

Date:	Revision/Addition/ Note	By:
Nov. 11, 2007	Original Concept and design.	GSC
Nov. 13, 2007	Pic Software : VOXALM2.hex 762 words used of 2048 words	GSC
Nov. 14, 2007	Pic Software : VOXALM3.hex Fixed timing issues in software	GSC
Nov. 16, 2007	Rev 2: Radio would key up when power failed to Alarm device. Isolated radio key line with relay. Added driver transistor to circuit and inverted PTT states in SW to drive relay.	GSC
Nov. 30, 2007	Pic Software : VOXALM4.hex 764 words used of 2048 words Rev 3: Showed to P. Herbst and he wants two alarm messages. One for lights on, one for lights off. Found a 2x20 sec VM module. Revising drawing with a 2 message voice module. Rewriting software for same.	GSC
Dec. 5, 2007	Pic Software : VOXALM4A.hex 767 words	GSC
Dec. 12, 2007	Pic Software : VOXALM4B.hex 989 words of 2048. Added a repeat of 10 minutes after original announcement.	GSC
Dec. 14, 2007	Pic Software : VOXALM4C.hex 1094 words of 2048. Added Alarm LED. Fixed timing issues with message.	GSC
Jan. 6, 2008	Rev 4: Added H11A1 opto isolator to CXR Detect to stop an intermittent detect condition.	GSC
May 20, 2008	Rev 5: Grouped I/O's by function together. Affects pins 9,10, 13, 17 18. Reworking software to change the function of the pins. Added Alarm when processor is in 10 minute wait mode.	GSC
May 23, 2008	Pic Software VOXALM4D.hex. 997 words of 2048 Removed Speaker from schematic. Removed Audio-connection to Quantar radio.	GSC
May 24, 2008	Rev 6: Added D2, power protection diode. Added DS3 PTT LED and R6 resistor. Changed resistor pack to resistor network and changed indicator from RP to RN to agree with industry convention. Changed R5 from 100 to 300 ohm.	GSC
May 24, 2008	Note: Received H11A1 from several different vendors. The only ones that worked and gave a reliable LOW condition were devices made by Harris.	GSC
May 25, 2008	Added C3 100uF. DC from Quantar Mike connection was lighting Power LED. DC blocking capacitor stopped this.	GSC

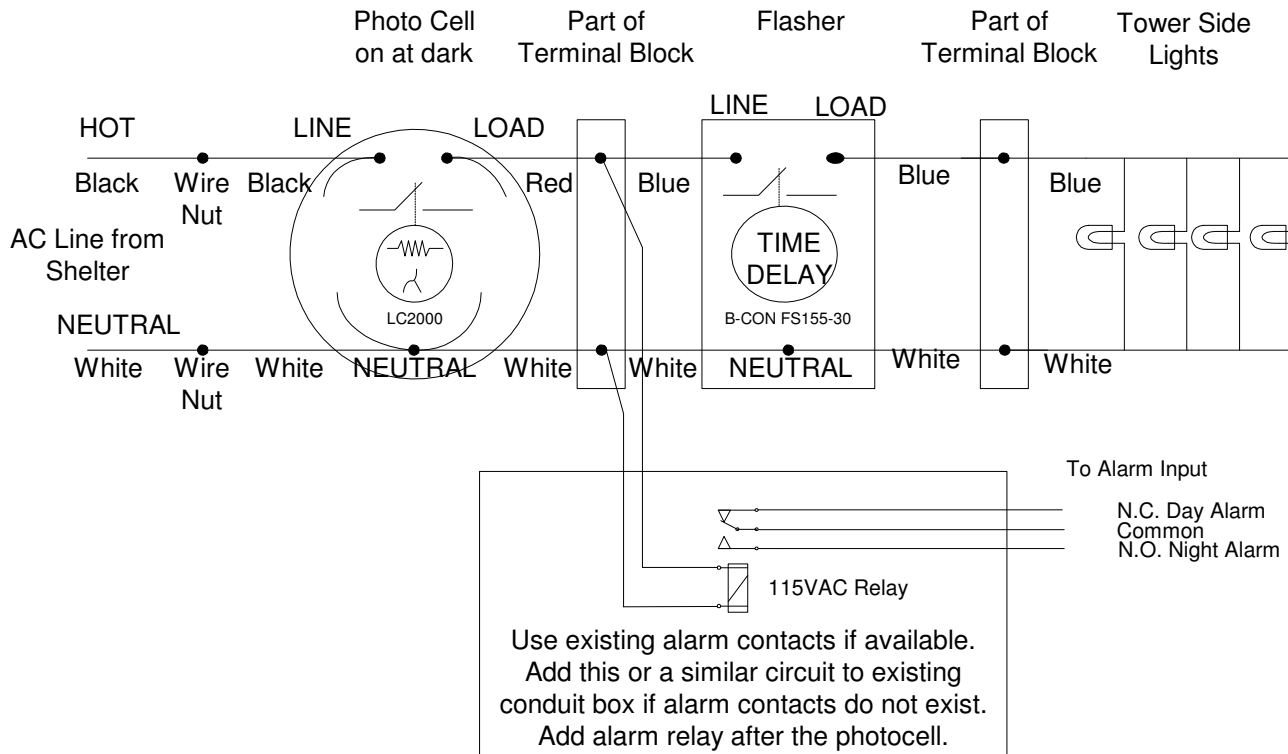
Package Outlines

S2	S3	S4	Radio Key time
On	On	On	4 Seconds
Off	On	On	6 Seconds
On	Off	On	8 Seconds
Off	Off	On	10 Seconds
On	On	Off	12 Seconds
Off	On	Off	14 Seconds
On	Off	Off	16 Seconds
Off	Off	Off	18 Seconds

