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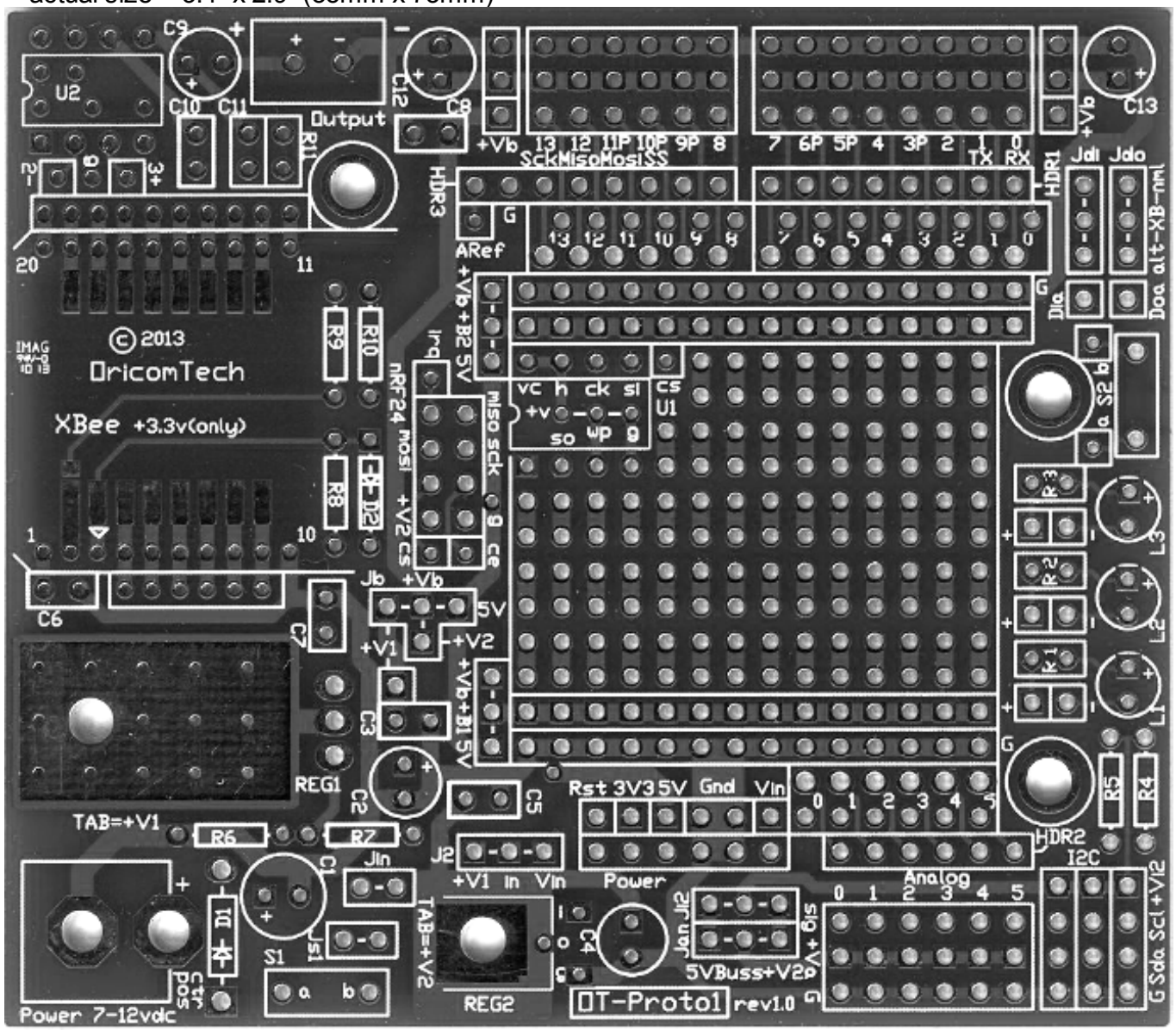
