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# HI-8476 ARINC 429 Receiver With parallel and serial outputs Evaluation Board

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## Quick Start Guide Jan 20, 2014

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## INTRODUCTION

The Holt HI-8476 Evaluation Board demonstrates features of the HI-8476 ARINC 429 receiver IC. This device will decode 32 bit ARINC 429 words into parallel or serial format without the use of any software. The board and the HI-8476 can be run from a single 3.3V+/- 5% supply voltage. The HI-8476 and EVM (Evaluation Module) requires no software for control; all functions are set by hardware switches. Data can be filtered according to the label content of the ARINC word, using LLA, LLB, LLC and FILT input setting and set with DIP switches. Other DIP switches configure the device speed, test modes etc. The EVM is shown in the picture below:

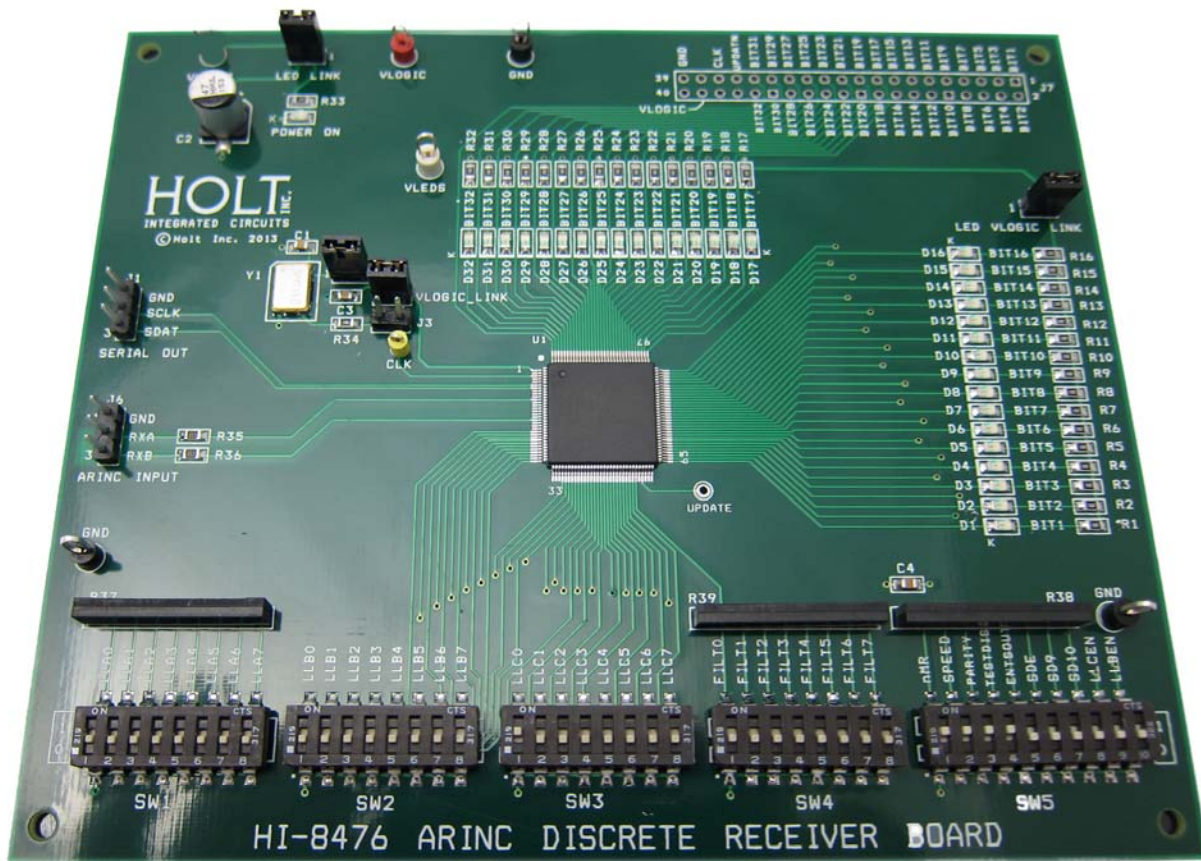


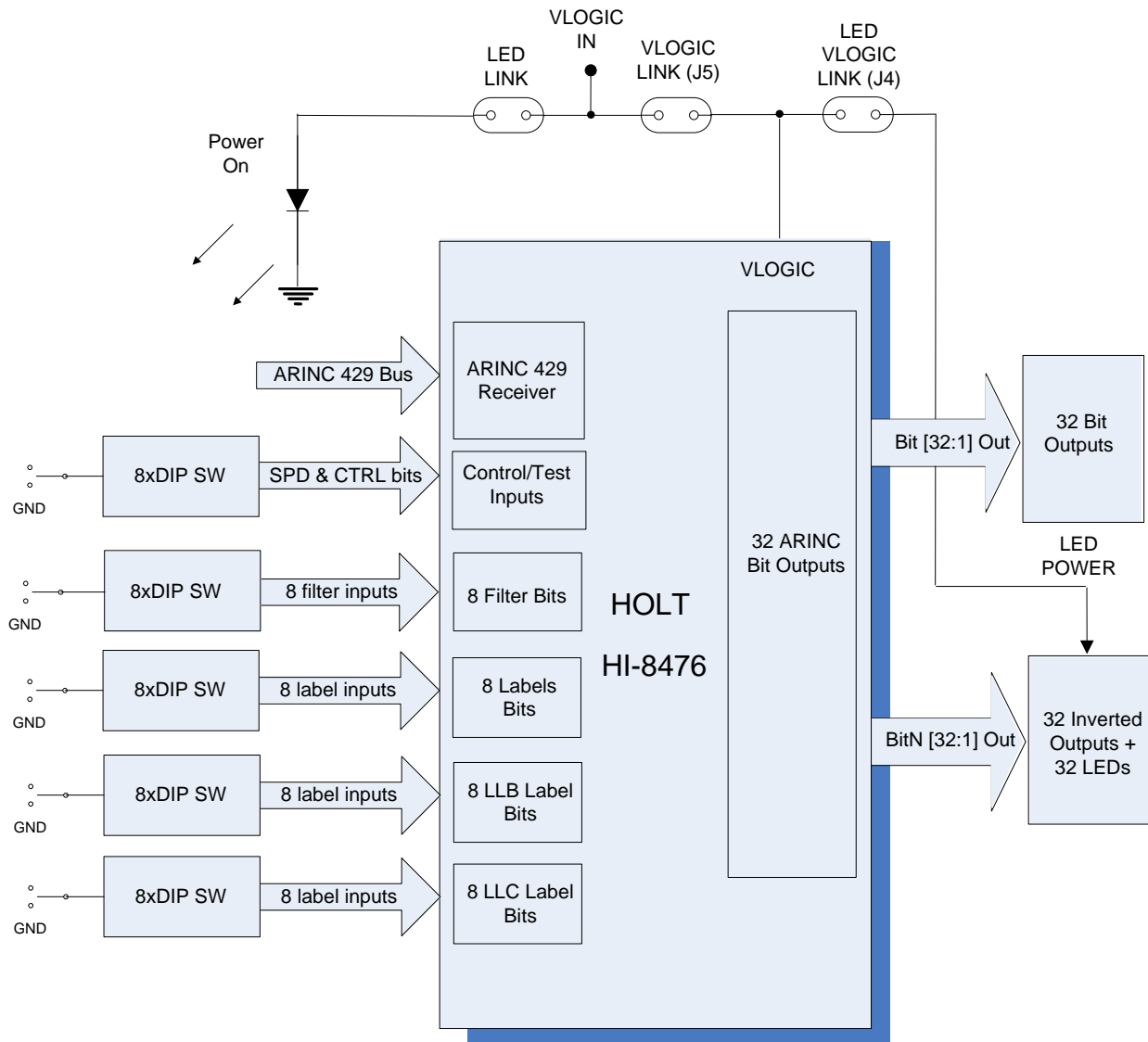
Fig 1 – HI-8476 Evaluation Board

This guide summarizes how to get set up and running quickly.

