
TMS320C642x Pin Multiplexing Utility

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ABSTRACT

The C642x devices use a great deal of internal pin multiplexing to allow the most functionality in the smallest and lowest cost package. The software accompanying this application report allows the pin multiplexing registers of the device to be calculated with ease, as well as showing what peripherals can be used together and what devices of the C642x family support the peripherals that are selected. This software is useful to anyone creating a system with a C642x device.

This application report contains project code that can be downloaded from <http://www.ti.com/lit/zip/SPRAAN2>.

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1 System Requirements

The C642x pin multiplexing utility was designed and tested on a Windows® XP operating system, however due to the relative simplicity of the utility it can function in other versions of Windows as well. This utility requires the Microsoft™ .net framework version 2.0; this can be downloaded from Microsoft at <http://msdn2.microsoft.com/en-us/netframework/aa731542.aspx>. It is suggested to use this utility with a screen resolution of 1024×768 or higher.

2 Using the C642x Pin Multiplexing Utility

This utility is a stand alone executable, there is no installation process required. Once you have opened the utility there is a user interface with various sections covering the multiplexed peripherals of the C642x devices. Simply select the peripherals necessary to your application. Note that as some peripherals share pins, when selecting one peripheral you may disable another. This way you can determine how many different combinations of peripherals are possible on the C642x devices. As the peripherals are selected, the utility dynamically updates which C642x family devices have selected the peripherals and the appropriate PINMUX register values.

Example Pin Multiplexing Configurations

Once the selections have been entered, the PINMUX register values are used in the application code to properly configure the device; all the peripherals that were selected are enabled. If the PINMUX register writes are to be done in the C environment then use the register level chip select library (CSL) provided in the peripheral support package. The code would be as shown below:

```
sysCtlRegs->PINMUX0 = 0x12345678 //where 0x12345678 is the PINMUX0 value generated
sysCtlRegs->PINMUX1 = 0x12345678 //where 0x12345678 is the PINMUX1 value generated
```

3 Example Pin Multiplexing Configurations

This utility also includes two example application configurations which provide a set of selected peripherals for a particular application. These can be selected by simply clicking on one of the buttons in the example application configurations box. Once an example configuration has been selected it can be modified to suit the needs of a specific application.

3.1 VoIP Gateway

The voice over IP (VoIP) Gateway example configuration provides a peripheral component interconnect (PCI) interface for integration into larger systems, which makes this a good application example for the C6424. In addition to the PCI, both multichannel buffered serial ports (McBSP) are fully enabled to provide flexible interfaces for audio; alternatively the multichannel audio serial port (McASP) could be used. A screen capture of the VoIP Gateway configuration can be found in [Figure 1](#).

