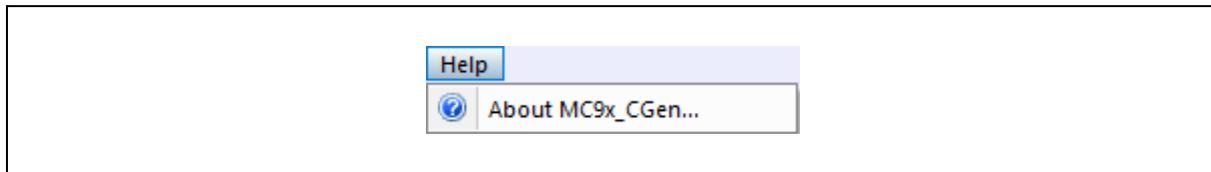
Figure 9 Help Menu
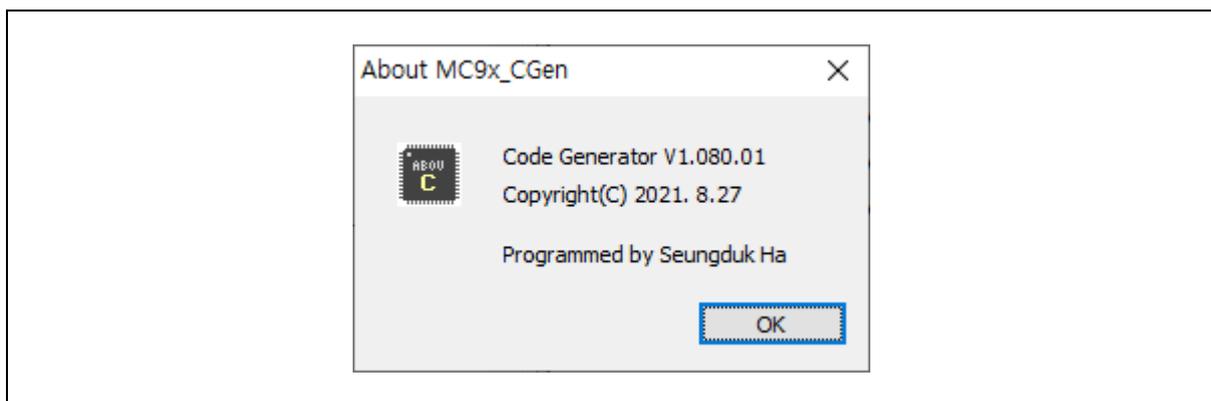
Figure 10 About Dialog Box

3.3   Control bars

3.3.1   Tool bar

The Tool bar is a control bar that implements frequently used functions in the form of buttons and collects them. On the Tool bar, the users can start certain functions by simply clicking on the button without opening a series of menus.
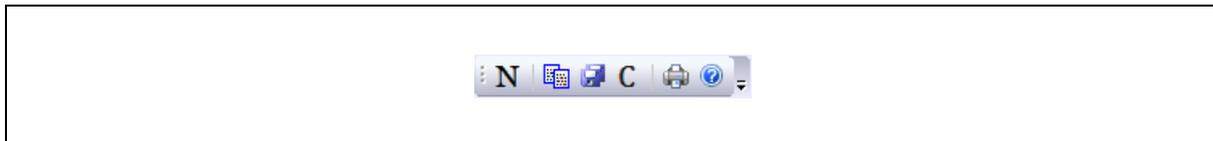
Figure 11 Help Menu: Tool Bar

3.3.2   Caption bar

The Caption bar displays the device name, package type, project name and project target compiler button.
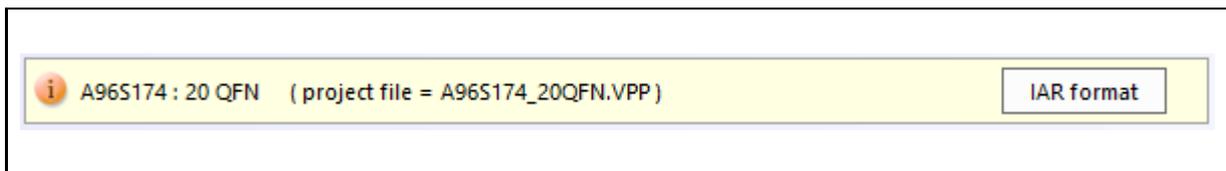
Figure 12 Help Menu: Caption Bar