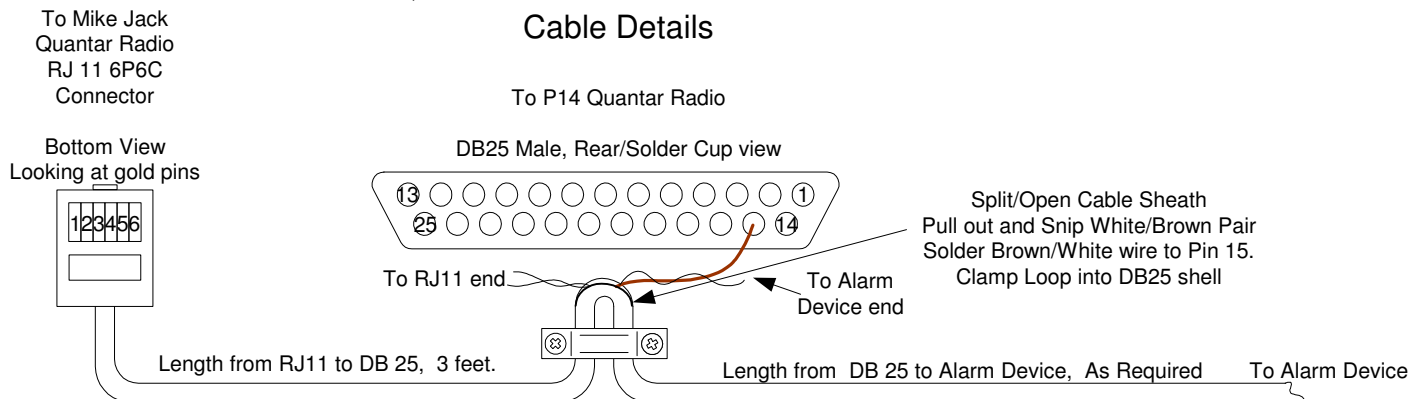
S1 is Microprocessor reset. Turn ON then OFF to reset processor

Drawn By: Gerald Crenshaw WD4BIS	Date: May 25, 2008	From the bench of: Amateur Radio Station WD4BIS	Page 1
Engineer: Gerald Crenshaw WD4BIS	Date: May 25, 2008		of 2
Checked By: Janet Crenshaw WB9ZPH	Date: May 25, 2008	Title: Tower Lights Voice Alarm Rev. 6	

TYPICAL EXAMPLE OF TOWER LIGHT WIRING



Quantar Radio to Alarm Device. Cable Details



Cable made with Cat 3 or Cat 5, 4 Pair cable. Snip off White Brown pair at RJ11 connector and crimp remaining wires into RJ11 as follows.

1 White/Blue
2 Blue/White
3 White /Orange
4 Orange/White
5 White/Green
6 Green/White

Date	Revision/Addition/ Note	by
Nov. 10, 2007	Original Concept and design.	GSC
Nov. 23, 2007	Added Quantar Radio to Alarm Device cable detail.	GSC
May 23, 2008	Changed length of cable from 6P6C RJ11 to DB25 from 2' to 3'. The 2' cable length only allows cable routing under Quantar radio not over the top as may be required in some installations.	GSC

Drawn By: Gerald Crenshaw WD4BIS	Date: May 23, 2008	From the bench of: Amateur Radio Station WD4BIS	Page 2 of 2
Engineer: Gerald Crenshaw WD4BIS	Date: May 23, 2008		Title: Tower Lights Voice Alarm Cable Rev. 3
Checked By: Janet Crenshaw WB9ZPH	Date: May 23, 2008		