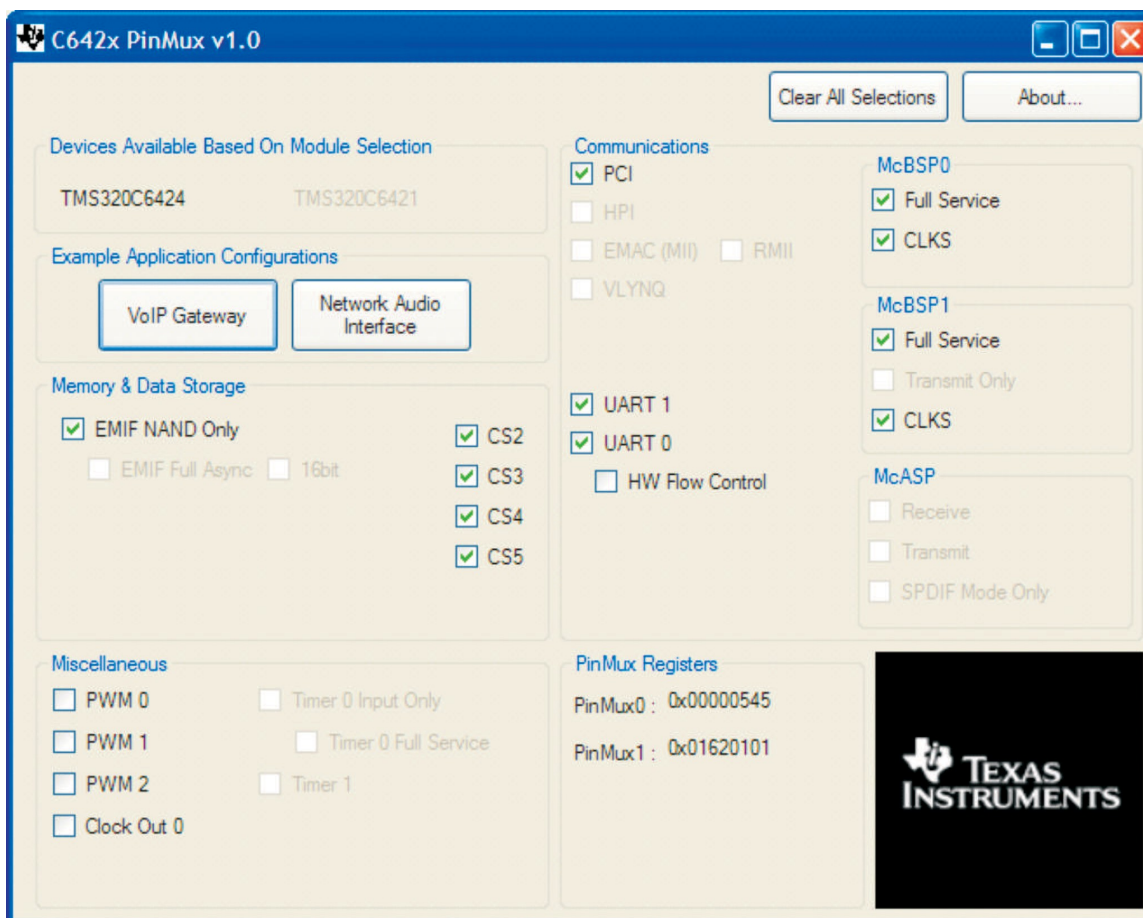


Figure 1. VoIP Gateway Configuration

3.2 Network Audio Interface

The network audio interface example configuration provides full McASP functionality as well as a reduced media independent interface (RMII) network interface for use in applications such as a network audio player or network driven speakers. This makes a good application example for the C6421 as it would not typically require the additional features included in the C6424, such as PCI. A screen capture of the network audio interface configuration can be found in [Figure 2](#).