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- HI-8476 Evaluation Board

## Board Block Diagram



### Jumper Functions

REF	NAME	DEFAULT	DESCRIPTION
J1	LED_GND_LINK	ON	Link for BIT LED current to ground
J2	-	ON	Supplies 3.3V to the 1MHz crystal oscillator
J3	EXTCLK	ON	To use external clock, disconnect link and apply a VLOGIC level clock to the CLK test point
J4	LINK	ON	Link for supply indicator LED
J5	VLOGIC_LINK	ON	Link for device VDD supply current (this supplies the HI-8476 only) and can be used to measure device current, make sure LED link is OFF

### Test Point and Connector Functions

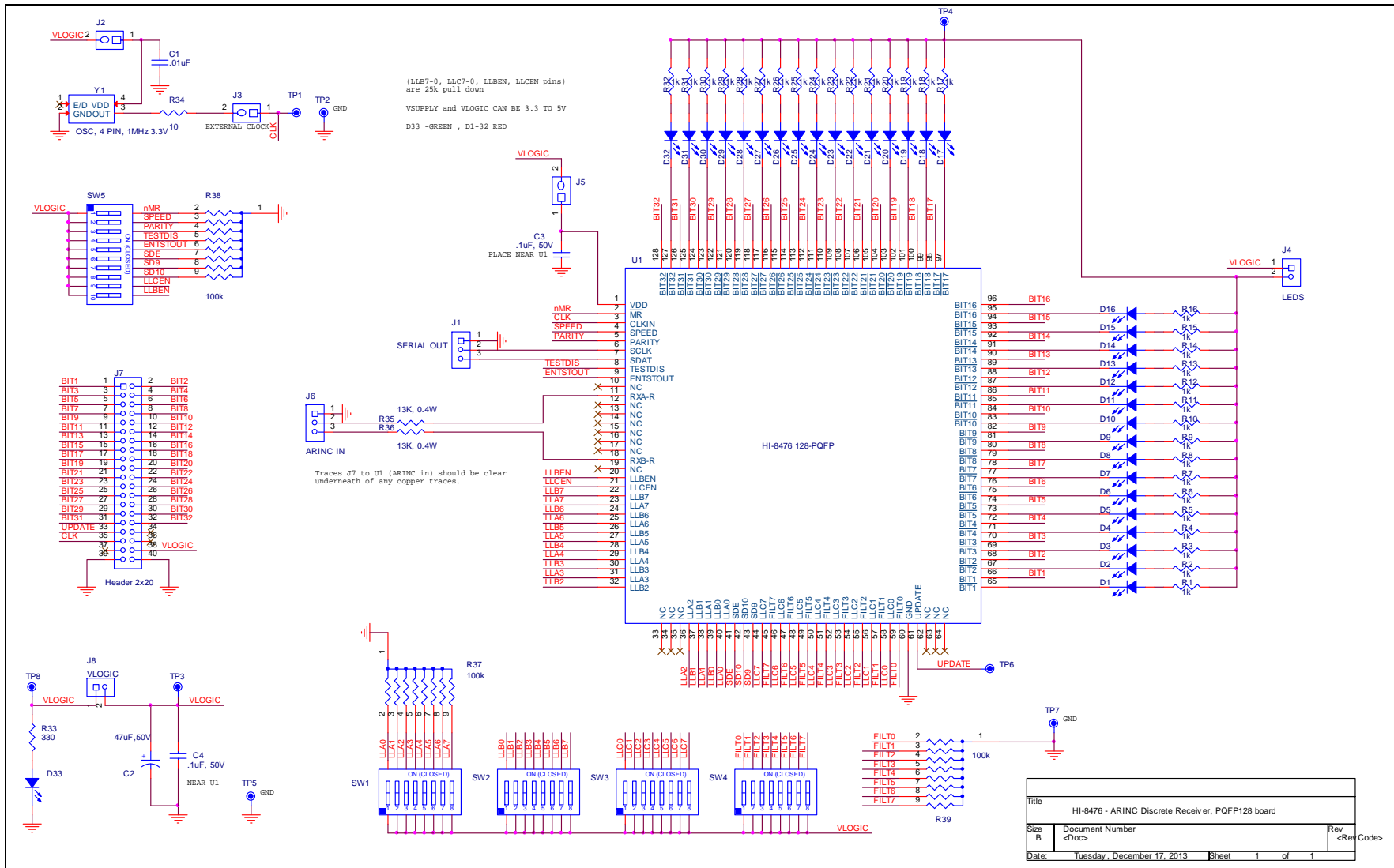
REF	NAME	DESCRIPTION
TP1	CLK	1MHz clock, can be used for external clock connection, disconnect link J3 and apply a VLOGIC level clock CLK
TP2/TP5/TP7	GND	Ground Test Point
TP3/4	VSUPPLY/VLOGIC	Connect 3.3 or 5V supply
TP6	UPDATE	Test point for Update signal indicates when ARINC word has been received
J7 pins 1-32	Received Data	ARINC data bits 1-32 respectively
J7 pin 35	CLK	1 MHz Clock
J7 pin 38	VLOGIC	VLOGIC Supply
J7 pin 39,40	GND	Board Ground