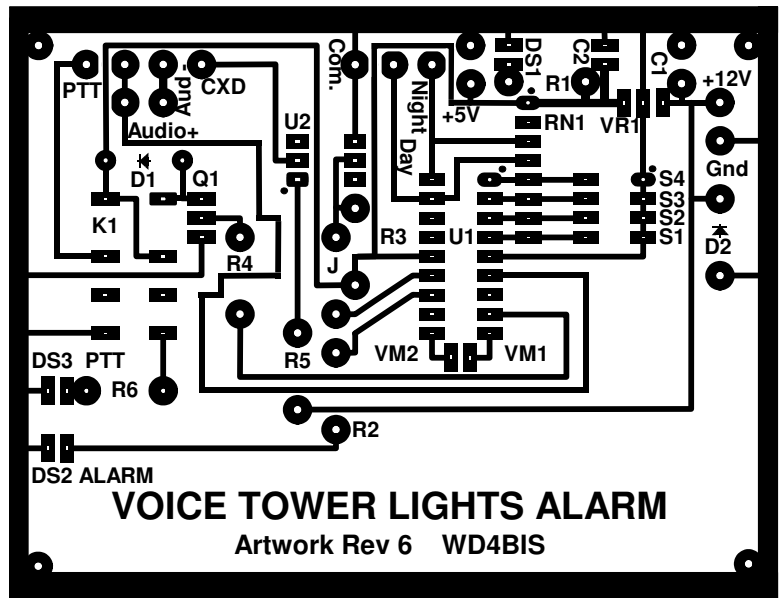
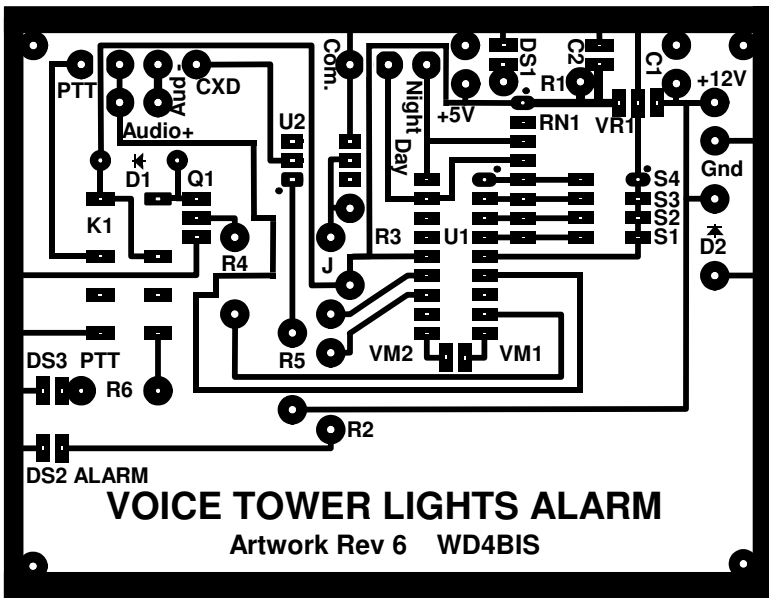
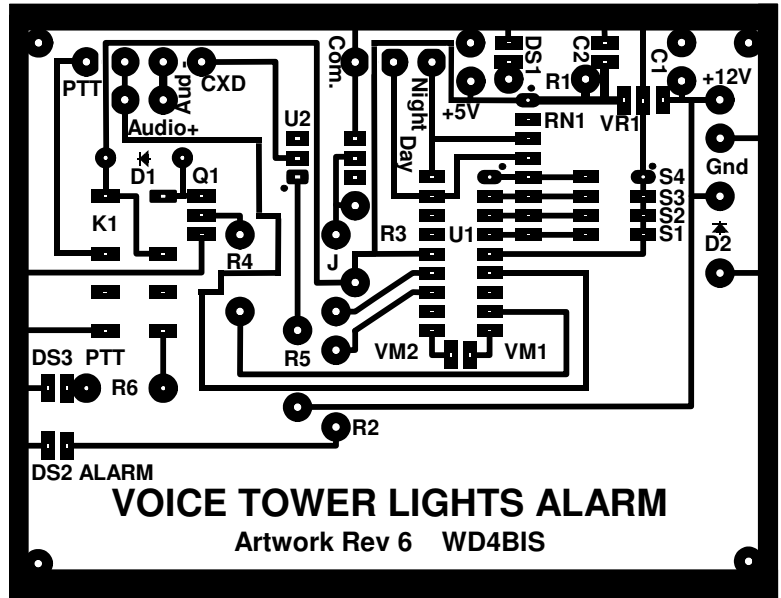
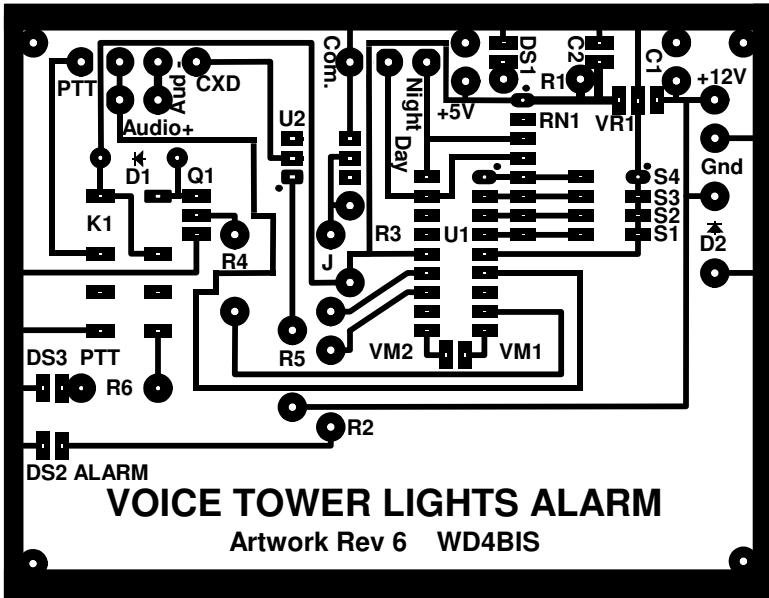