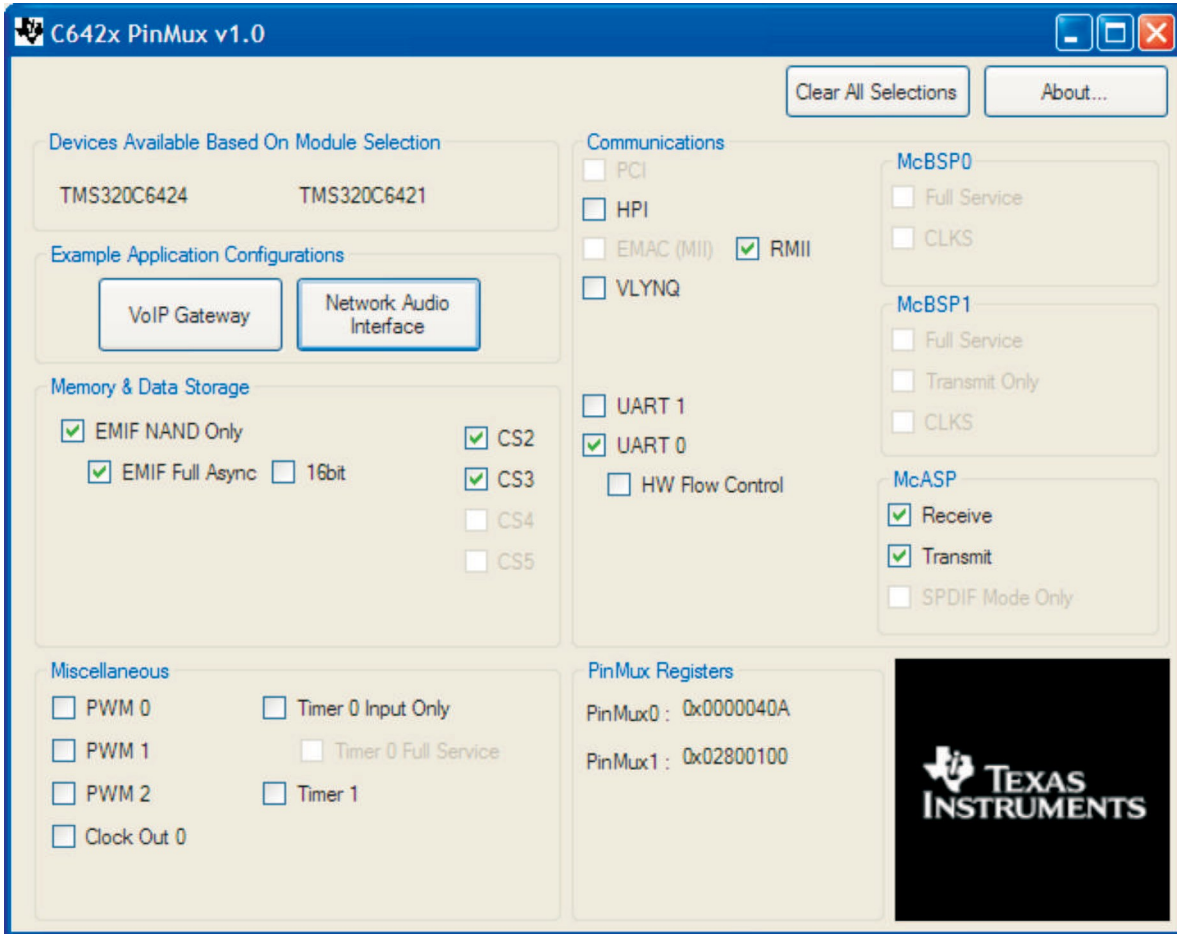


Figure 2. Network Audio Interface Configuration

4 Creating the VoIP Gateway Configuration

This section discusses the creation of the VoIP Gateway configuration in a step-by-step process starting from a blank utility shown below; this is what is seen when the utility is first started. At any time while using the utility you can determine the peripheral level multiplexing by holding the mouse over a check box; this brings up a tool tip as shown in [Figure 3](#).

