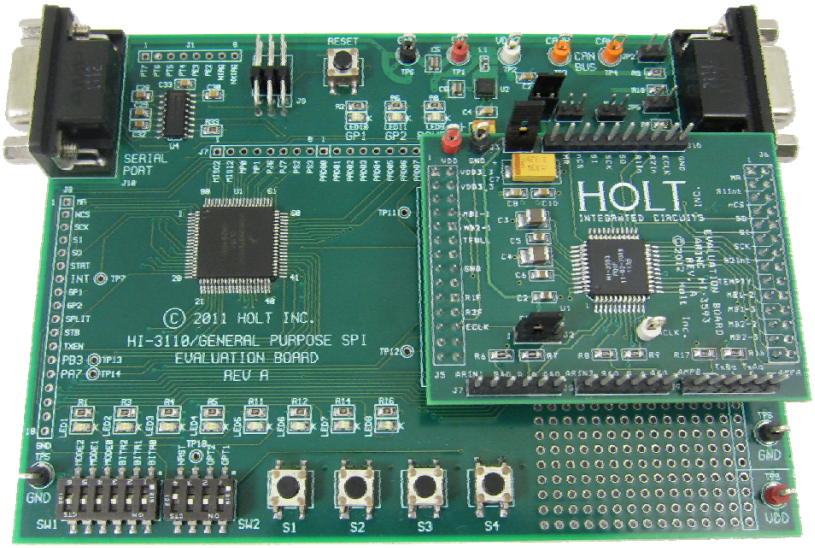
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HI-3593 ARINC 429 3.3V Dual Receiver, Single Transmitter with SPI Evaluation Board Quick Start Guide

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INTRODUCTION

The Holt HI-3593 ARINC 429 Evaluation Board demonstrates most of the features of the HI-3593 ARINC Dual Receiver and Single Transmitter IC. The HI-3593 features an on-chip DC-DC converter which generates both +5V and -5V to supply the bipolar differential voltage levels needed to meet the ARINC 429 Bus levels from a single 3.3V supply voltage. A Freescale MC9S12XDT512 microcontroller communicates with the HI-3593 through the SPI interface. The main board "General Purpose SPI Evaluation Board" includes switches and LEDs to help navigate the operating modes and confirm data and status information. A Serial UART port allows debug and data messages to be sent to a PC using any terminal program such as HyperTerminal. The HI-3593 Evaluation Board is a daughter card that plugs on to the General Purpose SPI board via two 26 pin connectors.

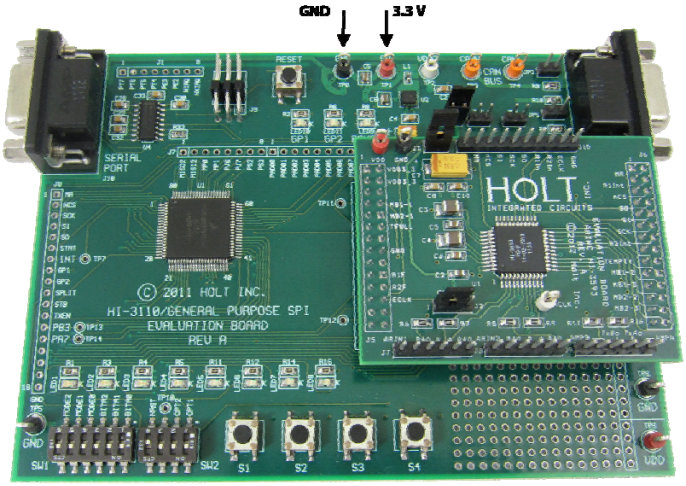
This guide summarizes how to get set up and running quickly. Additional support material and software are provided in the included CD-ROM.

KIT CONTENTS

- This Quick Start Guide.
- General Purpose SPI Evaluation board and schematic.
- HI-3593 Evaluation Board (daughter card) and schematic.
- HI-35593 Data Sheet.
- RS-232 9 Pin Serial Cable.
- Demo Project compatible with Freescale™ CodeWarrior™.
- HI-3593 Users Guide.
- HI-3593 Application Note.

Initial Board Set up

1. Connect a +3.3V power supply to TP1 and ground to TP6. The HI-3593 uses +3.3V. This is the only power supply needed by this demo since the HI-3593 includes an on-chip DC-DC converter which generates +5V and -5V to meet the ARINC transmit levels.



2. Connect the RS-232 cable to the board and the PC Serial (COM) port. Some features are only available using commands from the Console. To view ARINC messages, Control and Status registers and enter optional commands, a terminal program such as Hyper-Terminal may be used. Configure the communication for 115200 Baud, 8 bits, No Parity, No handshaking.