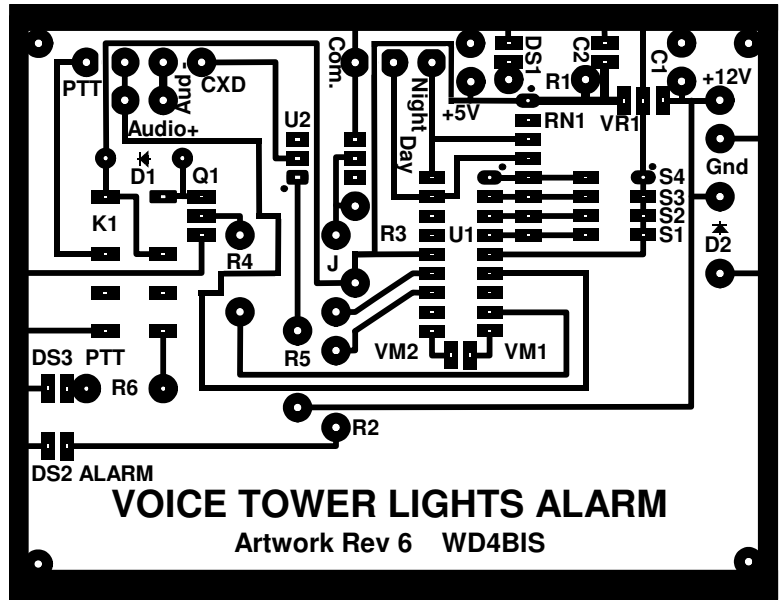
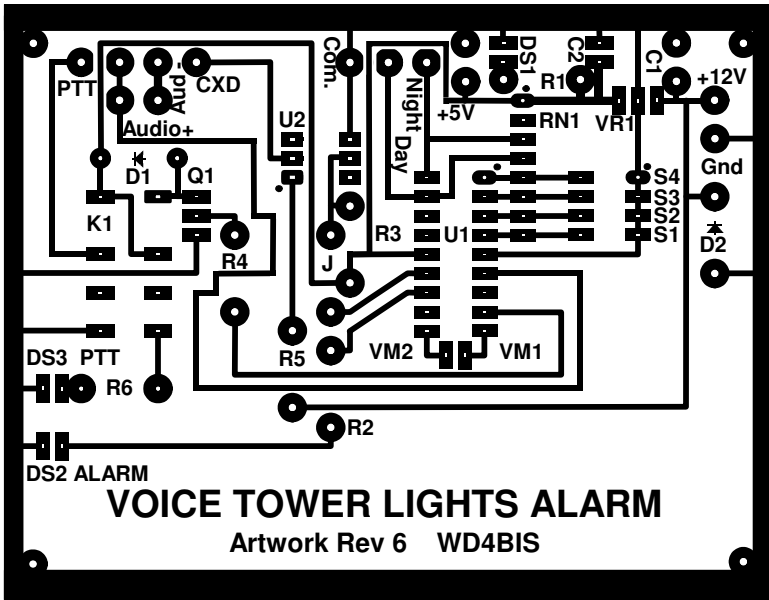
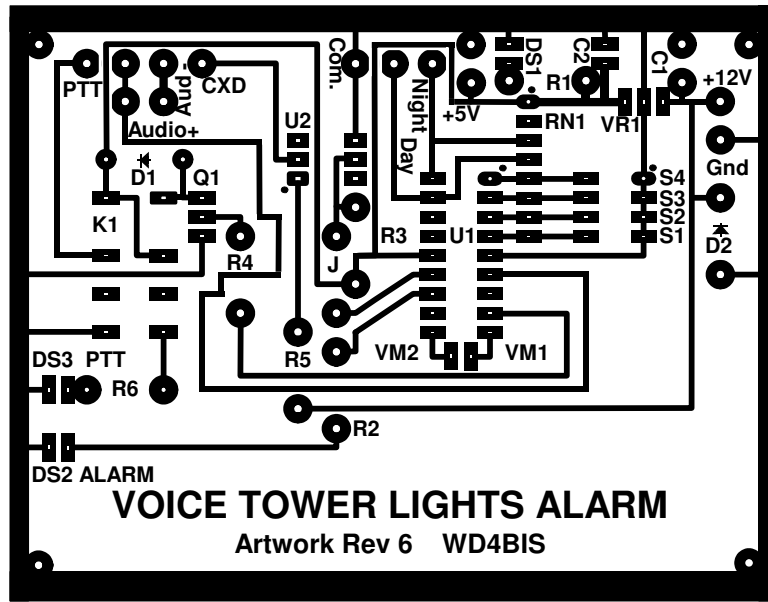


