

TIME DIFFERENCE OF ARRIVAL DIRECTION FINDER

UPDATES&CHANGES

FROM 102-73170-20:
ADD SYNCHRONOUS DETECTION
AND LED METER

CIRCUIT BOARD SIZE CHANGED
TO FIT HAMMOND 1599E ENCLOSURE

INTERNAL SPEAKER ADDED

SYNCHRONOUS DETECTOR ADDED

ANALOG METER EMULATION
(USING LEDs)

DAUGHTER CARDS

LED DISPLAY UP

LEDs MOUNTED TOP-SIDE
2 SPACER HOLES AVAILABLE
FOR ALIGNMENT JIG

MUST USE SHORT DAUGHTERCARD
MAY USE WIDE OR NARROW

WIDE DAUGHTERCARD MUST BE
REMOVED TO PROGRAM zNEO

LED DISPLAY DOWN

LEDs MOUNTED BOTTOM-SIDE

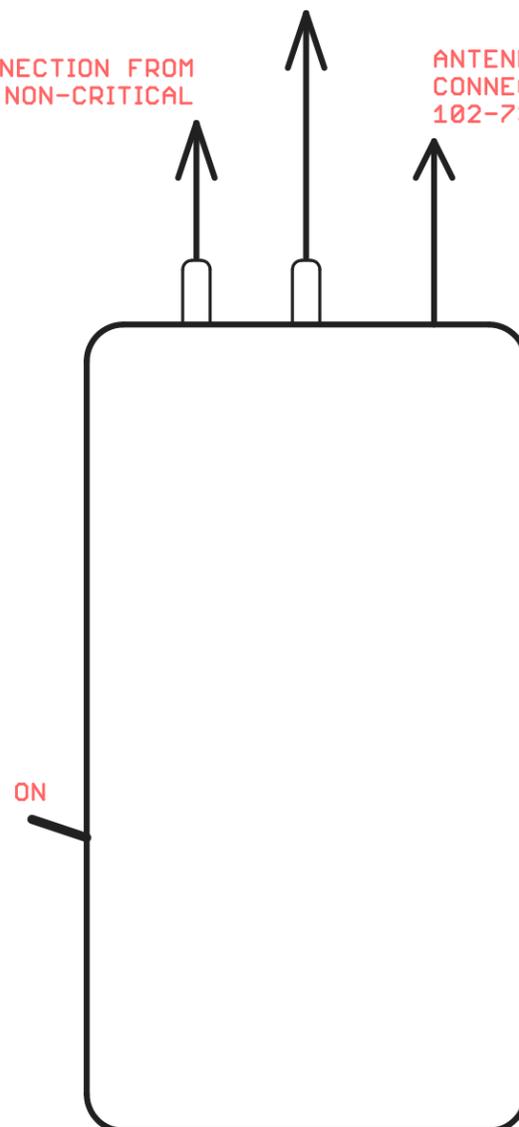
MAY USE TALL OR SHORT DAUGHTERCARD
MAY USE WIDE OR NARROW

WIDE DAUGHTERCARD MUST BE
REMOVED TO PROGRAM zNEO

SERIAL CONNECTION
HOST CONFIGURATION

AUDIO CONNECTION FROM
RADIO NON-CRITICAL

ANTENNA ROTATOR
CONNECTION
102-73174-70



PROTO

Z16F2810 SOFTWARE PROTOTYPING BUILD

PROD

PRODUCTION BUILD: (METER EMULATION)
OP-AMPS CIRCUITRY FOR METER
SUPPORT OMITTED

SW_P ANALOG LEVELS	
DAUGHTER BOARD	
NAKED	0V
102-73174-71	2.0V
102-73174-82	0V
102-73174-91	0V
102-73174-97	0V

PD1 DIGITAL LEVELS		
DAUGHTER BOARD	NO CARRIER	CARRIER DETECT
NAKED	1	1
102-73174-71	1	1
102-73174-82	0	0
102-73174-91	1	0
102-73174-97	1	0

ENCLOSURE
ENCL1
1599EBKBAT

KC0JFQ

THIS BOARD CONTAINS
STATIC SENSITIVE
DEVICES. HANDLE
ONLY IN STATIC SAFE
ENVIRONMENT

TOP_FULL BOARD ASSY BOT_COMPACT BOARD-ID
DRAWING FRAME SHOWN ON CIRCUIT BOARD

Drawn Date
W. ROBISON 10/2025

Designed Date
W. ROBISON 10/2025

MARK ZERO POINT FOR
PICK & PLACE FILE ON
PRINTED CIRCUIT BOARD

PWB RELEASED AS 2D354 102-73174-51

PWA RELEASED AS 2D354 102-73174-51

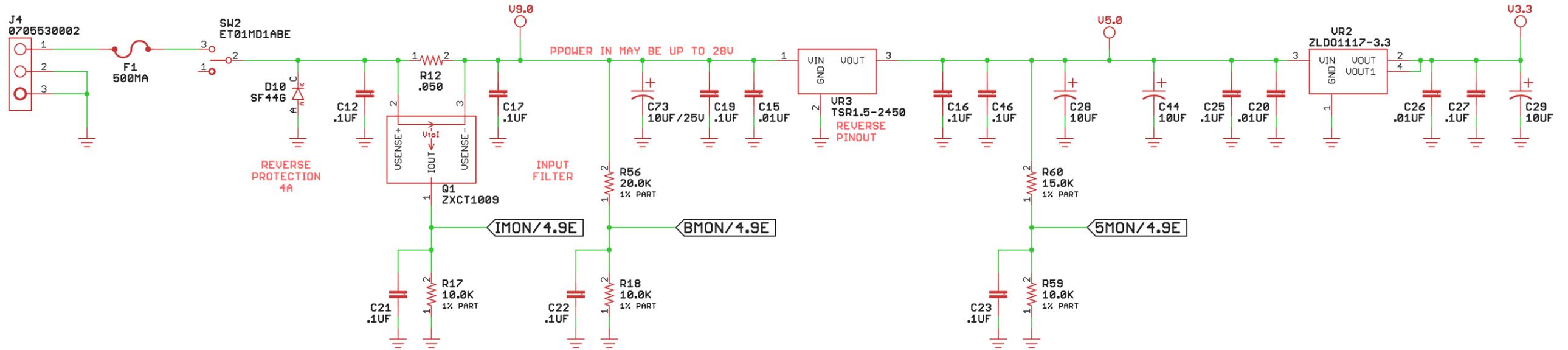
The University of Iowa
Department of Physics & Astronomy
Iowa City, IA, USA