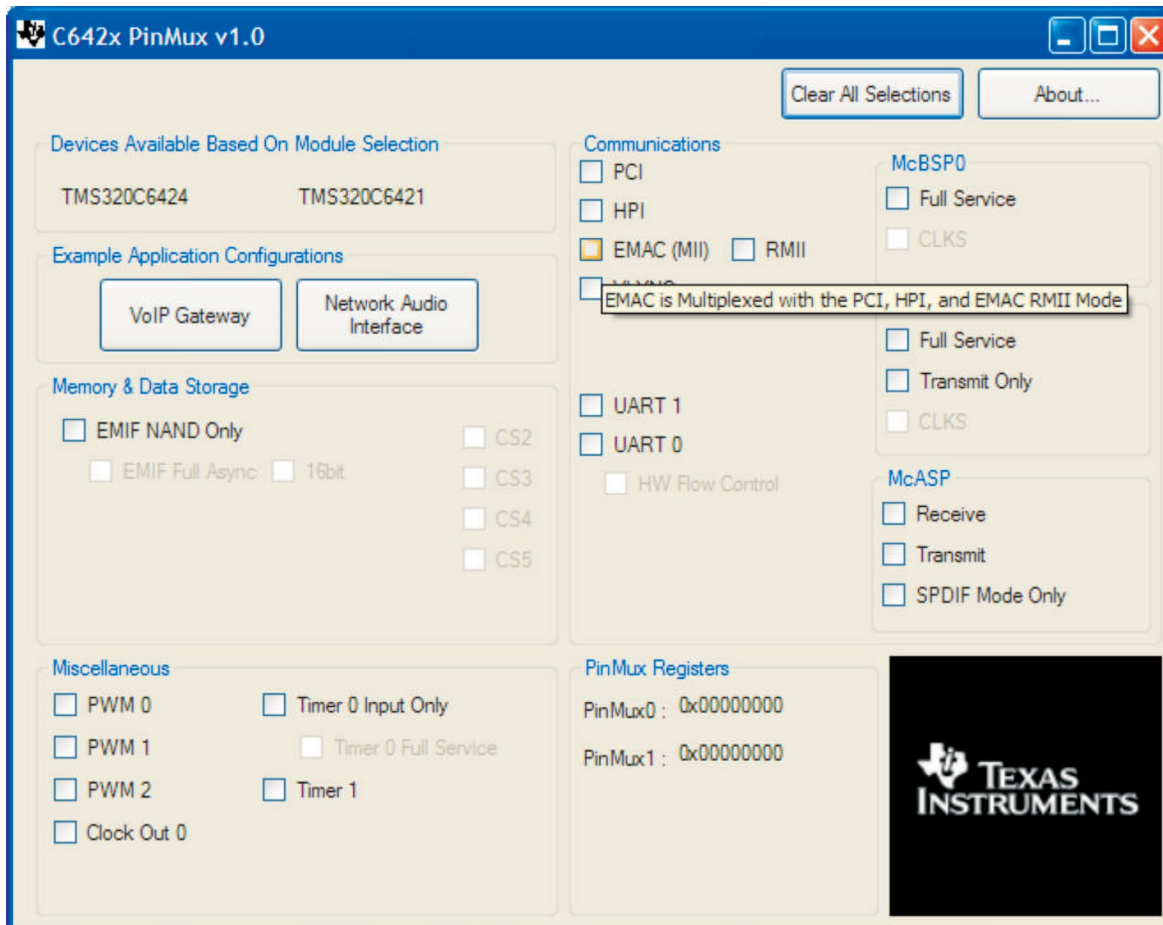


Figure 3. Blank C642x Pin Multiplexing Utility With Tool Tip

4.1 Selecting the Communication Peripherals

As this configuration is acting as a large scale VoIP gateway application, you can first enable the PCI which limits you to the C6424 device. The PCI interface allows several DSPs to be controlled by a host processor, such that a high throughput of VoIP traffic can be handled. You can also select both McBSP0 and McBSP1 for full service complete with CLKS signals for easy interfacing to external hardware which can implement the analog phone interfaces. Note that selecting the McBSPs disables the McASP due to the multiplexing. Additionally, you can select the two universal asynchronous receiver/transmitter (UART) ports to provide low speed communication on the board. This part of the selection process can be seen in Figure 4.

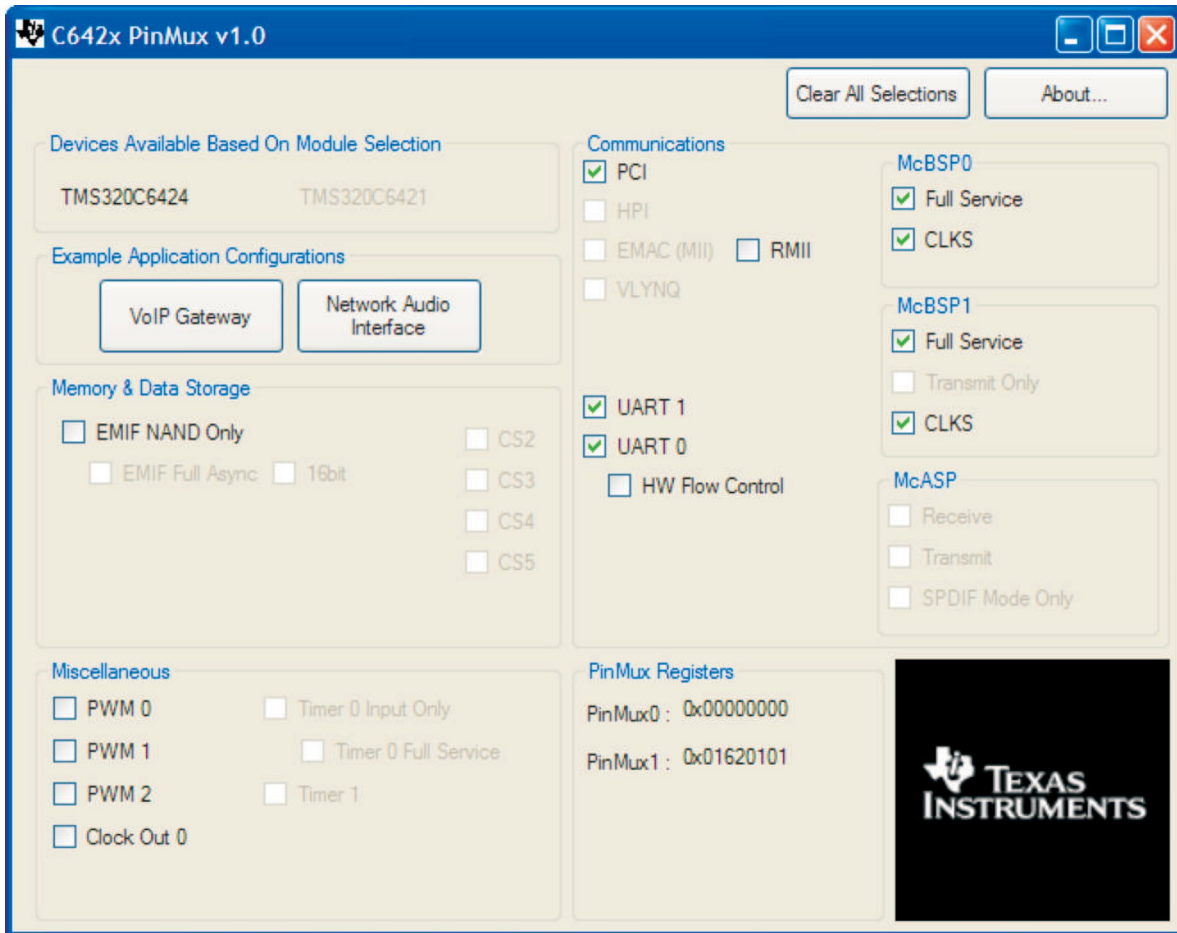


Figure 4. Selecting PCI and Serial Ports

4.2 Selecting the Memory and Data Storage Peripherals

Now that the communications interfaces are selected you can select the memory settings. In this case, since PCI has been chosen, the memory interface is limited to NAND flash only operation. Here you can also select all of the available chip select (CS) lines as they are not multiplexed with the peripherals that are already in use as can be seen in [Figure 5](#).

