

# Basic I-Q Control Software User's Guide Version C

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## Installation

Installed by opening the install CD and running the Setup program. Follow the directions on the install screens, as shown in Figures 1 through 8. Please do not insert the USB to SPI interface yet. Click Accept (Figure 1).

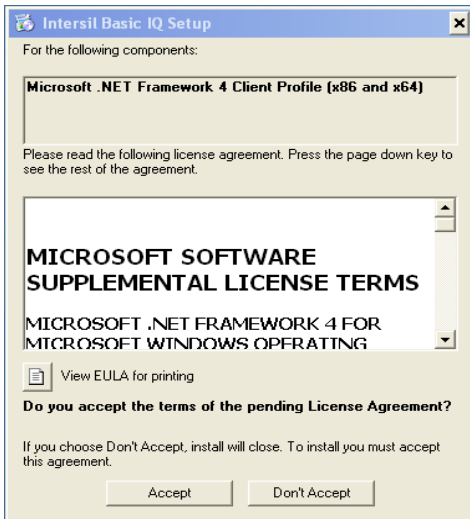


FIGURE 1.

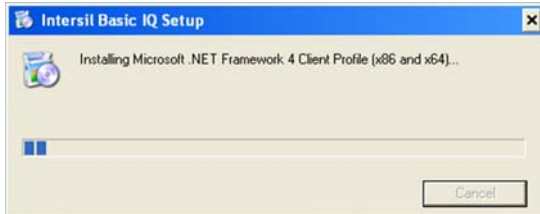


FIGURE 2.

Click Next (Figure 3).

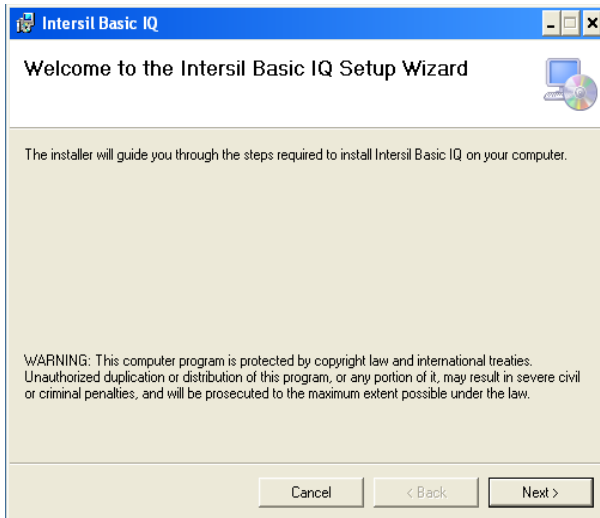


FIGURE 3.

Click I Agree (Figure 4).

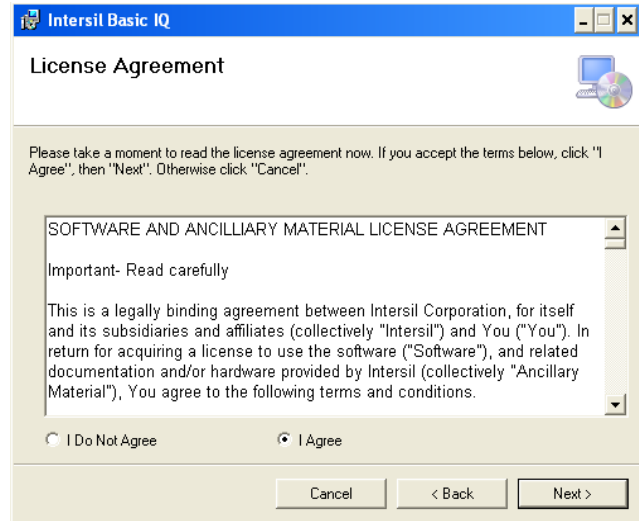


FIGURE 4.

Select folder to install Basic IQ (Figure 5).

