

# PK-232SC

## Operating Manual



**Note:** This manual covers the features added with the SC version of the PK-232.

The main PK-232 manual describes the modes and features found in the original PK-232 and PK-232MBX. They are marked with an “\*”.

The DSP manual supplement describes the DSP board features.

## WARRANTY

### **TIMEWAVE TECHNOLOGY INC. LIMITED ONE YEAR WARRANTY**

#### **WHO IS COVERED**

This warranty is extended only to the original purchaser of the A.06118.

#### **WHAT WE WILL DO**

If your A.06118 fails in normal use because of a defect in workmanship or materials within one year of the date of purchase, we will repair or replace (at our option) the equipment at our factory without charge to you. Timewave will pay for the return of the warranty-repaired unit to you.

#### **WHAT YOU MUST DO**

First, double check your connections and operating procedure. If you're certain that the unit is faulty, notify Timewave Customer Service immediately. If Timewave is unable to resolve the problem by telephone or email, we will give you an RMA number and ask you to return the unit. You must pay all shipping and insurance charges for returning the unit to our factory.

#### **WHAT IS NOT COVERED**

We cannot be responsible for damage caused by accidents, abuse, misuse, improper installation, or unauthorized attempts to repair the unit. This warranty does not cover any parts of the PK-232 except the A.06118.

#### **SERVICE WARRANTY**

Timewave service work performed in connection with this warranty is warranted to be free from defects in materials and workmanship for 30 days from the date of repair. All other terms of the limited warranty apply to the service warranty.

#### **HOW TO CONTACT TIMEWAVE**

Contact Timewave Customer Service by telephone at (651) 489-5080 or by FAX at (651) 489-5066.

Mailing and shipping address is: 27 Empire Drive, Suite 110, St. Paul, MN 55103

email: sales@timewave.com  
techsupport@timewave.com  
service@timewave.com

web: www.timewave.com

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## Overview

The PK-232SC is the latest generation of multimode data controllers built upon the solid foundation of the legendary PK-232. The PK-232SC features an expanded interface to connect and control your radio transceiver, station accessories and computer.

The key to the new PK-232SC is a single USB cable from your PK-232SC to your computer. No other connection is necessary. Note the PK-232SC block diagram in Figure 1. The USB cable from the computer connects to a four port USB hub inside the PK-232.

### **Port 1 of the USB hub connects to a dual USB-to-UART bridge.**

One of the UART serial ports connects directly to the PK-232SC UART serial port. This shows up on your computer as a standard COM port. Your software terminal program connects to this COM port to control the PK-232SC.

The other UART serial port is the rig control port. This optically isolated port supports Icom CI-V, Yaesu CAT, Kenwood logic level, and RS-232 connections. This shows up on your computer as an enhanced COM port. Your software rig control program controls your transceiver.

### **Port 2 of the USB hub connects to a USB Audio sound card inside the PK-232SC.**

The sound card audio is transformer isolated from the USB circuitry. The sound card/PK-232 switch or a software command selects either sound card transmit audio or PK-232SC transmit audio. Receive audio from your transceiver is always connected to both the sound card receive audio and the PK-232 receive audio.

**Ports 3 and 4 of the USB hub connect to a dual USB jack on the back panel of the PK-232SC.** Use these jacks for rig control of USB-equipped transceivers and for other USB station accessories.

A new feature in the PK-232SC is an instant reset switch. A quick flick of the switch when the power is off resets the PK-232SC to factory default condition.

