HOLT INC.
INTEGRATED CIRCUITS

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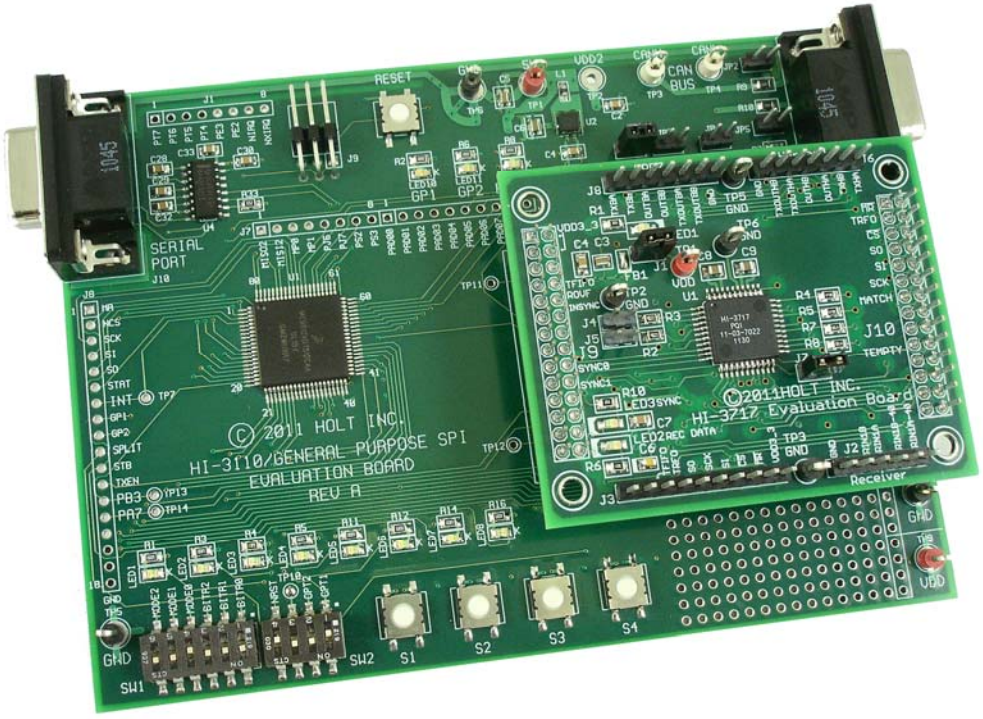
QSG-3717
HI-3717 Evaluation Board
Quick Start Guide

Introduction:

The Holt HI-3717 Evaluation Board demonstrates most of the features of the HI-3717A ARINC 717 Protocol IC. ARINC 717 is a communication protocol used between the Digital Flight Data Acquisition Unit (DFDAU) and the Digital Flight Data Recorder (DFDR) used on commercial aircraft.