Photo Positive artwork, Step and Repeat.

HP4/4M Laser Printer: File, Print ,Properties, Layout, Advance, Postscript Options, Mirror image, Yes

Print this page Mirror image only on Laser Printer. Print on Staples Photo Basic Gloss, SKU (item#) 471865

Artwork Copper Side



Green Led, Power

One, 3 terminal PWB mount block

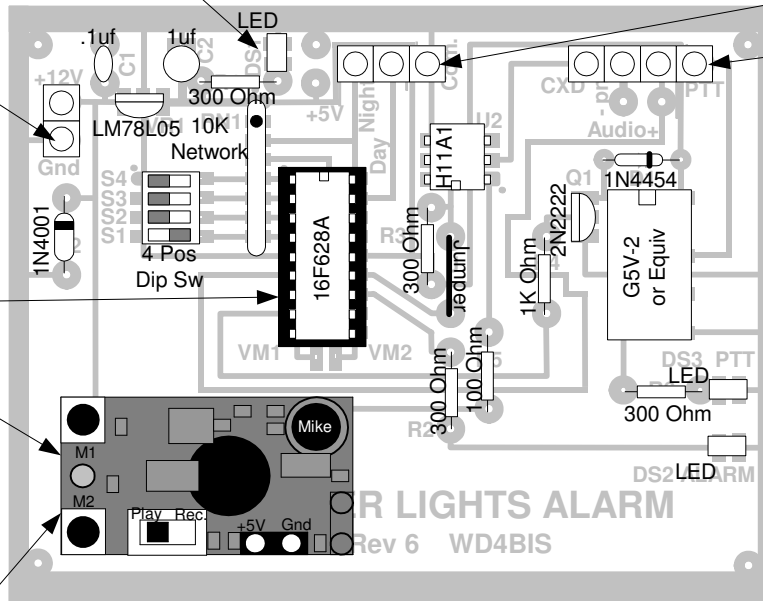
One, 2 terminal PWB mount block

Two, 2 terminal PWB mount block

Voice Recorder/Playback Module.
2 messages
20 seconds max per message
www.electronics123.com
Part# A96020

PTT Led, Amber
Alarm Led, Red

Attach to board with double sided tape.



Component Placement

Date:	Revision/Addition/ Note	By:
Apr. 30, 2008	Original Concept and design.	GSC
May. 5, 2008	Rev 1. Completed pre production. Artwork did not prove out	GSC
May. 7, 2008	Rev 2. Fixed Spacing issues on Lands	GSC
May 9, 2008	Rev 3. Functions on Pins changed to group similar. functions together. Reworked art to reflect changes	GSC
May 12, 2008	Rev 4. Fixed problem with wiring PTT Relay	GSC
May 17, 2008	Rev 5. Corrected wiring U2. Added Jumper	GSC
May 17, 2008	Production cards etched. Yield 6 cards	GSC
May 22, 2008	Artwork proved out. 1st production module completed.	GSC
May 25, 2008	Added D2, Power protection diode. Added R6 DS3, PTT LED	GSC

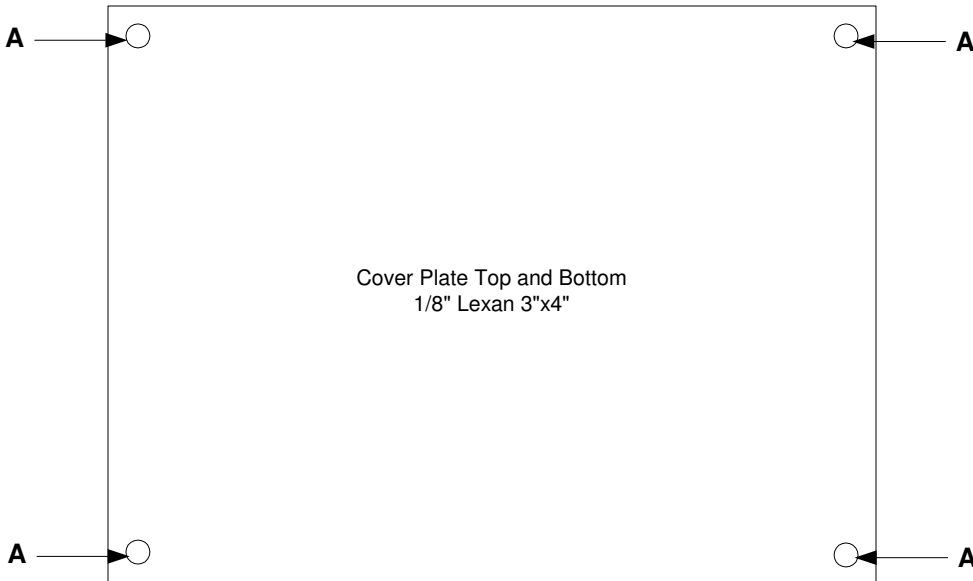
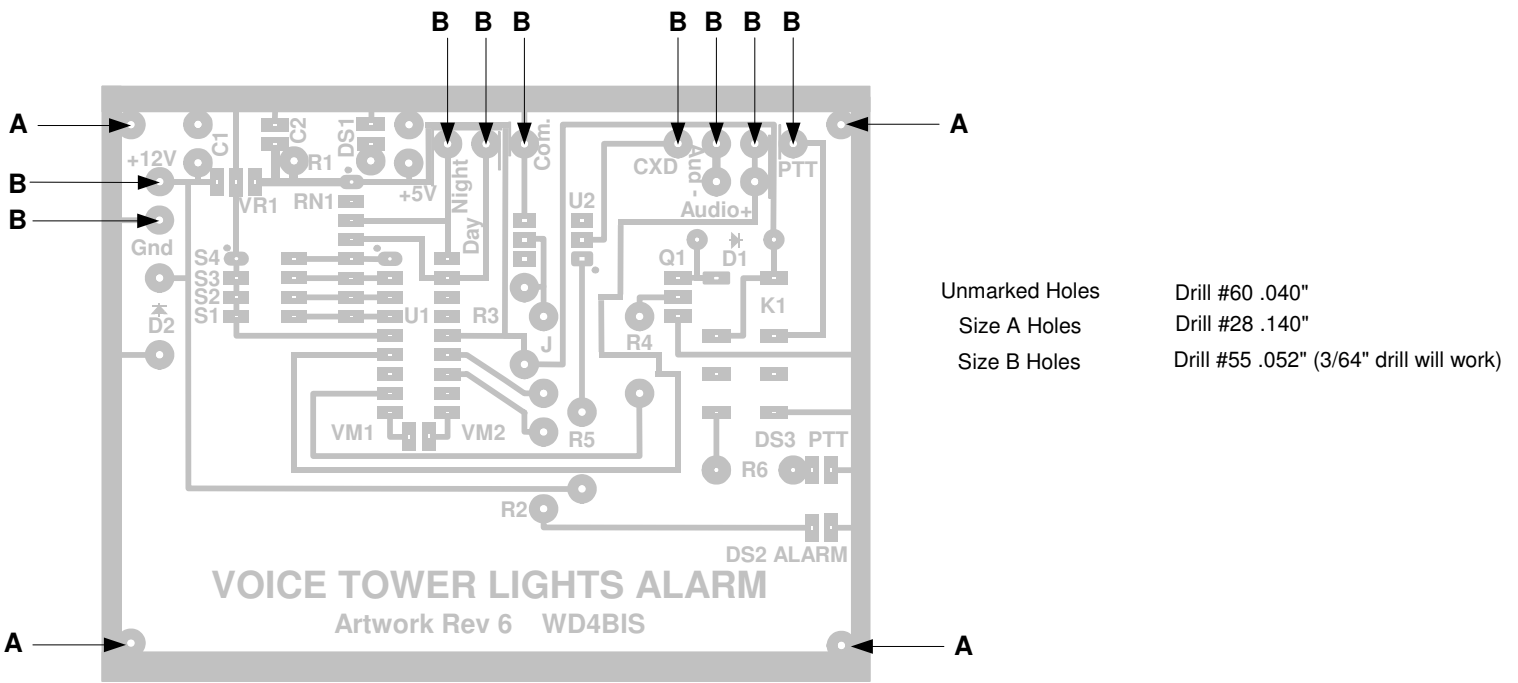
Drawn By: Gerald Crenshaw WD4BIS	Date: May. 17, 2008
Engineer: Gerald Crenshaw WD4BIS	Date: May 17, 2008
Checked By: Janet Crenshaw WB9ZPH	Date: May 17, 2008