TITLE: ICARC TDOA, zNEO A102_73174_51

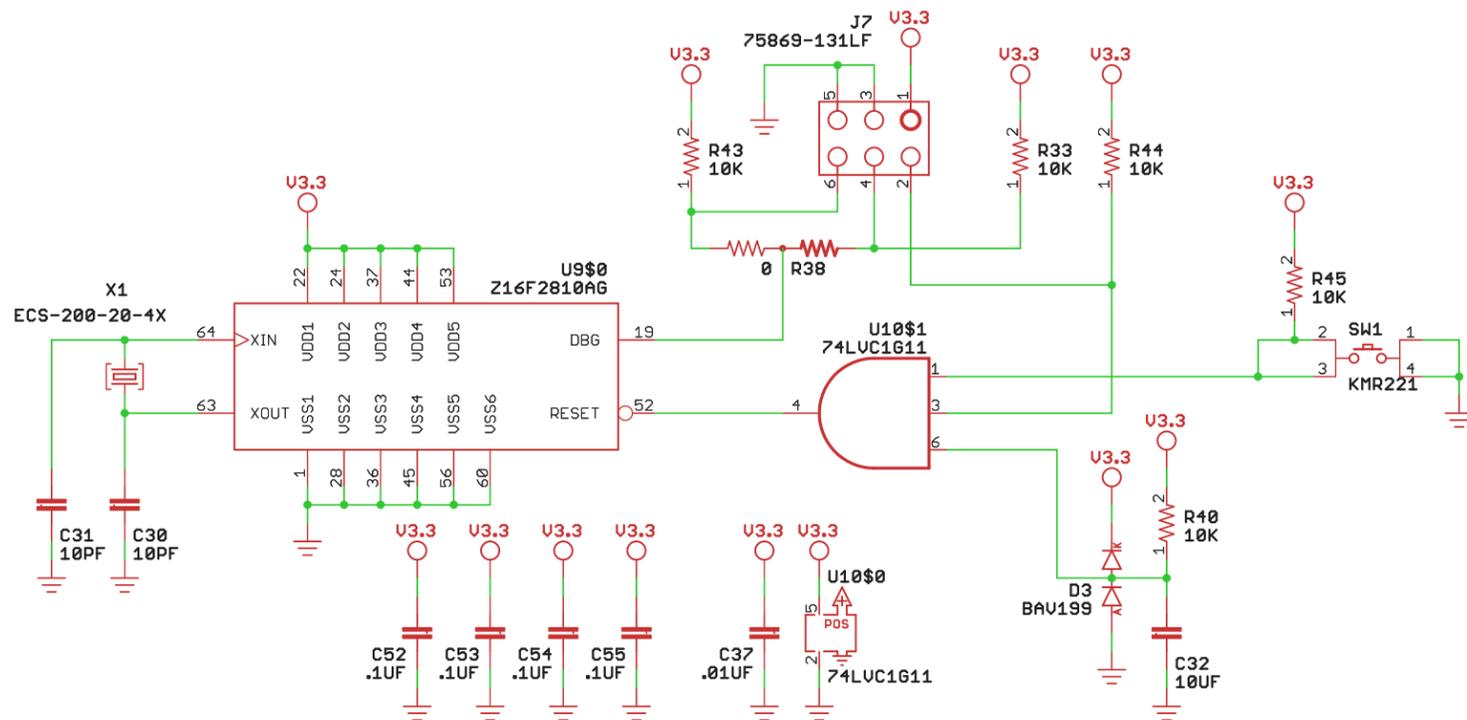
CAGE	Series	ICARC FOX HUNT	Number	4 Layers	Rev
2D354	102	B	73174		51