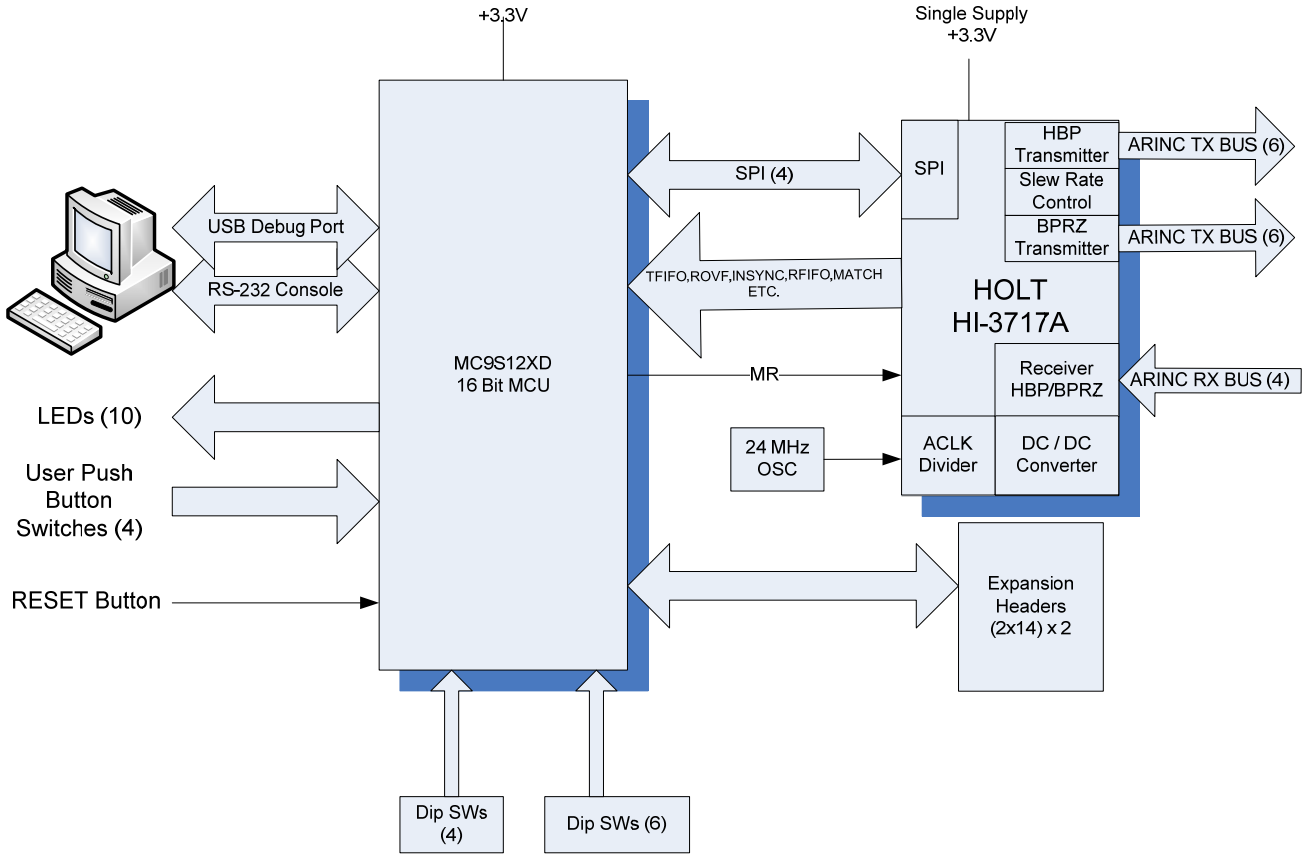
This guide demonstrates how to get set up and running quickly. Additional support material and software are provided in the included CD-ROM. Since the demo code is programmed into the microcontroller flash, the demo is operational right out of the box. No software development tools are needed to run the demo.



KIT CONTENTS

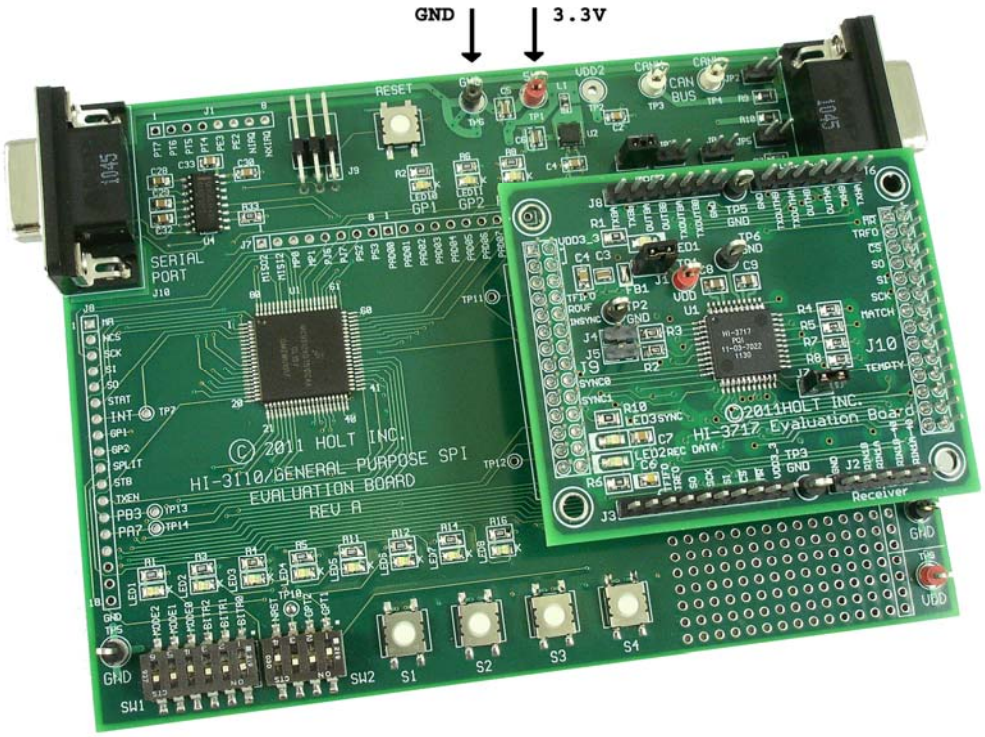
- This Quick Start Guide.
- General Purpose SPI Evaluation board and schematic.
- HI-3717 Evaluation Board (daughter card) and schematic.
- HI-3717A Data Sheet.
- RS-232 9 Pin Serial Cable.
- Demo Project compatible with Freescale™ CodeWarrior™.
- HI-3717 Users Guide.
- HI-3717 Application Note.
- CD-ROM containing all the documents and software.