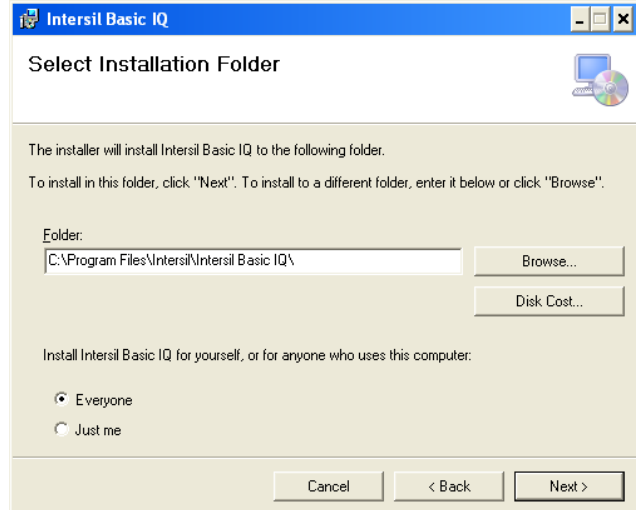
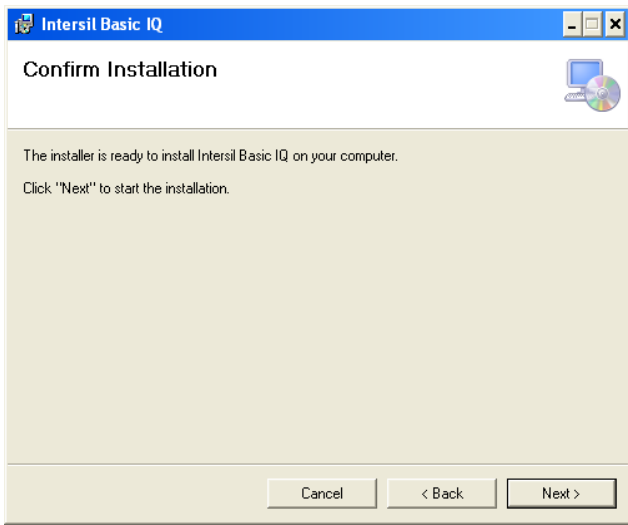


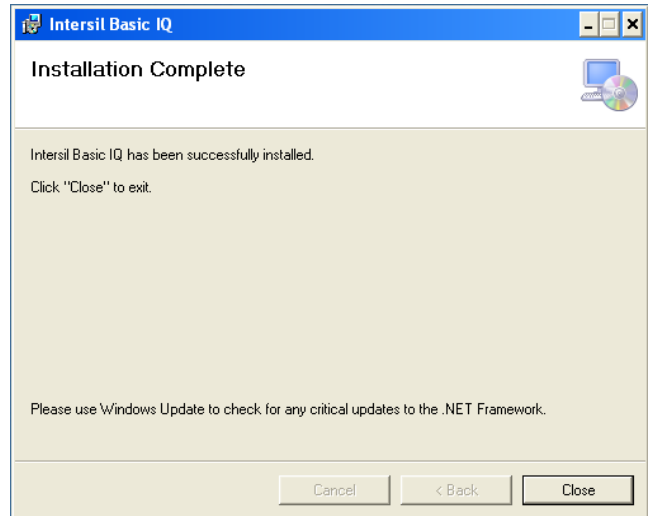
FIGURE 5.

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Click **Next** to Confirm and Start installation (Figure 6).