Date: 22 Nov 2025 15:35:49 22 Nov 2025 15:36:19 Sheet: 1/6

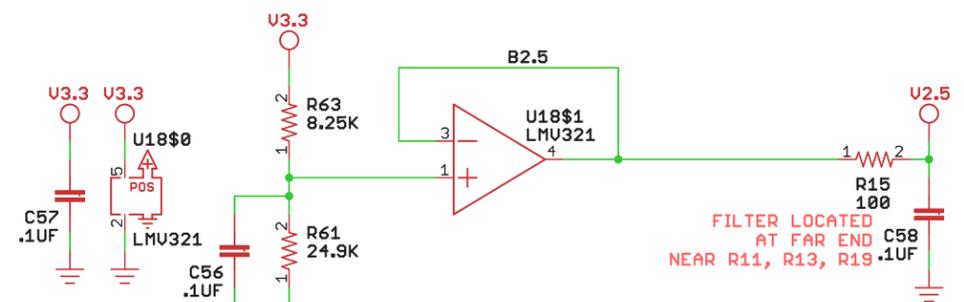
POWER CONDITIONING



zNEO CLOCK AND PROGRAMMING PORT



MID-RAIL REFERENCE



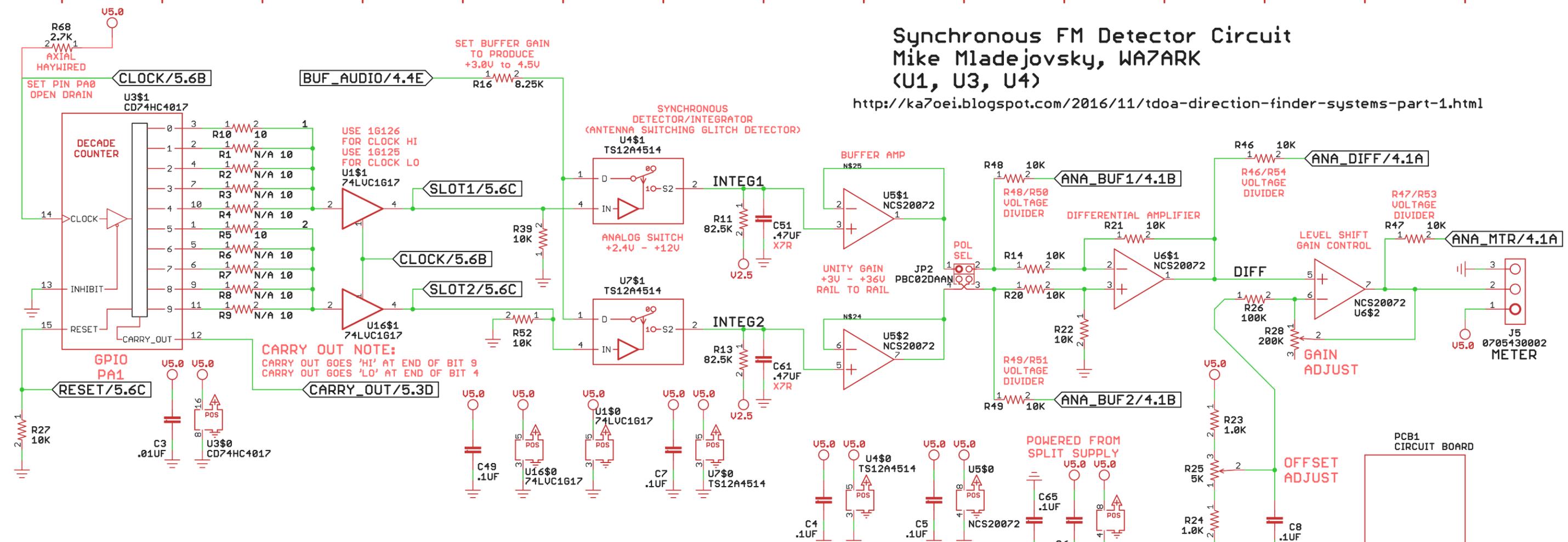
Drawn	W. ROBISON	Date	10/2025
Designed	W. ROBISON	Date	10/2025

The University of Iowa Department of Physics & Astronomy Iowa City, IA, USA				
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CAGE	Series	Number	4 Layers	Rev
2D354	102	B 73174		51
Date: 22 Nov 2025 15:35:49				Sheet: 2/6

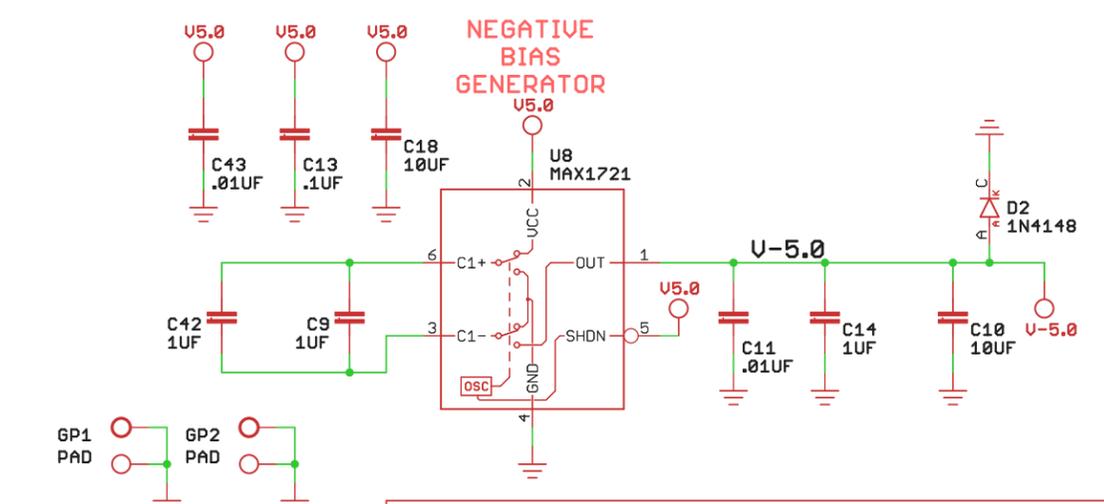
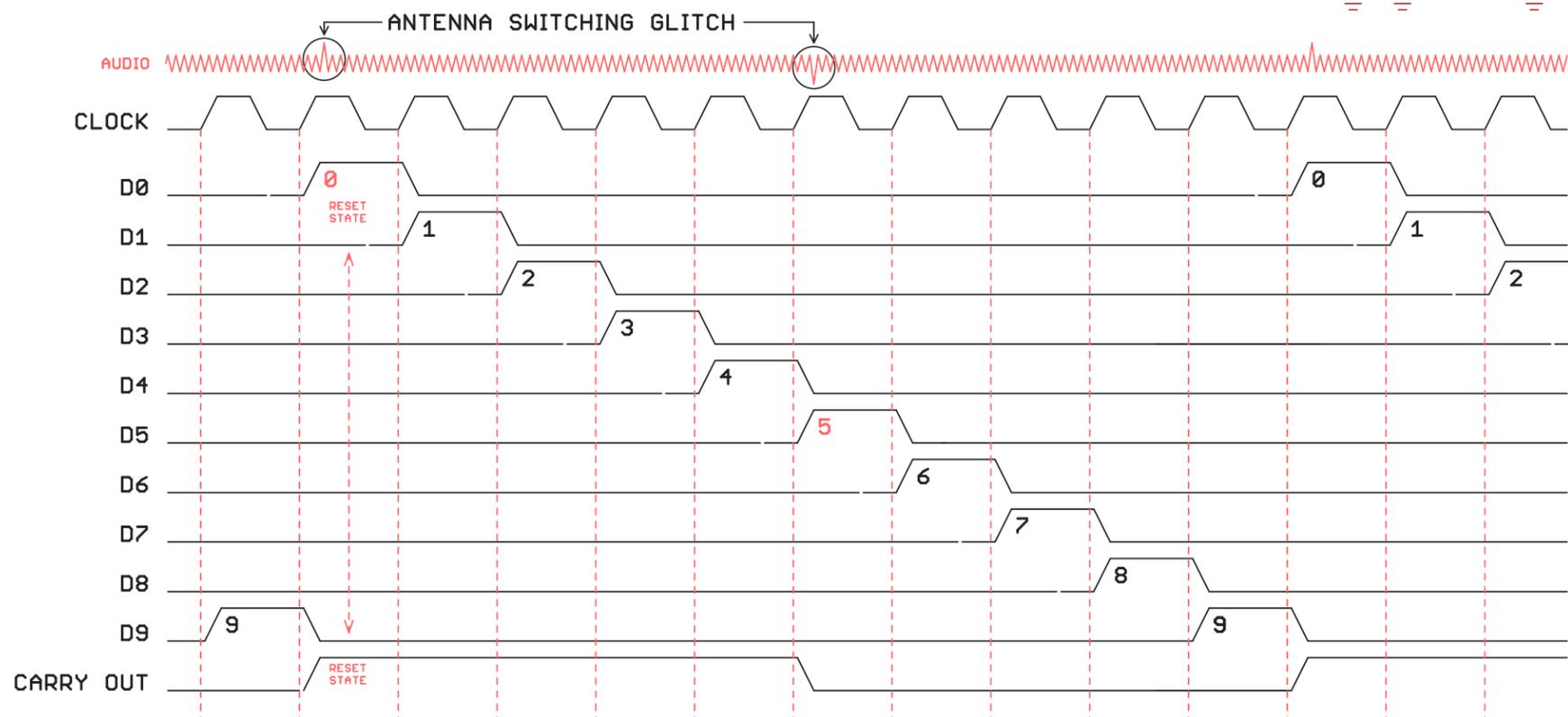
Synchronous FM Detector Circuit