Evaluation Board Diagram



Demonstration Board Set Up

1. Connect a +3.3V power supply to TP1 and ground to TP6. This is the only power supply needed since the HI-3717A includes an on-chip DC-DC converter which generates +5V and -5V to meet the ARINC transmit levels.



2. Connect the included RS-232 cable to the board and the PC Serial (COM) port. To view ARINC messages, Control and Status registers and enter optional commands, a terminal program such as Windows HyperTerminal may be used. Configure communication for 115200 Baud, 8 bits, No Parity, No handshaking.

3. HI-3717 daughter card default jumper settings:

J1 - shorted	J4 - open
J7 - shorted	J5 - open

Board RESET

A RESET pushbutton is provided. A DIP switch is also provided to continuously assert processor RESET. For normal operation ensure SW2 – 4 (MRST) is in the open position, otherwise the MCU is held in the reset state.

Main Board Jumpers

Some jumpers do not apply to the HI-3717 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.

Demo Mode Selection

Mode2	Mode1	Mode0	MODE NUMBER	DEMO MODE
0	0	0	0	Board Test
0	0	1	1	Transmit Receive Mode
0	1	0	2	Transmit Receive Mode SELF-TEST
0	1	1	3	Transmit Special Mode
1	0	0	4	Receive Mode Compare Off
1	0	1	5	Receive Mode Compare On
1	1	0	6	Software Sync Mode
1	1	1	7	Serial Commands

(0=CLOSED, 1=OPEN)

OPT1 switch Receiver Mode

Open = BPRZ (Bipolar Return-to-Zero) Receive mode.
Closed = HBP (Harvard Bi-phase) Receive mode.

OPT2 switch 32 WPS

Open = 32 WPS (overrides all other rates).
Closed = Rate follows BitRate0, BitRate1 and Bitrate2 switch settings.

Bit Rate DIP switches

BitR-2	BitR-1	BitR-0	WORD RATE	Slew Rate
0	0	0	64	7.5us
0	0	1	128	7.5us
0	1	0	256	7.5us
0	1	1	512	7.5us
1	0	0	1024	3.75us
1	0	1	2048	1.5us
1	1	0	4096	1.5us
1	1	1	8192	1.5us

(0=CLOSED, 1=OPEN)

Push Buttons SW1-SW4

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

DEMO Setup Instructions:

Set the DIP switches for **Transmit Receive Mode SELF-TEST (Mode- 2)**.
In Mode -2 the program transmits SYNC words and incrementing data. The receiver fetches this data and displays it on the console. Because the TEST bit is set in the Control Register 1 the line receiver and both line drivers are disabled. The transmitted and received data will be looped back digitally. No signals will be visible on the transmitter outputs.

Configure the Bit Rate DIP switches for 64 WPS ensuring that OPT2 is closed.
Open OPT1 DIP switch to configure the receiver for BPRZ mode.

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 LEDs turn 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.

After resetting the board the program sends information to the console to summarize the configuration, Receiver Mode, Word Rate and Slew Rate.

```
Holt HI-3717 Demonstration Software Revision: x.x

Transmit and Receive Mode

SELF-TEST, Internal Digital Loop-back, No data is transmitted
externally

Initializing the HI-3717

Receiver Mode: BPRZ
Word Rate = 64 WPS
Slew Rate 7.5uS Selected
HI-3717 Initialized OK
Match Word Count Register set to = 0x0005

Press S1 to start
```

The HI-3717A has been successfully initialized and the program is waiting for the S1 push button to be pressed before continuing on.