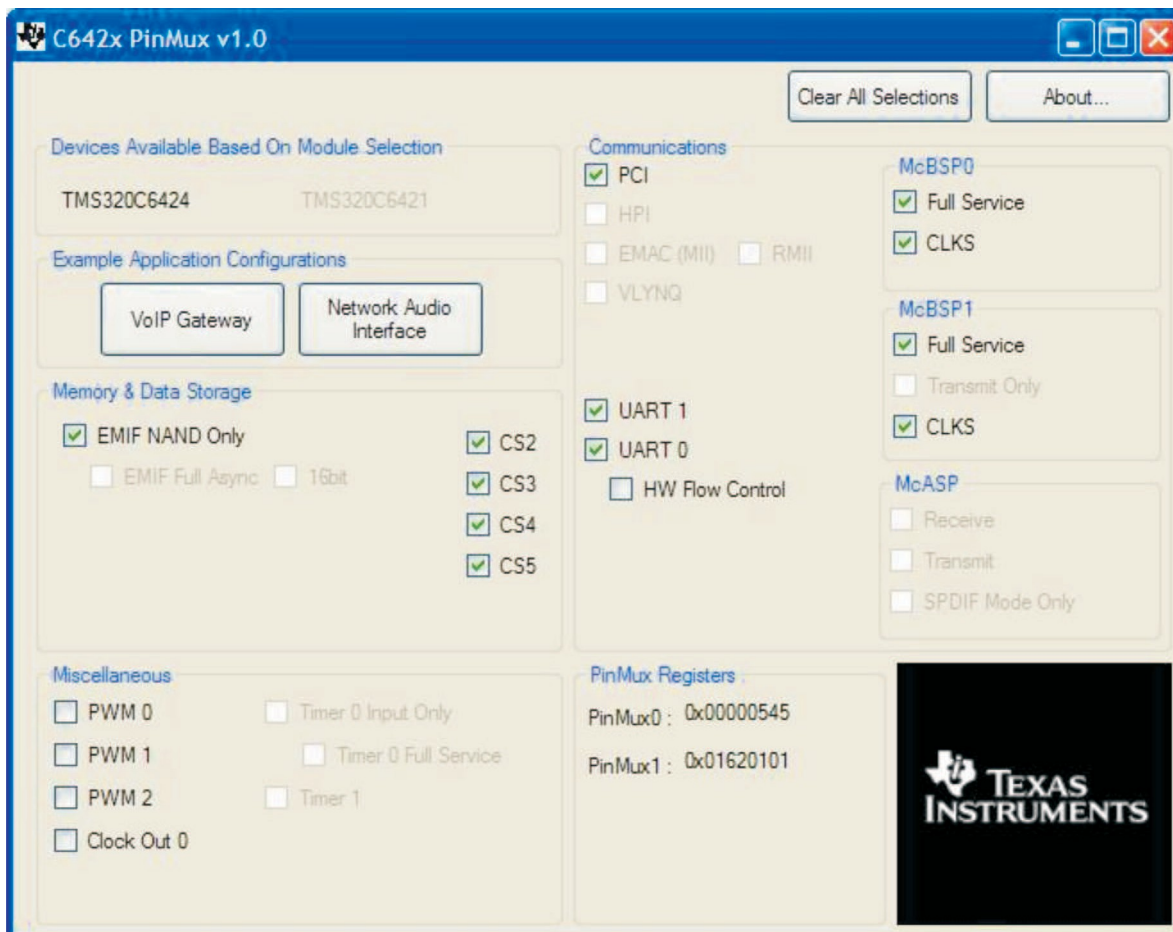


Figure 5. Selecting Memory and Data Storage

With the completion of the memory and data storage section, the configuration now fully resembles the built in VoIP Gateway example application configuration. From here, you can adjust any of the selections to better suit a particular application such as selecting pulse width modulation (PWM) or clock outputs or deselecting unnecessary peripherals.

5 References

- *TMS320C6424 Fixed-Point Digital Signal Processor Data Manual* ([SPRS347](#))
- *TMS320C6421 Fixed-Point Digital Signal Processor Data Manual* ([SPRS346](#))

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