Mike Mladejovsky, WA7ARK
(U1, U3, U4)

<http://ka7oei.blogspot.com/2016/11/tdoa-direction-finder-systems-part-1.html>



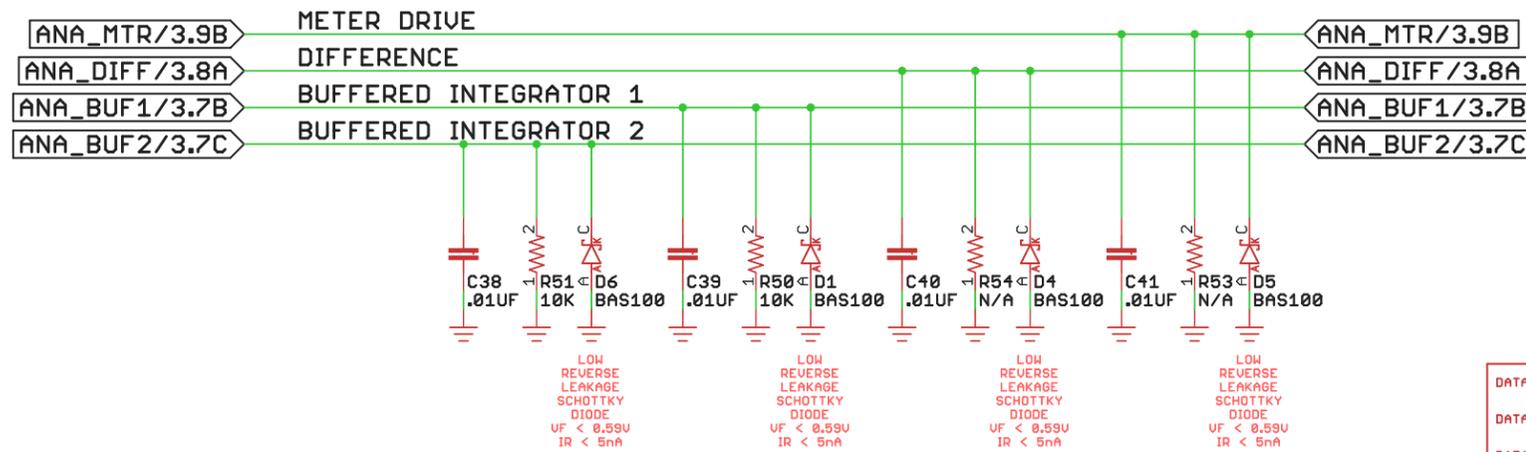
CARRY OUT NOTE:
CARRY OUT GOES 'HI' AT END OF BIT 9
CARRY OUT GOES 'LO' AT END OF BIT 4