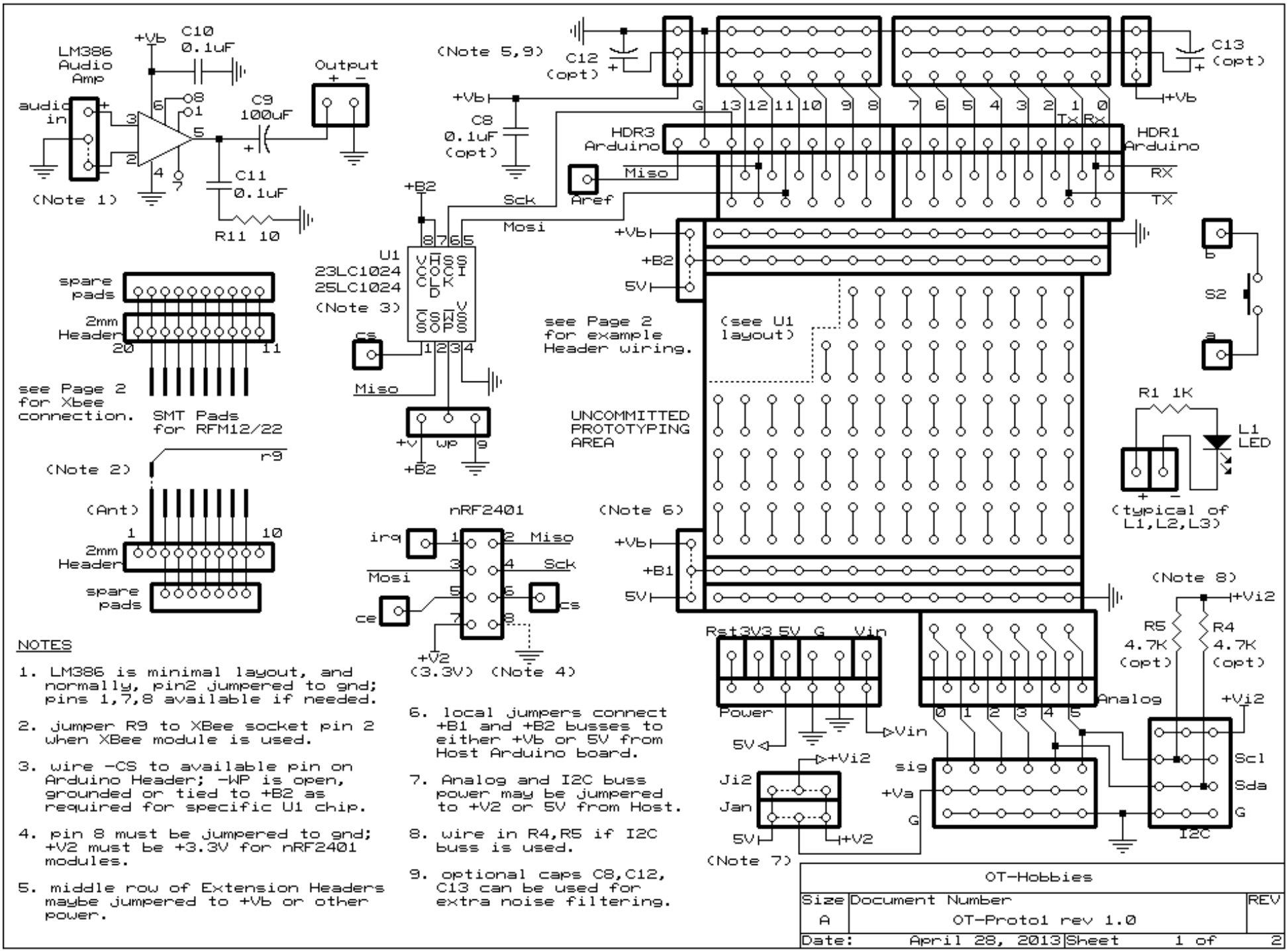
OT-Proto1 Shield Schematics & Layout