3. Provide an external connection between the transmitter and Receiver-2. Connect TXAOUT J9-5 to Receiver-2 J8-5 and TXBOUT J9-4 to J8-4. This provides an external loop back path.

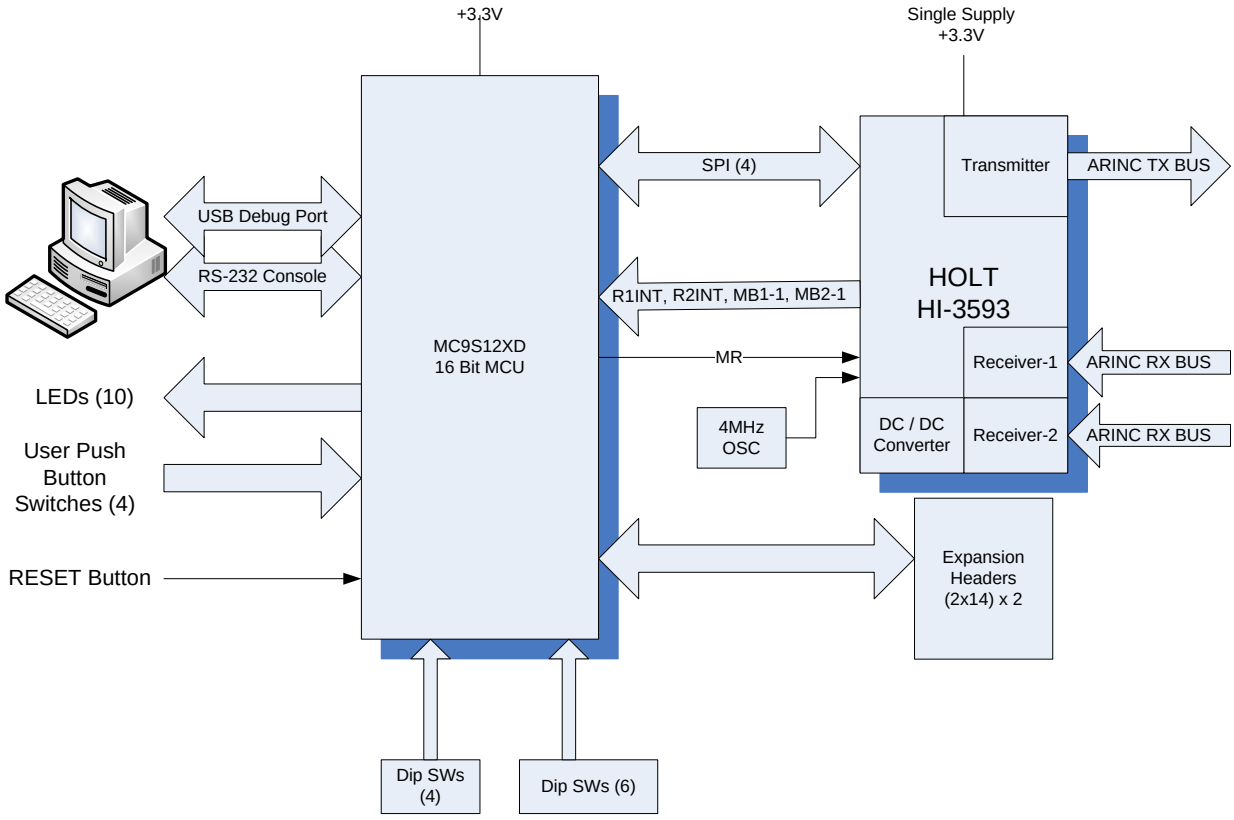
4. A user-provide PE Micro “USB Multilink Interface” debug cable must be connected when using Freescale “Code Warrior” for project software changes, program debugging and MCU reprogramming.

5. HI-3593 daughter card default jumper settings:

   JPR3 – shorted
   J2 - short between pins 1 and 2.

6. The USB Debug connector is used for downloading code to the board from the Freescale IDE and is not required for a standalone demo.

Demonstration Set-up



Power On Reset

For normal operation ensure SW2 – 4 (MRST) is in the open position otherwise the MCU will be held in the reset state. This MRST Dip switch allows easy interfacing of an external MCU to the HI-3593. Closing SW2-4 will keep the RESET pin low forcing the Freescale MCU GPIOs into a high impedance state. For normal operation keep this switch open and use the RESET button to reset the MCU during testing.

Main Board Jumpers

Some jumpers do not apply to the HI-3593 so they will typically be shown as NA.

JP1 - NA
JP2 - NA
JP3 - VDD jumper to J5 VLOGIC. Remove JP3 to measure ICC.
JP4 - NA
JP5 - NA
JP7 - NA.