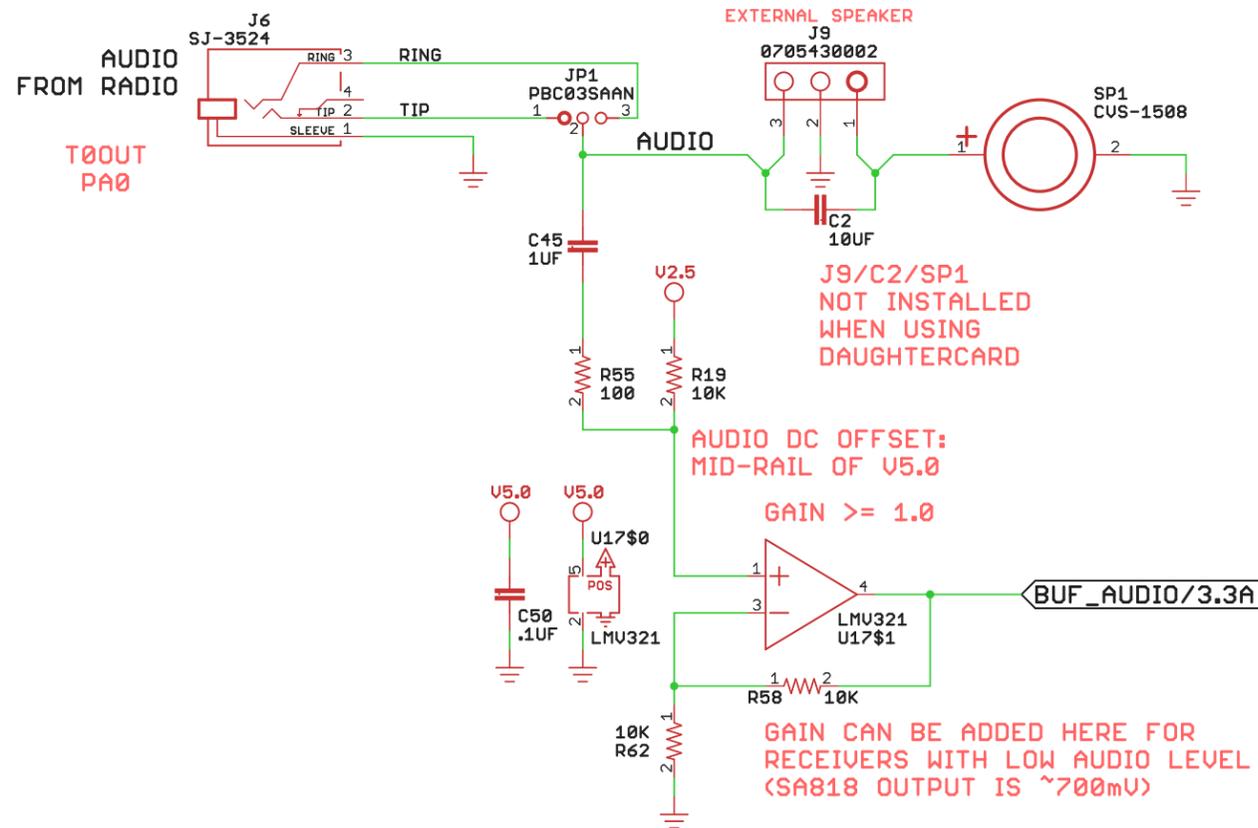
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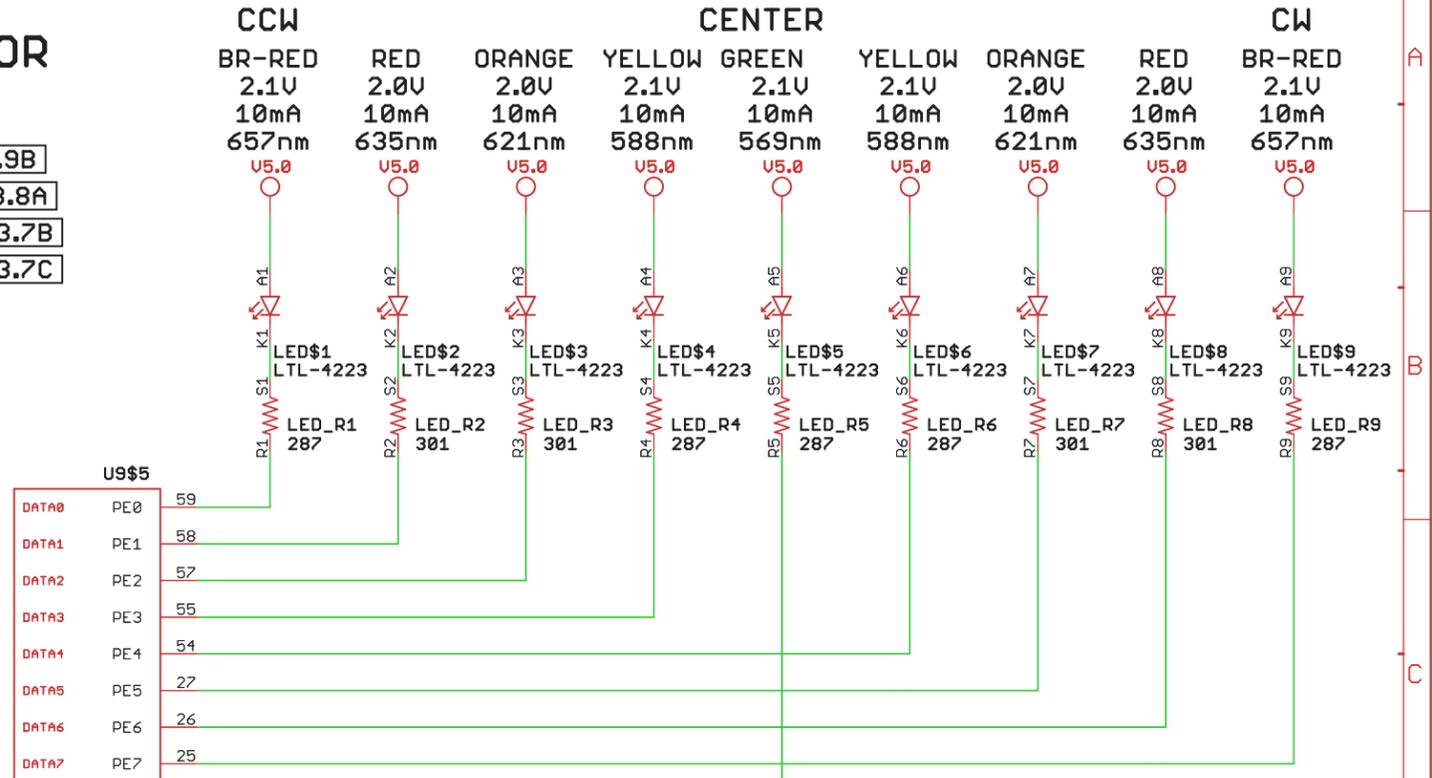
ANALOG INPUTS FROM SYNCHRONOUS DETECTOR