From the bench of: Amateur Radio Station WD4BIS	Page 1 of 1
Title: Tower Lights Voice Alarm PWB Component Placement. Artwork Rev. 6	

Parts List			
Designation	Description	Vendor & Part#	Qty
C1	Capacitor .1uf 50V	Any	1
C2	Capacitor 1uf 35V	Any	1
D1	Diode IN4454	Any	1
D2	Diode IN4001	Any	1
DS1	LED Rectangular Green	Any	1
DS2	LED Rectangular Red	Any	1
DS3	LED Rectangular Amber	Any	1
K1	DIP Relay, 5V, DPDT,G5V-2 or equiv	Jameco 139977	1
Q1	Transistor 2N2222	Jameco 38236	1
R1,R2,R3,R6	Resistor 1/4W 5% 300 ohm	Any	4
R4	Resistor 1/4W 5% 1000 ohm	Any	1
R5	Resistor 1/4W 5% 100 ohm	Any	1
RN1	Resistor Network, SIP 10K 5% by 7 Sections	Jameco 97826	1
S1-S4	Dip Switch, 4 sections	Jameco 139002	1
U1	Microchip PIC16F628A	Jameco 193447, Digikey PIC16F628A-I/P-ND	1
U2	Optoisolator H11A1	Jameco 277561,Digikey 751-1273-5-ND	1
VM1	Voice Module, 2 Message, 20 Seconds	www.electronics123.com A96020	1
C1-C2	2 Pin Connector, .1"centers, 8"long	www.electronics123.com BB089	2
VR1	Voltage Regulator, TO-92, 5V,100ma 78L05	Jameco 51182, Digikey 296-1365-ND	1
T1-T6	Terminal, 2 sections .2" Centers PWB	Jameco 189676, Digikey ED1601-ND	3
T7-T9	Terminal, 3 Sections, .2" Centers PWB	Jameco 189668, Digikey ED1602-ND	1
Other/Misc.			
Socket	18Pin DIP	Any	1
.1" 2Pin Header	Snap Apart header	Any	2pin
Standoff	.187" (3/16") Hex, 1.0" long, 4-40 thread	Jameco 139185,Digikey 1897K-ND	4
Power Supply	12V 500Ma	Any	1
Screw	4-40 PPH x.25"	Any	4
Screw	4-40 PPH x 1.0"	Any	4
Washer	#4	Any	4
Lock washer	#4	Any	4
PWB	Tower Alarm PWB Ver 5	WD4BIS	1
Cover Plate	3"x4" Cover Plate, 1/8"Lexan	Home Depot for raw material	2
Solder	60/40 rosin core	Any	As required
Double side tape		3M/Scotch	As required
Interconnect			
Cable			
25 pin	DB25 Male Solder cup	Any	1
Shell	DB 25 Connector Shell	Any	1
6 pin	Modular connector, RJ11 (AKA RJ12), 6P6C	Any	1
4 Pair	4 pair Cat 3 or Cat 5 cable	Any	Length as required