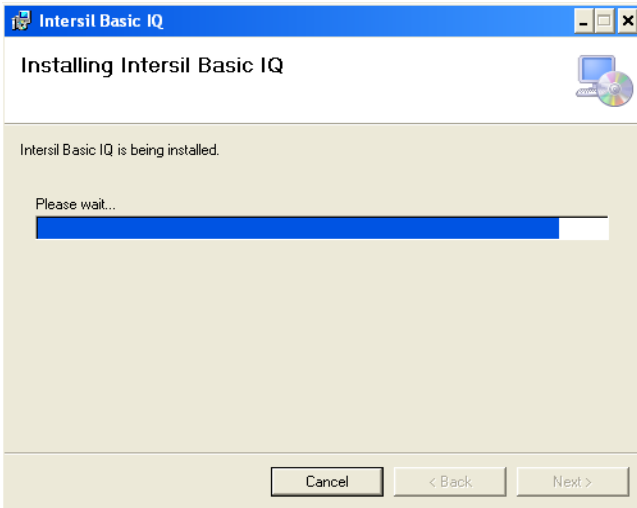


**FIGURE 6.**

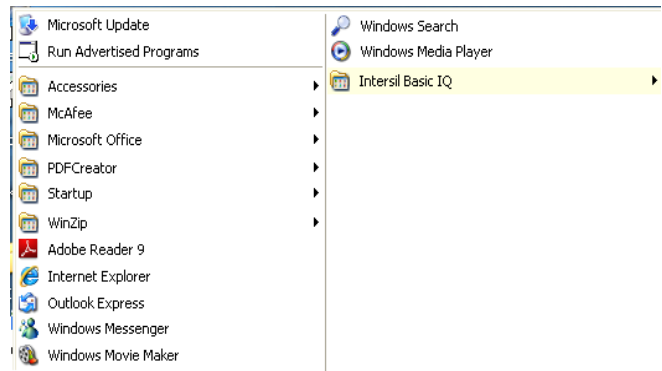


**FIGURE 8.**

Start the program from the folder where it was installed (Figure 9).

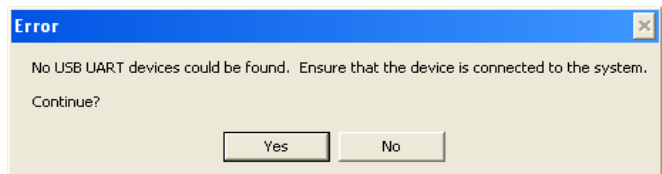


**FIGURE 7.**



**FIGURE 9.**

Follow the steps to install the USB driver for the hardware (Figures 10 through 12).



**FIGURE 10.**



FIGURE 11.

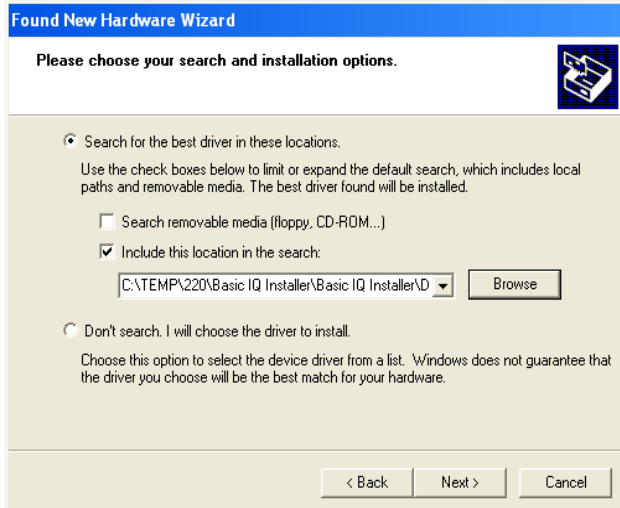


FIGURE 12.

Browse for \Driver folder on the CD or in unzipped folders downloaded from [www.intersil.com](http://www.intersil.com) as location for USBUART driver and click **Next** (Figure 12). After the driver installation is complete, click **Finish** to exit the hardware wizard and start the program.

## Program Execution

### Start-up Screen

The start-up screen should look similar to Figure 13.

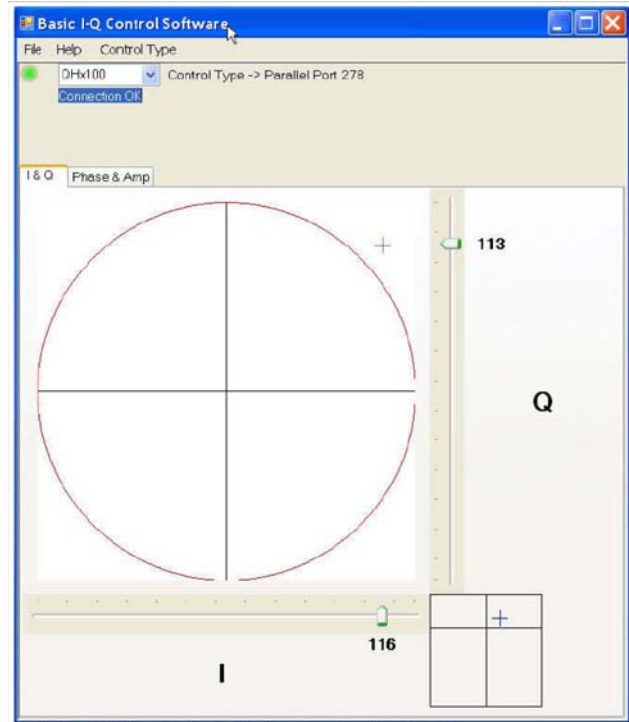


FIGURE 13. EXAMPLE START-UP SCREEN

### Selecting Part

First, select the particular QHx part number. The next time the software is run, the software remembers the selection, so this step can be skipped. Figure 14 shows the process.