- actual size = 3.4" x 2.9" (85mm x 73mm)





NOTES

1. LM386 is minimal layout, and normally, pin2 jumpered to gnd; pins 1,7,8 available if needed.
2. jumper R9 to XBee socket pin 2 when XBee module is used.
3. wire -CS to available pin on Arduino Header; -WP is open, grounded or tied to +B2 as required for specific U1 chip.
4. pin 8 must be jumpered to gnd; +V2 must be +3.3V for nRF2401 modules.
5. middle row of Extension Headers maybe jumpered to +Vb or other power.
6. local jumpers connect +B1 and +B2 busses to either +Vb or 5V from Host Arduino board.
7. Analog and I2C buss power may be jumpered to +V2 or 5V from Host.
8. wire in R4,R5 if I2C buss is used.
9. optional caps C8,C12, C13 can be used for extra noise filtering.

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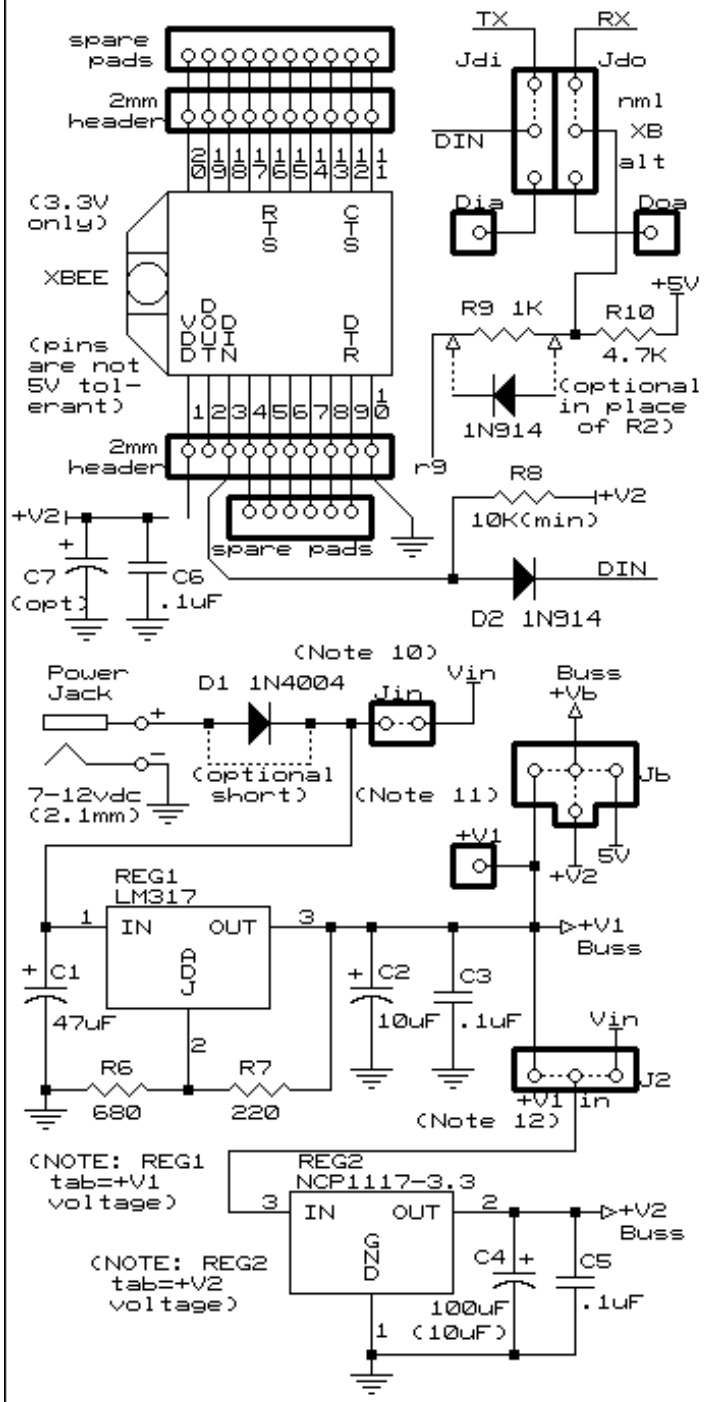


XBee, RFM12/22, nRF2401 Hookup

To use an XBee module, install 2mm headers, plus D2,R8,R9,R10, as well as jumper from R9 to header pin 2 (see Page 1).

Install jumpers at Jdi,Jdo "nml" positions to connect XBee directly to Arduino Rx,Tx pins.

NOTE - when XBee is jumpered to Rx,Tx, the PC USB port must be disconnected to prevent conflicts. Power Arduino from Power Jack.

To use RFM12,22 module, solder to the 2mm-pitch smt pads, and use the spare pads to make connections to +3.3V and SPI port pins; 5V-3.3V level-shifters must be wired into the proto area! (see Page 1).

NOTE - USE A THIN INSULATOR UNDER RFM12/22 MODULE TO PREVENT VIAS POSSIBLY BEING SHORTED OUT!!!

To use nRF2401 module, install 8-pos 0.1" female hdr, and connect pins to power, gnd, and SPI port.

Proto1 Voltages

+V1	output of REG1, adjustable via R6,R7 to 2.5-40V, nominal 5V.
+V2	should be +3.3V normally; +V2 label is used here to avoid confusion with 3V3 on Arduino Power Header.
Vin	Vin from Host Arduino board; can be used to power REG1 if jumper Jin is installed, and REG2 if J2:Vin jmpr installed.
5V	+5V from Host Arduino board.
3V3	+3.3V from Host Arduino board; available, but not used.