## Switch Functions

REF	NAME	DEFAULT	DESCRIPTION
SW1	LLA[7:0]	OFF	ARINC 429 label A bits 0:7, ON = '1'
SW2	LLB[7:0]	OFF	ARINC 429 label B bits 0:7. ON = '1'
SW3	LLC[7:0]	OFF	ARINC 429 label C bits 0:7. ON = '1'
SW4	FILT[7:0]	OFF	Sets which label bits are filtered. ON = '1'
SW5/1	nMR	ON	Master Reset, switch to OFF to reset
SW5/2	SPEED	ON	ON = High Speed OFF = Low Speed
SW5/4	PARITY CHECK	ON	ON = Enable Parity Checking OFF = Disable Parity Checking
SW5/4	TESTDIS	ON	ON = Disable Test Mode OFF = Enable Test Mode
SW5/5	ENTSTOUT	OFF	ON = Enables Test Output OFF = Enable Test Mode
SW5/6	SDE	OFF	ON = Enables SD bit checking OFF = Disables SD bit checking
SW5/7	SD9	OFF	ON = Check for SD9 bit = 1 OFF = Check for SD9 bit = 0
SW5/8	SD10	OFF	ON = Check for SD10 bit = 1 OFF = Check for SD10 bit = 0

## Using the Board

1. Check all the link and switch positions comply with the tables above. Connect a 3.3V supply to the VLOGIC test point, verify the 'Power On LED' is lit; the board should take about 35mA. The jumper J4 supplies only the Power LED, disconnect if you don't want the LED powered.
2. To measure the device's VLOGIC supply current; remove the VLOGIC\_LINK jumper and connect an ammeter across the jumper pins, this will be about 2mA at 3.3V. This point measures only the device current and not the other circuitry on the board, but will include the bit LEDs current, so also remove jumper LED\_GND\_LNK .
3. The HI-8476 has a Self Test mode. This sends an internal ARINC data stream with all the data bits set to a '1'. The label bits match the settings on the LLA inputs. Set the LLA7:0 and ENTSTOUT switches to '1', set 'TESTDIS' to '0'. Flick the 'nMR' switch from '1' to '0' and back. This causes a reset and the device then initiates the self test sequence; all 1's data should be indicated by all the LEDs being lit. Return TESTDIS and ENTSTOUT back to default.
4. To test the board, an ARINC 429 data source is required; if available the HI-8470 or HI-3593 boards can be used for this. Use a pair of wires to connect the ARINC source + and – to the RXA and RXB terminals respectively on J6. Set the source rate to High Speed 100kb/s, in the default state with all FILT bits set to '0' the device will accept any label value. Transmit an FE FF FF FF pattern (all ones, but BIT32 set to 0) and verify all LEDs are lit (except the parity bit). Repeat with a 01 00 00 00 pattern, all LEDs should go out. Switch SW5/3 parity switch enable to '1', check BIT32 LED lights. With 54 55 55 55 pattern, alternate LEDs should be lit, with the exception of parity (bit32).
5. To check the filter bit functions, set the FILT7:0 switches to all '1's. Reset the device, then transmit the 54 55 55 55 pattern again; no data should be received. Now set the LLA switches to '0101 0101' and transmit again; the alternate 1010 pattern should be indicated on the LEDs.
6. Set LLA switches back to '00000000' then reset the device, set LLB switches to '01010101', LLBEN to '1' then as in section 5 the LEDs should show 1010 pattern.
7. Set LLBEN to '0', LLB switches back to '00000000' then reset the device, set LLC switches to '01010101', LLCEN to '1' then as in section 5, the LEDs should show 1010 pattern.
8. Filtering for the SD9 and SD10 ARINC bits can also be done in a similar manner. First put the SDE switch to '1', then set SD9 and SD10 bits as desired.
9. Access to all the ARINC data bits, update and clock is also available on J7, see table for connector pin numbers.