### QHx100 VIEW

The default setting for the controller is for the QHx100. The typical view is shown in Figure 14. The I and Q values run from 0 to 127. Since the interface is connected to a QHx100/120 evaluation board, the I<sup>2</sup>C bus driven DAC on the evaluation board will convert into a control voltage between 0V and 1.4V.

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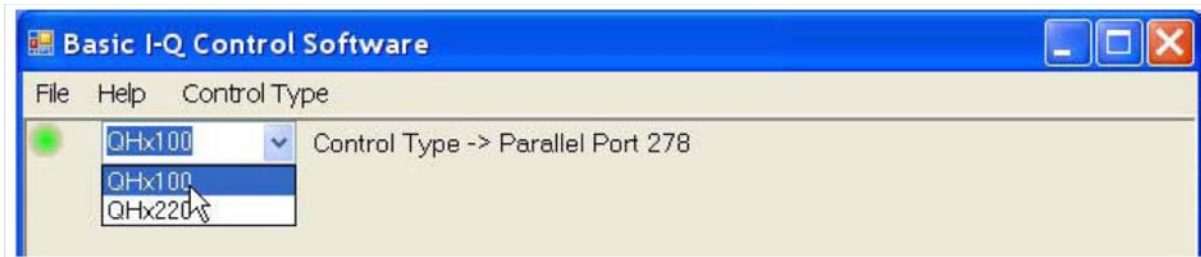


FIGURE 14. PART SELECTION

## QHx220 VIEW

The QHx220 has some extra software settable controls that show up when the part is selected (Figure 15).

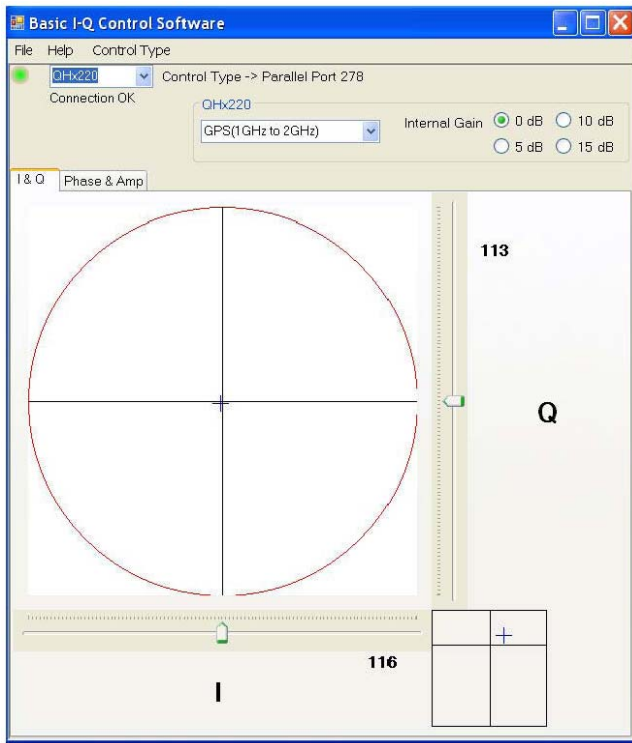


FIGURE 15. QHx220 START-UP SCREEN

## FREQUENCY RANGE SELECTION

The part has three different frequency bands to select from for the application to work properly. In the dropdown list shown in Figure 16, select the appropriate application.

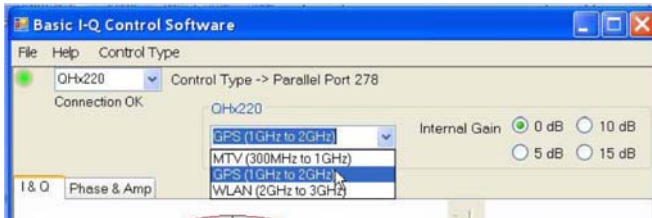


FIGURE 16. APPLICATION SELECTION FOR QHx220

## BANDWIDTH OPTIONS

The three bandwidth choices are shown in Table 1.