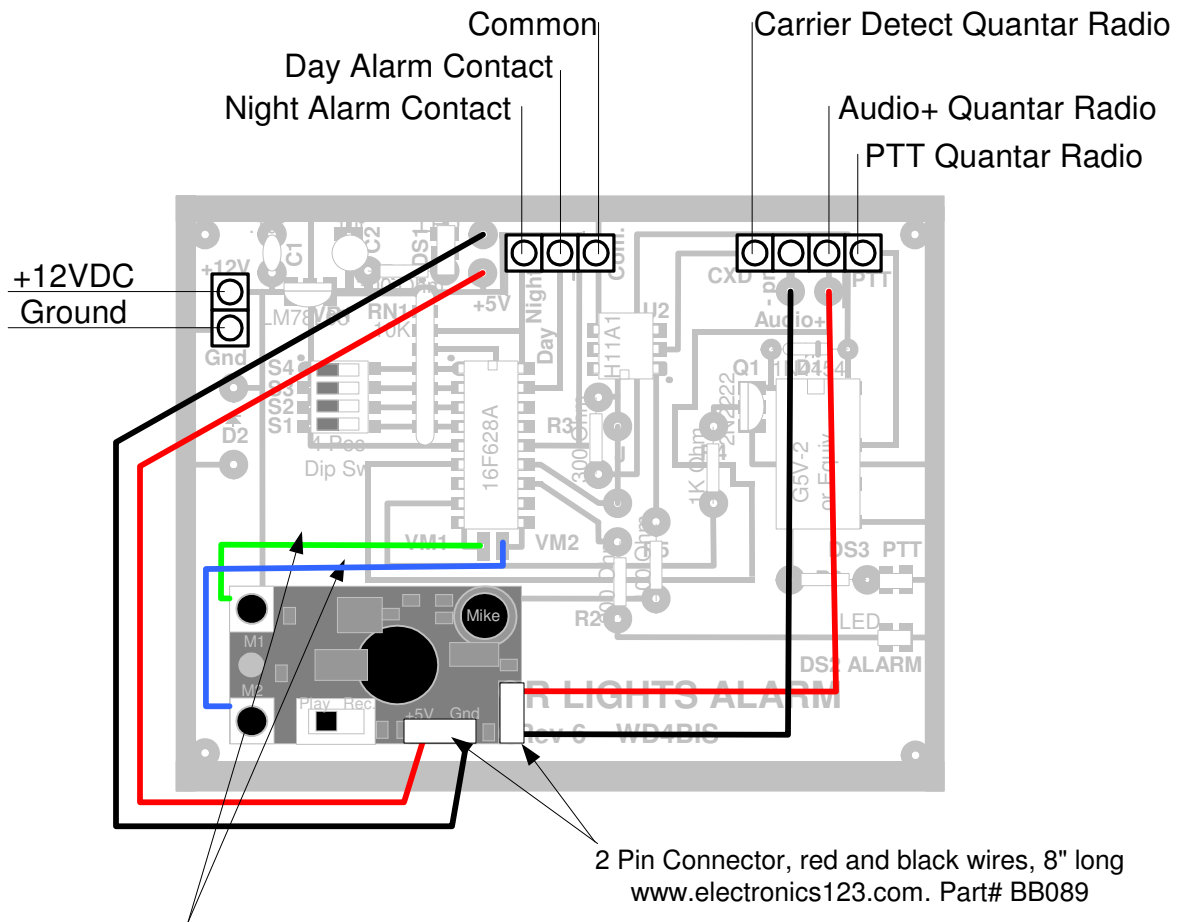
Date:	Revision/Addition/ Note	By:
May 17, 2008	Original Parts List.	GSC
May 23, 2008	Added parts for interconnect cable.	GSC
May 25, 2008	Added DS3, R6,D3 for Ver. 6.	GSC

Drawn By: Gerald Crenshaw WD4BIS	Date: May. 25, 2008	From the bench of: Amateur Radio Station WD4BIS	Page 1
Engineer: Gerald Crenshaw WD4BIS	Date: May 25, 2008		of 1
Checked By: Janet Crenshaw WB9ZPH	Date: May 25, 2008	Title: Tower Lights Voice Alarm PWB Parts List	



Date:	Revision/Addition/ Note	By:
May 17, 2008	Original drawing.	GSC
May 20, 2008	Added cover plate drawing and schedule.	GSC
May 20, 2008	Cut Lexan to size on Table Saw. Clamped a drilled board and Lexan together with four binder clips. Used board as guide to drill pilot holes through Lexan, then opened pilot holes to #4 clearance dimensions.	GSC
May 25, 2008	Changed board to Ver. 6 Artwork. No changes to drill schedule.	GSC