AUDIO BUFFER



ANALOG METER EMULATION

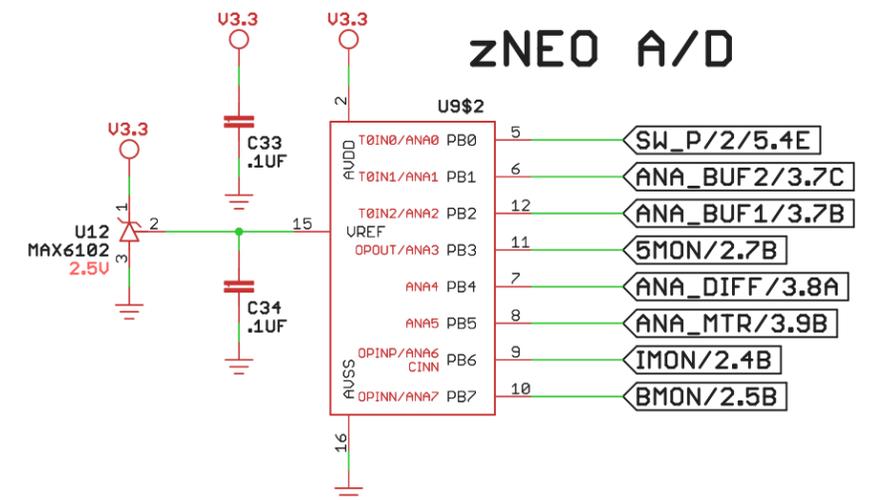


LED\$1..LED\$9 INSTALL INSTRUCTIONS APPEAR ON THE PWA DRAWING

LED\$1..LED\$9 AND LED_R1..LED_R9 ARE A COMPOSITE PART THAT FORCE THE LED ARRAY INTO A SEMICIRCLE MANUAL PROCUREMENT REQUIRED AS THESE PARTS DO NOT APPEAR CORRECTLY IN THE PARTS LIST

LED DROP	RESISTOR	
1.5	350	348
1.6	340	340
1.7	330	332
1.8	320	324
1.9	310	309
2.0	300	301
2.1	290	287
2.2	280	280
2.3	270	267
2.4	260	261
2.5	250	249

zNEO A/D



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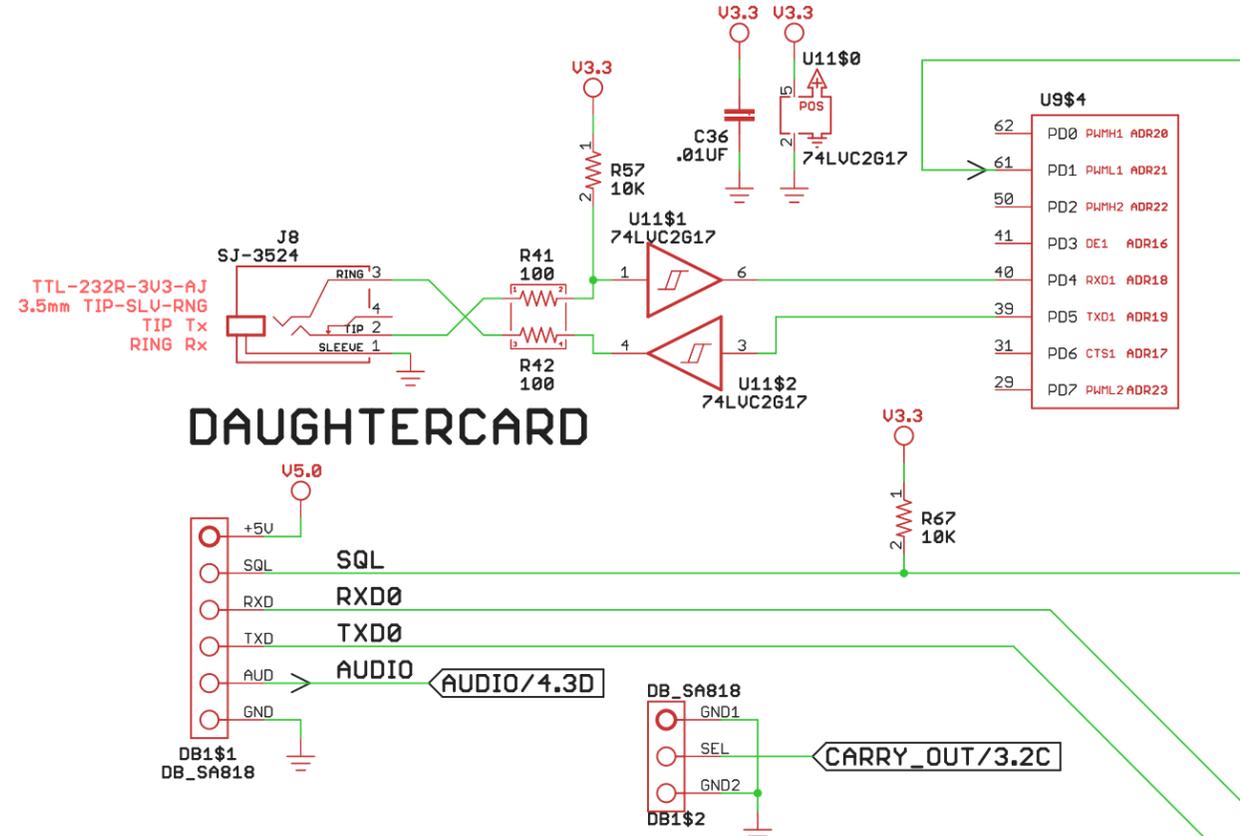
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A102_73174_51