TABLE 1.

MTV	GPS	WLAN
300MHz to 1GHz	1GHz to 2GHz	2GHz to 3GHz

Four internal gain settings are available in the noise sampler path. Select the desired course gain step (0dB to 15dB) with the four corresponding buttons (Figure 16).

## Selecting Control Mechanism

The part can be controlled either with a USB serial port that talks to the QHx controller board or by a parallel port connection.

## PARALLEL PORT CONTROL

Parallel Port selection is made from the Control Type tab as shown in Figure 17. The Port address can be selected from the list, or you can enter an additional address if you are using a PCMCIA parallel port card.

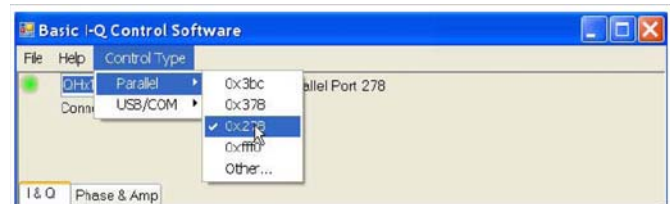


FIGURE 17. PARALLEL PORT SELECTION

## USB CONTROL

If an Intersil USB interface card is used, select CONTROL TYPE > USB/COM > 38400 as the Baud rate to allow proper control of the device. To find the COM port assigned to the USBUART dongle/ card, right-click on My Computer>Properties (Figure 18). Select the Hardware tab, and then click the Device Manager button. Select the Ports icon and open to see all of the COM and LPT ports. Notice the USBUART designation, which is COM4 (Figure 19).

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FIGURE 18. MY COMPUTER PROPERTIES WINDOW

To select the correct COM Port for control click the Control Type menu. Select USB/COM and then select the appropriate COM port and Baud rate (Figure 20).

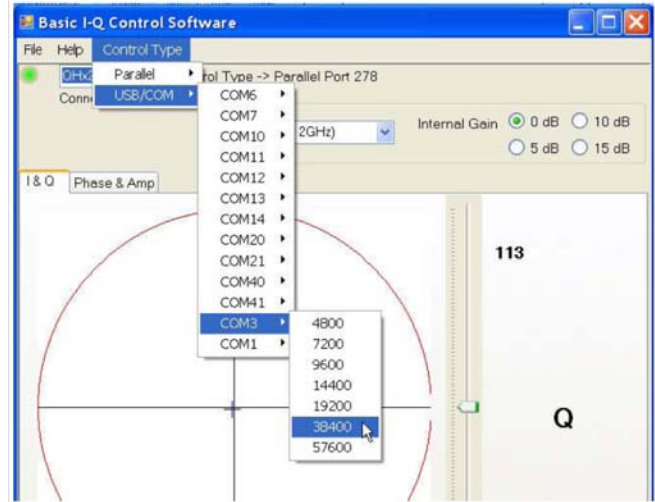


FIGURE 20. SELECTING A COM PORT AND BAUD RATE

Assure that 38400 Baud is selected for the USBUART device, to ensure proper operation.

## I/Q vs Phase/Amp Control

There are two visual ways to control the device. Since the part is controlled with voltages that correspond to an inphase (I) and quadrature (Q) setting, the I and Q tab more closely match the actual operation of the chip. However, in some systems it is helpful to control and visualize the chip in the Phase and Amplitude space. Both of the controls operate in the same manner: simply click on the position you desire, or move the sliders to change one of the parameters. The sliders can be moved either directly with the mouse pointer (click on it and hold left mouse button while moving it) or by clicking once on the slider and moving it with the left/right cursor arrow keys.