After pressing S1 the transmitter begins transmitting SYNC words and incrementing data words. The receiver FIFO is checked for data at the same time, and captured data is displayed on the console.

The first data word in the sub-frame is the SNYC word (marked with an asterisk) followed by the remaining number or words according to the Bit Rate selected by the DIP switches. Below there are 64 words total. The exact format of the console display may vary depending on the HyperTerminal setup or PC window size.

```
Transmitting
247*001 002 003 004 005 006 007 008 009 00A 00B 00C 00D 00E 00F
010 011 012 013 014 015 016 017 018 019 01A 01B 01C 01D 01E 01F
020 021 022 023 024 025 026 027 028 029 02A 02B 02C 02D 02E 02F
030 031 032 033 034 035 036 037 038 039 03A 03B 03C 03D 03E 03F
5B8*001 002 003 004 005 006 007 008 009 00A 00B 00C 00D 00E 00F
010 011 012 013 014 015 016 017 018 019 01A 01B 01C 01D 01E 01F
020 021 022 023 024 025 026 027 028 029 02A 02B 02C 02D 02E 02F
030 031 032 033 034 035 036 037 038 039 03A 03B 03C 03D 03E 03F
A47*001 002 003 004 005 006 007 008 009 00A 00B 00C 00D 00E 00F
010 011 012 013 014 015 016 017 018 019 01A 01B 01C 01D 01E 01F
020 021 022 023 024 025 026 027 028 029 02A 02B 02C 02D 02E 02F
030 031 032 033 034 035 036 037 038 039 03A 03B 03C 03D 03E 03F
DB8*001 002 003 004 005 006 007 008 009 00A 00B 00C 00D 00E 00F
010 011 012 013 014 015 016 017 018 019 01A 01B 01C 01D 01E 01F
020 021 022 023 024 025 026 027 028 029 02A 02B 02C 02D 02E 02F
030 031 032 033 034 035 036 037 038 039 03A 03B 03C 03D 03E 03F
```

Daughter Card LEDs

LED	FUNCTION	ACTION
LED1 - AMBER	3.3V POWER	ON
LED2 - GREEN	RECEIVE DATA	ON
LED3 - YELLOW	INSYNC	ON DURING SYNC

Status LEDs

LED	FUNCTION	ACTION
LED1	SNYC WORD TX FIFO LOADS	FLASHES
LED2	SYNC WORD PATTERN RECEIVED	FLASHES
LED3	SYNC WORD (PROPER) RECEIVED	FLASHES
LED4	MATCH COUNT INTERRUPT	FLASHES
LED5	RX FIFO FULL	ON
LED6	TX FIFO FULL	ON
LED7	PROCESSOR RUNNING	FLASHES 1HZ
LED8 (Red)	HI-3717A INTIALIZED, DATA COMPARE FAIL	ON

While the program is transmitting and receiving data, pressing the **S1** switch stops the program and displays the HI-3717A status and control registers.

```
HI-3717 Status, Control Registers

Control Reg 0           0x01
Control Reg 1           0x01
FIFO Status Reg         0xE4
FIFO XMT Reg            0x00
REC FIFO Status Pin Reg 0x00
WORD Count Utility Reg  0x0028
REC FIFO Word and Count 0x0007 0x0043
Transmitting Paused

Press S4 or spacebar to continue
```

Press S4 on the board or press the space bar on the HyperTerminal program to resume transmitting and receiving data.

Note: All program console output references to HI-3717 apply to HI-3717A in this version.

Summary

This quick demo exercises just one demo mode. To learn and use more features of the demo program, refer to the AN-170 User's Guide. To learn more about the demo software project and how to get setup with the Freescale Codewarrior IDE, refer to the AN-171 Software Application Note on the CD-ROM.

REVISION HISTORY

P/N	Rev	Date	Description of Change
QSG-3717	NEW	08/18/11	Initial Release.
	A	1/8/14	Added Mode 6, Software Sync Mode.
	B	3/12/15	Change 1024 slew rate to 3.75us for the new HI-3717A part. Change some HI-3717 references to HI-3717A.