Drawn By: Gerald Crenshaw WD4BIS	Date: May 25 2008	From the bench of: Amateur Radio Station WD4BIS	Page 1 of 1
Engineer: Gerald Crenshaw WD4BIS	Date: May 25, 2008		Title: Tower Lights Voice Alarm PWB Mechanical, Drill Schedule And Cover Plates
Checked By: Janet Crenshaw WB9ZPH	Date: May 25, 2008		

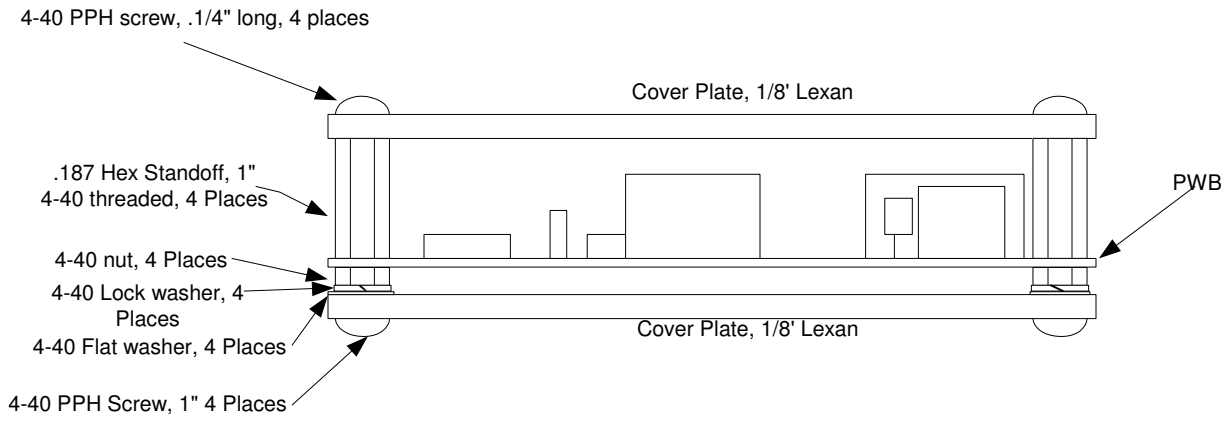


Attach and solder 30 gauge wire to upper pin on M1 and M2 Switch. Connect to VM1, VM2 pads on PWB.

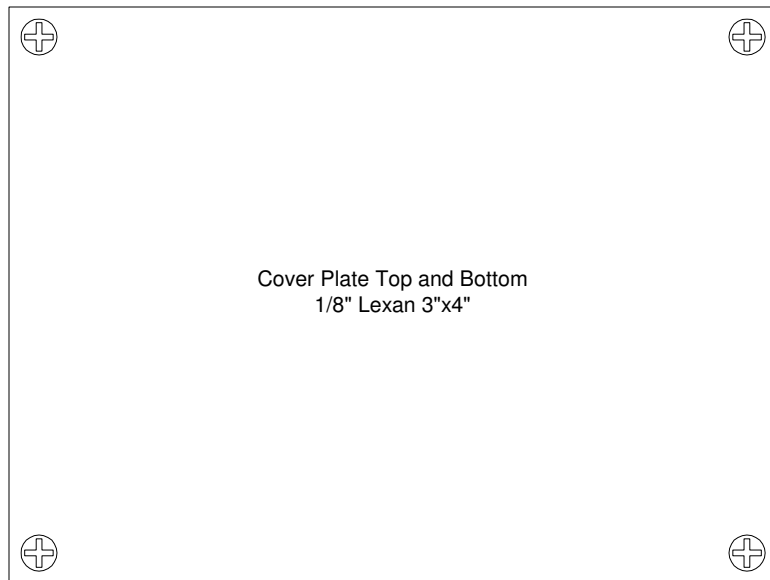
Date:	Revision/Addition/ Note	By:
May 17, 2008	Original drawing and detail.	GSC
May 20, 2008	Added voice module interconnect detail.	GSC
May 21, 2008	Added part number on 2 pin connector.	GSC
May 25, 2008	Changed PWB to Version 6 Artwork. Corrected connections.	GSC

Drawn By: Gerald Crenshaw WD4BIS	Date: May. 25 2008	From the bench of: Amateur Radio Station WD4BIS	Page 1 of 1
Engineer: Gerald Crenshaw WD4BIS	Date: May 25, 2008		Title: Tower Lights Voice Alarm PWB Interconnections
Checked By: Janet Crenshaw WB9ZPH	Date: May 25, 2008		

Side View



Top and Bottom View



Date:	Revision/Addition/ Note	By:
May 17, 2008	Original drawing and detail.	GSC
May 22, 2008	After putting first production module together, adjusted length of screws.	GSC

Drawn By: Gerald Crenshaw WD4BIS	Date: May. 22 2008	From the bench of: Amateur Radio Station WD4BIS	Page 1 of 1
Engineer: Gerald Crenshaw WD4BIS	Date: May 22, 2008		Title: Tower Lights Voice Alarm PWB Mechanical Assembly
Checked By: Janet Crenshaw WB9ZPH	Date: May 22, 2008		