CAGE	Series	Number	4 Layers	Rev
2D354	102 ICARC FOX HUNT	B 73174		51

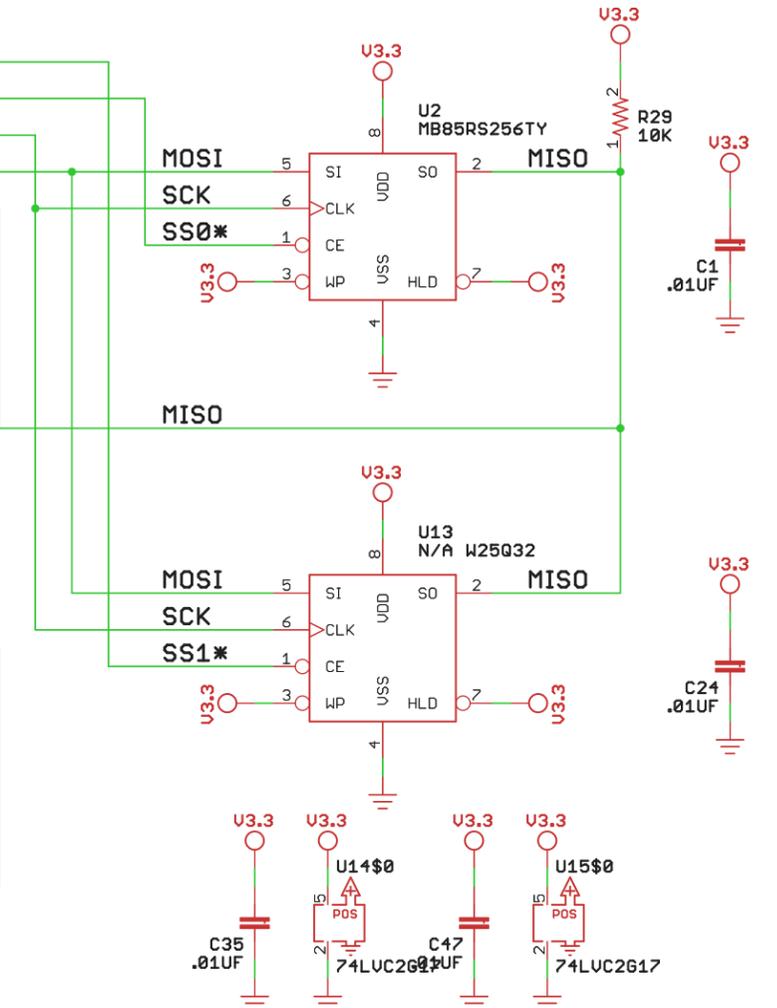
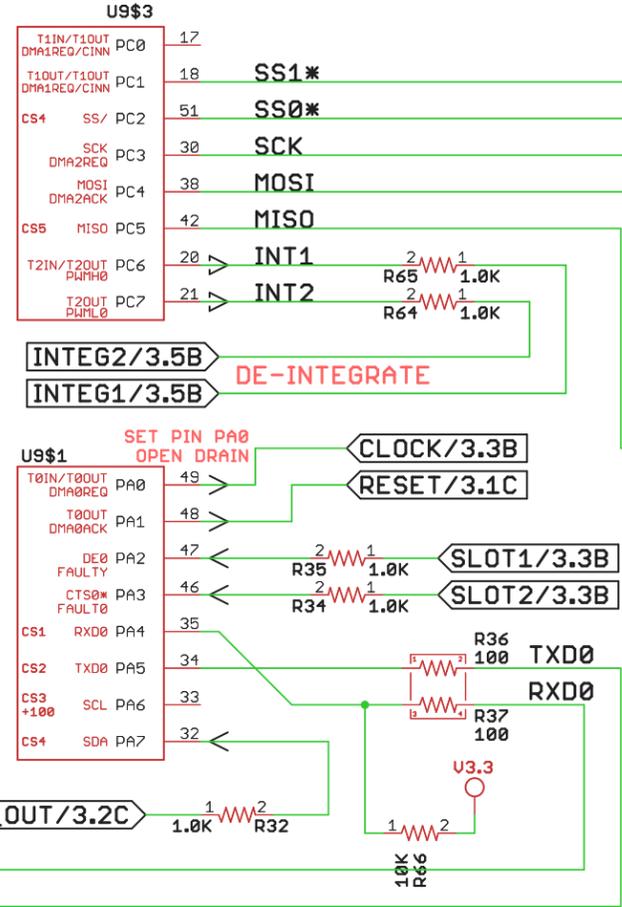
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SOFTWARE DEBUG PORT