3.3.3   Status bar

The Status bar displays information on the current state of the CodeGen8.
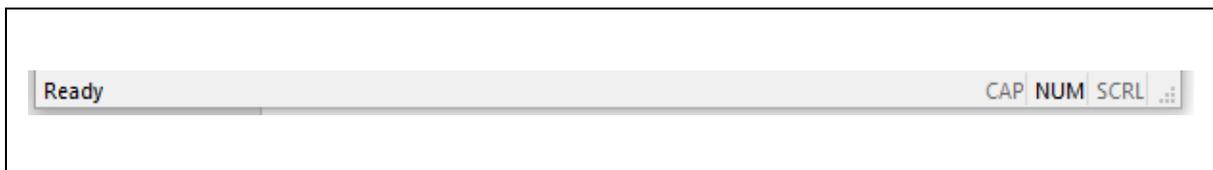
Figure 13 Help Menu: Status Bar

3.4   Description of each pane

3.4.1   File View pane

In this pane, files that are used or will be used in the Project are listed: Source file (*.c), Header file (*.h), and other files that are requested.

As shown in Table 1, the created files differ depending on whether a user selects a Single-source file project or a Multi-source file project. The Single-source file project is selected by default.

Table 1 shows the difference between the Single-source file project selection and Multi-source file project selection. Each file opens when the user double-clicks on the file name.

Table 1 Difference between Single/ Multi Source File Projects

Single source file project	Multi source file project
• All codes are created in the main.c file. • The main.c includes all of the interrupts, peripheral initialize codes, and call functions.	• Each source code for a function is created. • The main.c includes only codes for the call functions, and the interrupt and peripheral initialize codes are created in individual files, respectively.

3.4.2   Text file pane

This pane shows the selected text file as shown in Figure 14. The file is created by the CodeGen8, and does not support the edit function with user key inputs.

In the C-type source program, different colors are applied to each keyword to enhance readability.
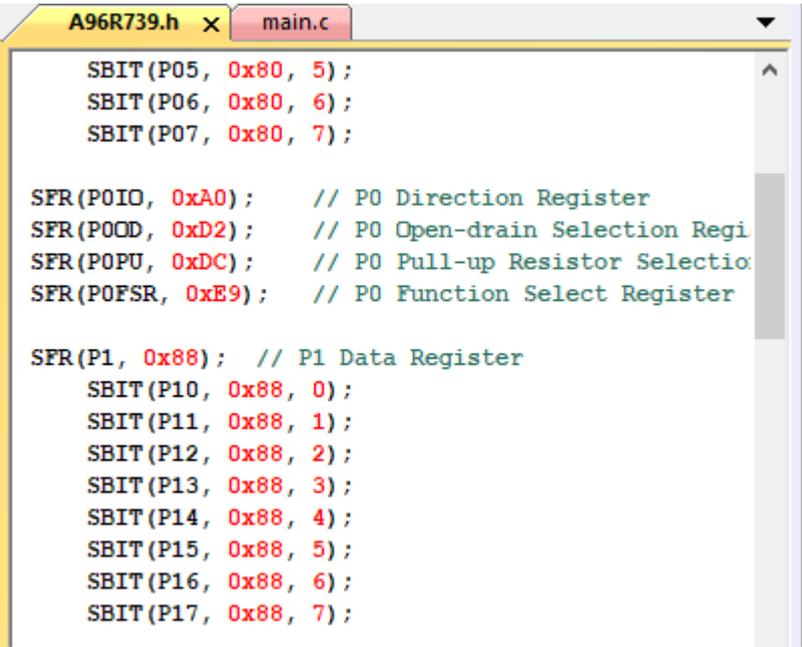

```
A96R739.h  X    main.c                                        ▼
      SBIT(P05, 0x80, 5);
      SBIT(P06, 0x80, 6);
      SBIT(P07, 0x80, 7);

SFR(P0IO, 0xA0);      // P0 Direction Register
SFR(P0OD, 0xD2);      // P0 Open-drain Selection Regi
SFR(P0PU, 0xDC);      // P0 Pull-up Resistor Selectio
SFR(P0FSR, 0xE9);     // P0 Function Select Register

SFR(P1, 0x88);  // P1 Data Register
      SBIT(P10, 0x88, 0);
      SBIT(P11, 0x88, 1);
      SBIT(P12, 0x88, 2);
      SBIT(P13, 0x88, 3);
      SBIT(P14, 0x88, 4);
      SBIT(P15, 0x88, 5);
      SBIT(P16, 0x88, 6);
      SBIT(P17, 0x88, 7);
```

Figure 14 Device Selection

3.4.3   Package pane

This pane displays packages of the selected device, and allows users to specify the initial settings for each pin.