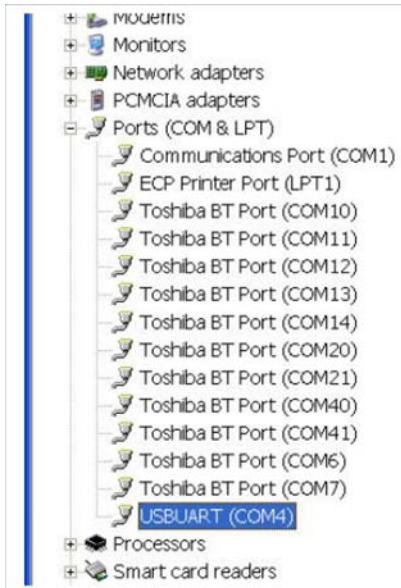
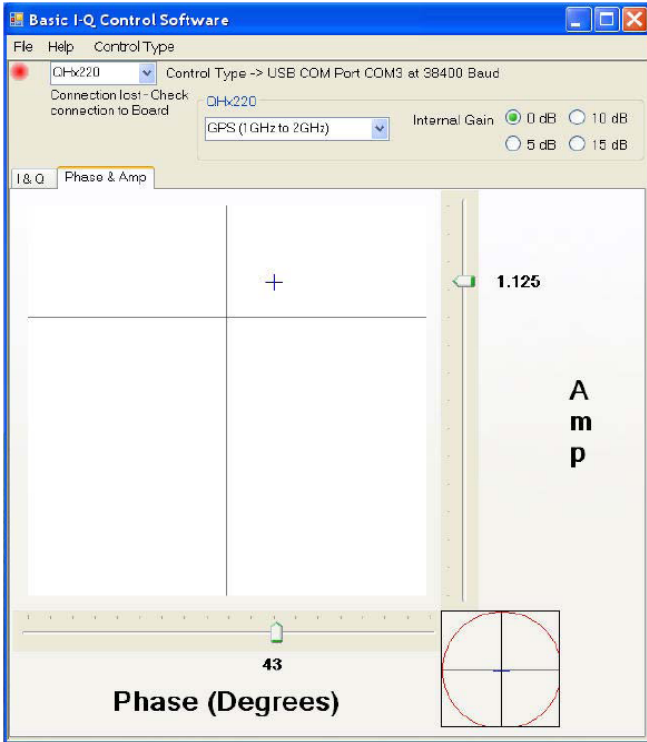


FIGURE 19. USBUART COM PORT DESIGNATION

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Figure 21 shows the phase and amplitude display. Each case shows a miniature version of the other space in the lower right corner of the window.



**FIGURE 21. PHASE AND AMPLITUDE**

After starting the software, the connection indicator might turn 'red'; if so, click twice in the I-Q or Phase-Amp plane to turn it green. If it does not turn green, check to see if the interface board is properly connected and/or if the driver is correctly loaded (device manager > port > COMxy > Properties).

The mathematical relationship between Phase and Amplitude and I and Q is as shown by Equation 1:

$$\text{Amp} = \sqrt{I^2 + Q^2}$$

$$\text{Phase} = (180^\circ/\pi) \cdot \text{atan}(Q/I) \quad (\text{EQ. 1})$$

and the reverse is shown by Equation 2:

$$I = \text{Amp} \cdot \cos(\text{Phase} \cdot (\pi/180^\circ))$$

$$Q = \text{Amp} \cdot \sin(\text{Phase} \cdot (\pi/180^\circ)) \quad (\text{EQ. 2})$$

Note that the GUI should be shut down before the interface is removed from the USB port. Likewise, the interface needs to be inserted and the drivers loaded (automatic) before the GUI is started.

## Running Multiple GUIs on One Computer

To run two or more interfaces on the same computer, a USB HUB must be used, since the typical built-in USB port controllers cannot discern identical driver/USB card combinations. The USB HUB circumvents this problem by adding a port number to the USB designator. After the installation of the first driver, the second interface is inserted into the HUB. Hence, the OS will prompt for the location of the new driver. Follow the instructions in the "Installation" on page 2 to install the second driver. After the second driver is loaded, check the presence of another COM port in the device manager. The port number of this new port device must be selected after the second GUI is started (Figure 20). After two clicks on the control plane and setting the device type, the second evaluation board should be ready for use. Follow these same steps if a third evaluation board is used.

### **Q:ACTIVE**

Q:ACTIVE Technology is behind Intersil's ability to insert its ICs inside radios, automotive infotainment systems, satellite broadcast equipment, and various consumer electronic devices such as GPS units, cell phones, and portable gaming systems. By doing so, Intersil achieves the ability to reduce electromagnetic interference by as much as 30dB. This breakthrough in radio sensitivity allows for several signals to run simultaneously and enables new technologies such as mobile TV on hand held games, cell phones, and in automotive systems.

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