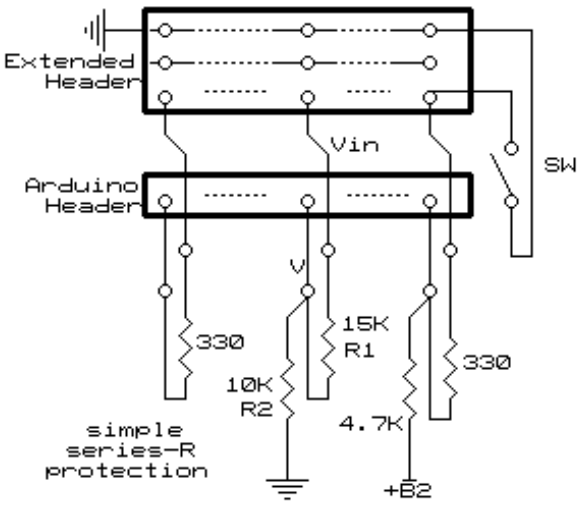
Proto1 Busses

+Vb	local distribution buss to HDR1,HDR3 Ext Headers, LM386. and proto area +B1,+B2 busses.
+B2	local buss in upper proto area, jumperable to +Vb or 5V; also powers U1 SRAM/EEPROM chip.
+B1	local buss in lower proto area, jumperable to +Vb or 5V.
+Va	middle row on Analog Ext Header jumperable to 5V or +V2.
+Vi2	top row on I2C Ext Header, jumperable to 5V or +V2.

NOTES

10. Jin can bring Arduino Vin power to the shield, or vice versa.
11. +Vb Buss should be jumpered to only one of +V1,+V2,or 5V.
12. REG2 input should be jumpered to only one of +V1 or +Vin.
13. the general layout of the Proto1 Shield is that all I/O pins can be brought to the Extended Hdrs in addition to the std Arduino stacking headers. The two can be connected together, or used for different purposes; eg circuitry soldered into the proto area can have 1 side connected to an Arduino pin and the other connected to an Extension Hdr pin.

Header Hookup Examples
(inputs on Extended Headers)



voltage divider on input pin

$$V = Vin * \frac{R2}{R1+R2}$$

pullup with series-R & external switch on input pin

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OT-PROTO1 SHIELD PARTS LIST

PARTS included with -MINIMUS Kit

Capacitors

C4	10-100 uF, 10V - (use large value when using XBee,RFM22).
C5	0.1 uF, 50V ceramic.

Resistors

R1,R2,R3	470-1000 ohm - (Led current-limiting Rs).
R4,R5	2.7-4.7K ohms - (optional; for I2C pullups).

Bulk Resistors

20/ea	120-330 ohm - (for wiring as series-Rs in I/O lines).
6/ea	2.4K ohms - (for use in voltage-dividers on A/D channels).
6/ea	4.7K ohms - (for use in voltage-dividers on A/D channels).

Miscellaneous

REG2	NCP1117 3.3V, 1A LDO voltage regulator, DPAK.
L1,L2,L3	Led, red,green,etc, T1 or T1 3/4.

Headers

2/ea	6-pos, Arduino Stacking Header.
2/ea	8-pos, Arduino Stacking Header.
1/ea	2x36 0.1" male header strip - (for Extended Headers).
1/ea	1x36 0.1" male header strip - (for Extended Headers).
1/ea	1x24 0.1" male header strip - (for miscellaneous headers).

ADDITIONAL PARTS included with -MAXIMUS Kit

Miscellaneous

Power Jack	2.1mm barrel jack.
D1	1N4004 silicon diode - (optional).
REG1	LM317, 1.5A voltage regulator, TO-220.
R6,R7	680,220 ohms - (use for 5V output on REG1).
C1	10-100 uF, 25V electrolytic.
C2	10-22 uF, 25V electrolytic.
C3,C6	0.1 uF, 50V ceramic.
S1,S2	push-button switch.
1/ea	heatsink, plus #4 screw & nut.
1/ea	DIP8 socket - (for U1).
4/ea	0.1" shorting blocks.

Transceiver Parts

2/ea	10-pos, 2mm female headers - (for XBee).
R8,R10	4.7K - (for XBee; do not substitute value).
R9	470 ohm - (for XBee; do not substitute value).
D2	1N914 or 1N4148 silicon signal diode - (for XBee).
1/ea	2x4 0.1" female header - (for nRF2401).

Audio Amp Parts

LM386	audio amplifier chip, plus DIP8 socket.
C9	100-220 uF, 25V electrolytic.
C10,C11	0.1 uF, 50V ceramic.
R11	10 ohm, 1/8w.
(Output)	2-pos, 3.5mm screw Terminal Block.

NOT INCLUDED

x C7,C8,C12,C13	(optional; not included).
x	XBee, RFM12/22, nRF2401 Transceiver - (not included).
x	23LC512,23LC1024 64KB,128KB SPI SRAM - (U1 - not included).
x	25LC1024 128KB SPI EEPROM - (U1, not included).