To set a function on a pin in the Package pane, double click on the pin to open a dialog box for the pin settings. When the pin completes to be set, it is displayed in a different color.
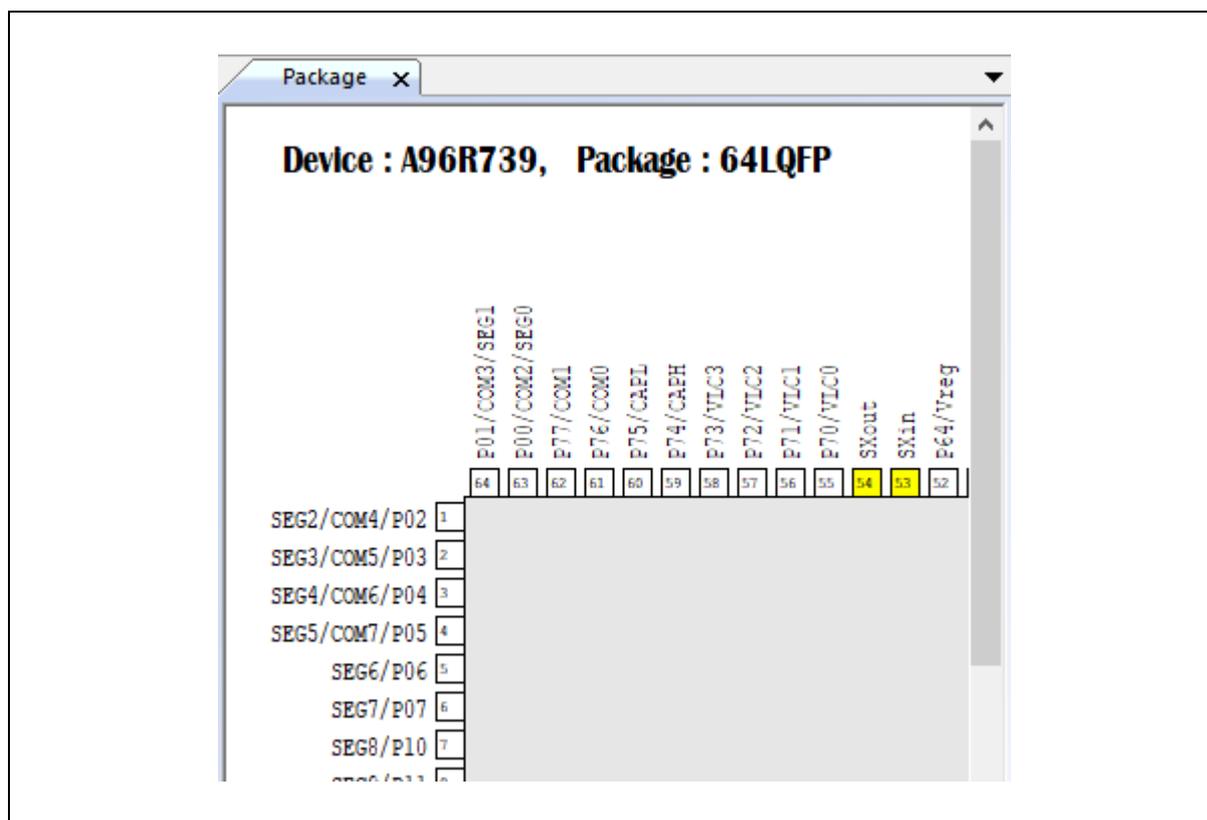
Figure 15 Load Hex File

Users can easily read the status of the pin because it is displayed in different colors.

Table 2 Definition of Color

Pin color	Meaning
Red	This pin is a power source pin.
Blue	This pin is a ground pin.
White	This pin is not assigned function yet.
Yellow	• This pin is assigned a specific function. • Assigned function text color changed to red. • Assigned pin list is displayed under package shape.

3.4.4　　Properties pane

The Properties pane introduces the most important function of the CodeGen8 program, and is shown in Figure 16.

In this pane, users can set the detailed initial status of built-in peripherals of the selected device. Since each device has a different type and number of built-in peripherals, this pane displays different configurations for each device.

Most of all, the Properties pane is designed intuitively allowing application developers to set the necessary functions without any difficulties, even if the users are not familiar with the data book of the device the users want to use.