Mode Selection

Mode-2	Mode-1	Mode-0	Mode
0	0	0	Board Test
0	0	1	Transmit Messages with Labels
0	1	0	Transmit Messages with Labels SELF-TEST
0	1	1	HI3593 Explorer
1	0	0	HI3593 Explorer SELF-TEST
1	1	1	Serial Console Commands

OPT1 switch

Open = Transmit Parity Enabled.

OPT2 switch

Open = Enables label recognition. This includes the 256 possible labels and also the three Priority Label Mail Boxes in both Receiver-1 and Receiver-2.

Push Buttons SW1-SW4

Depending on the selected mode, these buttons perform specific tasks.

For this demonstration set the switches for **Transmit Messages with Labels SELF-TEST Mode (Mode- 2)** as follows:

MODE2 - closed.
MODE1 - open.
MODE0 - closed.

BITR2 and BIT1 – closed (Receiver 1 and Receiver 2 Parity)
BITR0 - closed (high speed)
OTP2 - open (enables Labels)
OTP1 - closed (disables Transmitter Parity)

After a power on reset, the program revision is displayed on the LEDs for two seconds in binary format, where LED1 is the LSB. After two seconds, they turned off, then LED7 flashes every second as the main MCU “live” operating indicator.

A message is also sent to the Console Port. Some of the displayed information reflects the options selected by the Dip switches. For example “SELF-TEST”, “Fast Speed” and “All labels are Enabled” is displayed if these options are enabled by the corresponding Dip switches.

Mode- 4 is shown as:

```
Holt HI-3593 Demonstration Software Revision: X.X

Transmit & Receive With Labels Mode

Fast Speed
Receiver-1 Parity is Enabled
Receiver-2 Parity is Disabled
All labels are Enabled

Press SW-1 to start initially

--- Button Commands ---
  SW-1 or Space Bar to Display Status and Control Registers
  SW-2 to Pause
  SW-3 to Display Label Memory

--- Console Commands Help ---
  P = Parity Toggle on/off
  T = TFLIP  Toggle on/off
  R = RFLIP  Toggle on/off
  S = SDON, SD9, SD10 Toggle on/off
  H = This Help Page
  Space Bar = Display Status and Control regs
  I = Increment Message and Transmit. Explorer Mode - ONLY!
  M = Enter Custom Message. Explorer Mode - ONLY!
  ENTER= Transmit next message. Explorer Mode - ONLY!

>
```

Mode- 2 Transmit Messages with Labels SELF-TEST

After pressing SW-1 the transmitter begins transmitting an incrementing data pattern and the receivers will capture and display it on the console. The screen below shows just the first few messages. Generally, all data displayed on the console is displayed in hex format.

The TX line shows the transmitted data and the two other lines are showing what each receiver received.

```
Transmitting
>
>TX    Data:00 00 00 Label:30
>Rec-1 Data:00 00 00 Label:30
>Rec-2 Data:FF FF FF Label:CF    (SELF-TEST show complemented data)
>
>TX    Data:00 00 01 Label:01
>Rec-1 Data:00 00 01 Label:01
>Rec-2 Data:FF FF FE Label:FE
.
.
.
>TX    Data:00 00 1F Label:1F
>Rec-1 Data:00 00 1F Label:1F
>Rec-2 Data:FF FF E0 Label:E0
>
>TX    Data:00 00 20 Label:20
>Rec-1 Data:00 00 20 Label:20    (Priority Label 1 received)
>PL1-1 Data:00 00 21 Match:20
>Rec-2 Data:FF FF DF Label:DF
```

In self-test mode, the data is complemented on Receiver-2. This demo configures the labels and Priority Labels. LED5, LED6 or LED7 flicker when any Priority Labels are received. PL1=LED5, PL2=LED6 and PL3=LED7. Messages with labels 0-127 are received on Receiver-1, Messages with labels 128– 255 are received on Receiver-2. To disable label filters close OTP2, reset the board and start over.

Options while the transmitting include:

SW-1. Stops the transmitter and displays a list of the control and status registers of the HI-3593. Press SW-4 to resume.

SW-2 . Pauses the transmitter and each subsequent press of SW-2 transmits the next message. Any message received will be displayed. Press SW-4 to resume.

SW-3. Stops the transmitter and displays the contents of the label memory for both receivers. Press SW-4 to resume.

To run this same test but not in SELF-TEST mode, reconfigure the mode switches to Mode-1 and reset the board and start over. Verify the external connections described on page 2 or no data will be received and displayed.

Summary

This quick demo exercises just one demo mode. To learn and use more features of the demo program refer to the user's guide on the CD-ROM.

REVISION HISTORY

Revision	Date	Description of Change
QSG-3593, Rev. New	2-11-11	Initial Release
QSG-3593, Rev. A	3-4-11	Updated revision number text on screen console example
QSG-3593, Rev. B	6-14-12	Update new daughter card photo