Title		
HI-8476 - ARINC Discrete Receiver, PQFP128 board		
Size	Document Number	Rev
B	<Doc>	<Rev Code>
Date:	Tuesday, December 17, 2013	Sheet 1 of 1

Bill of Materials			HI-8476 Arinc Discrete Receiver Board	12-Dec-13	
Item	Qty	Description	Reference	DigiKey	Mfr P/N
1	2	Capacitor, Cer 0.1uF 20% 50V Z5U 0805	C3,C4	399-1176-1-ND	Kemet
2	1	Capacitor, Cer 0.01uF 20% 50V Z5U 0805	C1	399-1160-1-ND	Kemet
3	1	Cap Alum 47uF 50V 20% SMD	C2	PCE4222CT-ND	Panasonic EEE-
4	1	Header, Male 1x3, .1" Pitch	J1,J6	S1012E-03-ND	Sullins S1012E-03-ND
5	5	Header, Male 1x2, .1" Pitch	J2,J3,J4,J5,J8	S1012E-02-ND	Sullins S1012E-02-ND
6	1	Header, Male 2x20 0.1" Pitch	J7 Optional	S2012E-20-ND	Sullins PEC36DAAN
7	1	LED Green 0805	D33	160-1179-1-ND	LiteOn LTST-C170GKT
8	32	LED Red 0805	D1-D32	160-1178-1-ND	LiteOn LTST-C170GKT
9	1	Resistor, 10 5% 1/8W 0805	R34	P10ACT-ND	Panasonic ERJ-6GEYJ100V
10	1	Resistor, 330 5% 1/8W 0805	R33	P330ACT-ND	Panasonic ERJ-6GEYJ331V
11	32	Resistor, 1.0K 5% 1/8W 0805	R1-R32	P1.0KACT-ND	Panasonic ERJ-6GEYJ102V
12	2	Resistor, 13K 0.4W 5% 0805 SMD	R35,R36	RHM13KKCT-ND	Rohm ESR10EZPJ133
13	3	Resistor Network, 100K 5% 8 Res 9SIP	R37,R38,R39	4609X-101-104LF-ND	Bourns 4609X-101-104LF
14	1	Osc 1.0 MHz 3.3V, 5x7mm SMD	Y1	631-1122-1-ND	FOX FXO-HC735-1
15	4	Switch Tape Seal 8Pos SMD	SW1,SW2,SW3,SW4	CT2198MST-ND	CTS 219-8MST
16	1	Switch Tape Seal 10Pos SMD	SW5	CT21910MST-ND	CTS 219-10MST
17	2	Test Point, Red Insulator, 0.062" hole	VLOGIC	5010K-ND	Keystone 5010
18	3	Test Point, Black Insulator, 0.062" hole	GND	5011K-ND	Keystone 5011
19	1	Test Point, White Insulator, 0.040" hole	CLK	5001K-ND	Keystone 5002
20	1	Test Point, Yellow Insulator, 0.062" hole	VLEDS	5014K-ND	Keystone 5014
21	1	HI-8476 - 128QFP	U1	HOLT IC	Holt IC



## Appendix 1      Lightning Protection

The ARINC 429 inputs (RXA-R and RXB-R) are protected to RTCA/DO-160G, Section 22 Level 3 Pin Injection Test Waveform Set A (3 & 4), Set B (3 & 5A) and Set Z (3 & 5B) when used with the recommended 13kohm series input resistors. For more details please see the latest datasheet.

The level of lightning protection can be increased by using external components, please see the Application Notes available on Holt's website <http://www.holtic.com>.

The layout of a HI-8476 board should always have low conductivity paths from the device power/ground pin to the relevant power or ground origin. These paths should avoid proximity to sense or other signal traces; this applies to above and below as well as horizontally. It is good practice to have a power and ground 'moat' beneath the sense line to prevent disturbance on these lines during a 'lightning' event.

## REVISION HISTORY

Revision	Date	Description of Change
QSG-8476, Rev. New	12-11-13	This document refers to the HI-8476 ARINC 429 repeater board and has been renamed from QSG-8476_New to QSG-8476-Repeater_New
QSG-8476, Rev. A	01/20/14	Initial Release of Quick Start Guide for HI-8476 demo board.