If users select each sub-menu, related functions are expanded and displayed so that the users can check or modify the value. The changed value in this pane is immediately applied to the source code and updates the corresponding display.
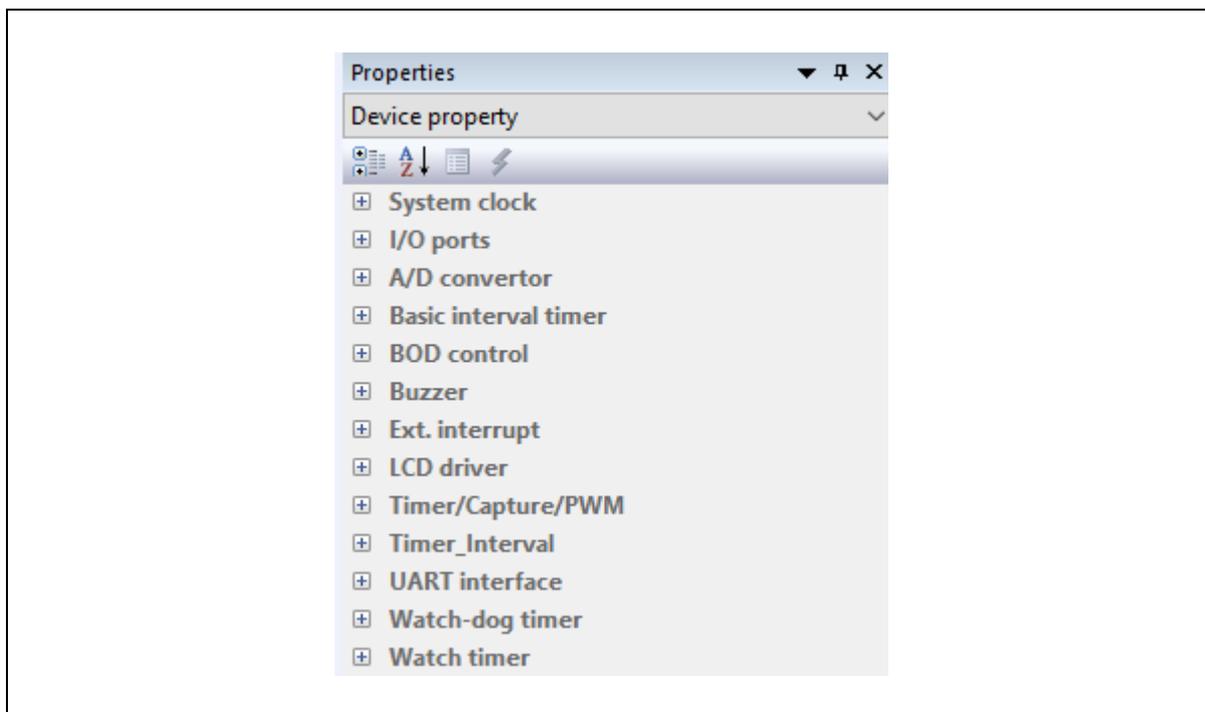
Figure 16 Properties Pane

3.4.5   Output pane

The Output pane displays a warning message of the device peripheral settings or conflictions. Users must clear the warning message by changing the device peripheral settings. Otherwise, it creates C source program that omits some peripheral settings.
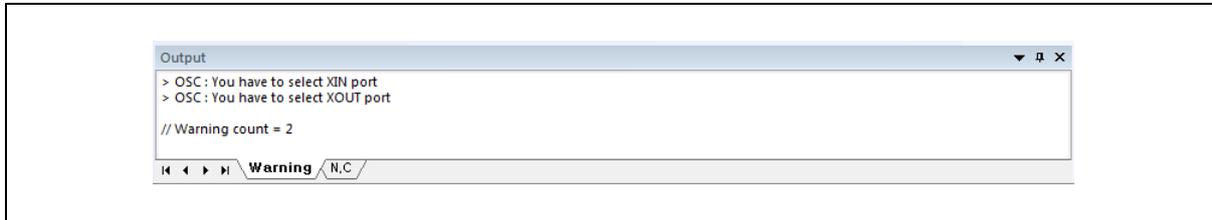
Figure 17 Output Pane

3.5   Output files

3.5.1   Project files

The project files created here are for the purpose of being identified by the compiler that developers are using.

It includes the device information used when compiling source files (e.g.: memory map) and the path information of the source files used by application software.

The CodeGen8 program creates project files for the 8051 compiler of KEIL and IAR.

3.5.2   Header files

A header file includes the files below:

- Description of peripheral address information of the target device. It consists of DEFINE statements that can be used by KEIL or IAR.

- Basic definition of functions used for device initialization.

3.5.3   Source files

A source file includes the files below:

- Main.c: A main file of a C source program. It describes the overall flow of an application program.

- Description of peripheral initialization function of the target device. It describes functions that reflect all values set by users using the CodeGen8 program.

- Description of interrupt routine of a device.

Revision history

Version	Date	Description
1.0.0	May. 2013	First release, Support KEIL project only.
1.0.1	Feb. 2019	Change program name from VPE to CodeGen8
1.0.2	Oct. 2021	Add IAR project generating feature

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