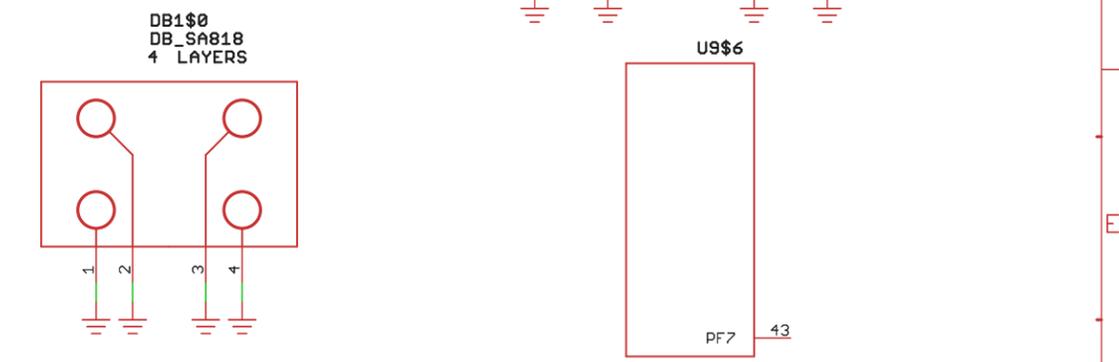
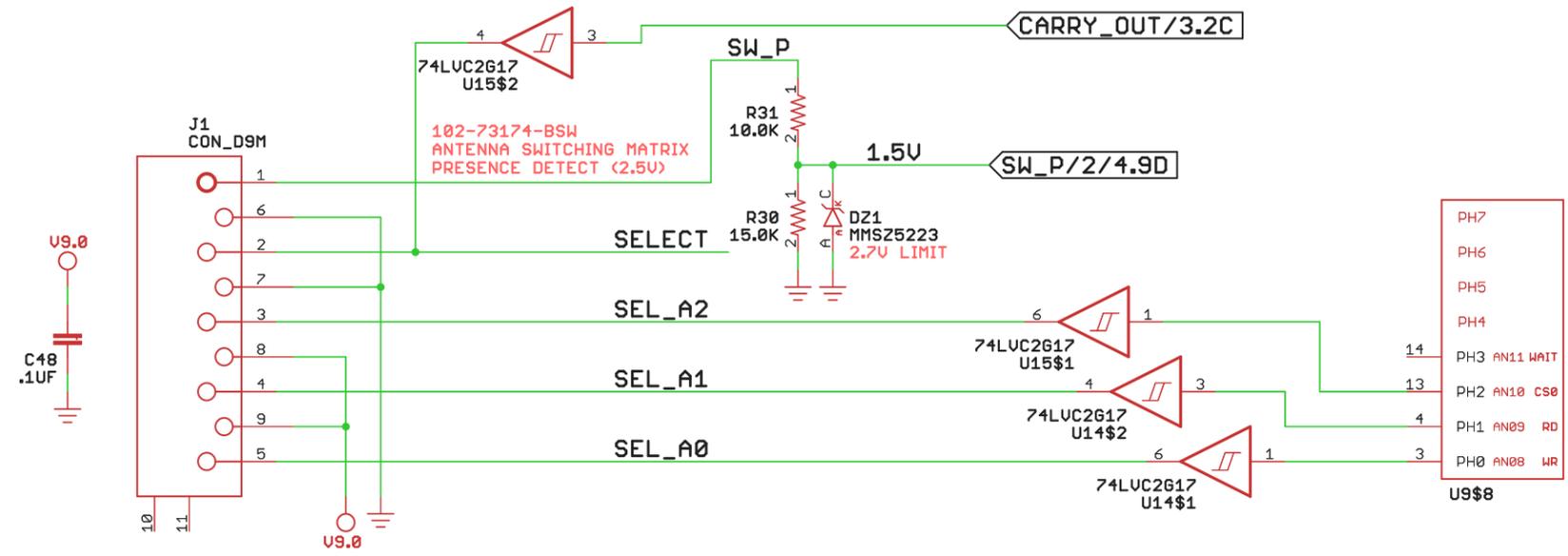
EXTERNAL MEMORY



DAUGHTERCARD



REMOTE ANTENNA SWITCH CONTROL



Drawn	W. ROBISON	Date	10/2025	The University of Iowa Department of Physics & Astronomy Iowa City, IA, USA	
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CAGE	2D354	Series	102	ICARC FOX HUNT	Number
				B	4 Layers
				73174	Rev
				51	
Date: 22 Nov 2025 15:35:49			22 Nov 2025 15:36:19		Sheet: 5/6

		BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
102-73174-51	PORT A	CARRY_OUT INTERRUPT	NOT USED OUT	TXD0 UART OUT	RXD0 UART IN	SLOT2 INTERRUPT	SLOT1 INTERRUPT	RESET OUT	CLOCK T0OUT
102-73174-51	PORT B	BMON ANALOG IN	IMON ANALOG IN	ANA_MTR ANALOG IN	ANA_DIFF ANALOG IN	5MON ANALOG IN	ANA_BUF1 ANALOG IN	ANA_BUF2 ANALOG IN	SW_P ANALOG IN
102-73174-51	PORT C	INTEG2 OPEN DRAIN	INTEG1 OPEN DRAIN	MISO ESPI IN	MOSI ESPI OUT	SCLK ESPI OUT	SS0* OUT	SS1* OUT	NOT USED OUT
102-73174-51	PORT D	NOT USED OUT	NOT USED OUT	TXD1 UART OUT	RXD1 UART IN	NOT USED OUT	NOT USED OUT	SQL IN	NOT USED
102-73174-51	PORT E	LED8 OUT	LED7 OUT	LED6 OUT	LED5 OUT	LED4 OUT	LED3 OUT	LED2 OUT	LED1 OUT
102-73174-51	PORT F	NOT USED OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT
102-73174-51	PORT G	NO PIN OUT	NO PIN OUT	NO PIN OUT	LED9 OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT
102-73174-51	PORT H	NO PIN OUT	NO PIN OUT	NO PIN OUT	NO PIN OUT	NOT USED OUT	SEL_A2 OUT	SEL_A1 OUT	SEL_A0 OUT

ICARC FOX TDOA RECEIVER PORT ASSIGNMENTS

73174-51