# PK-232SC Block Diagram

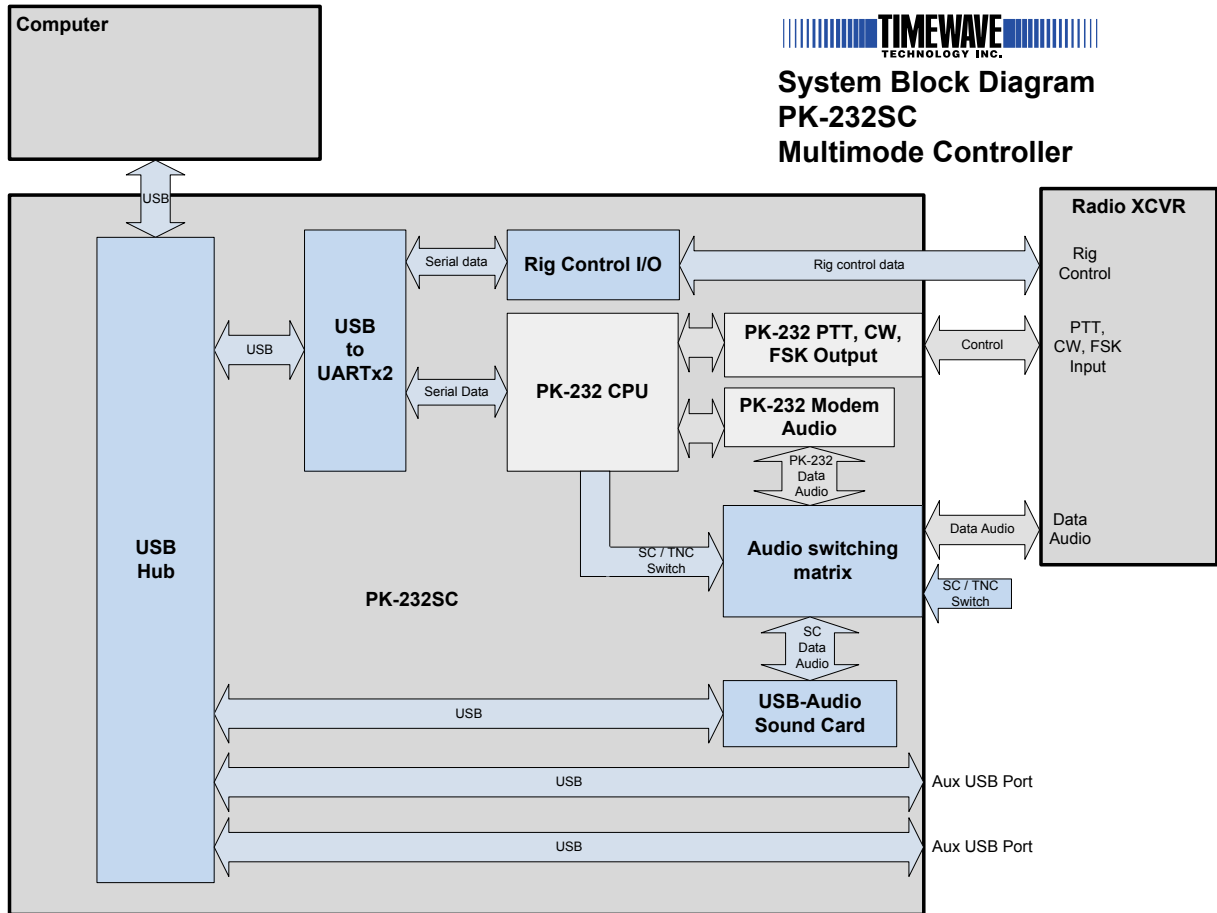
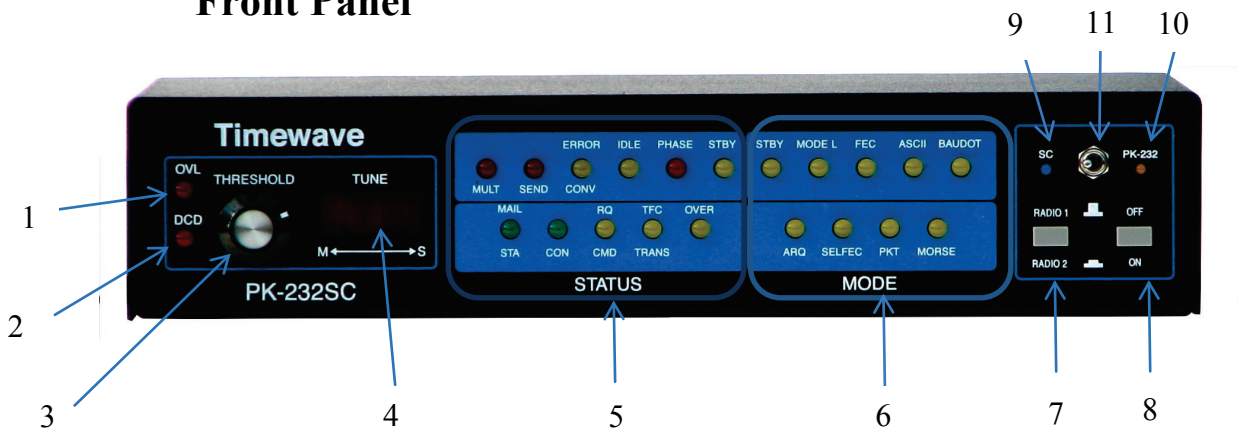


Figure 1

## Front Panel



**1. OVL LED**

**2. DCD LED\***

**3. THRESHOLD control\***

**4. TUNE LED bar\***

**M – Mark**  
**S – Space**

**5. STATUS LEDs\***

**6. MODE LEDs\***

**7. RADIO 1 / RADIO 2 switch\***

**8. ON / OFF Power Switch\***

**9. SC LED**

**10. PK-232 LED**

**11. SC / PK-232 panel switch**

**1. Blue SC LED on – The SC mode is on if:**

**a) the switch is set to left**

**OR**

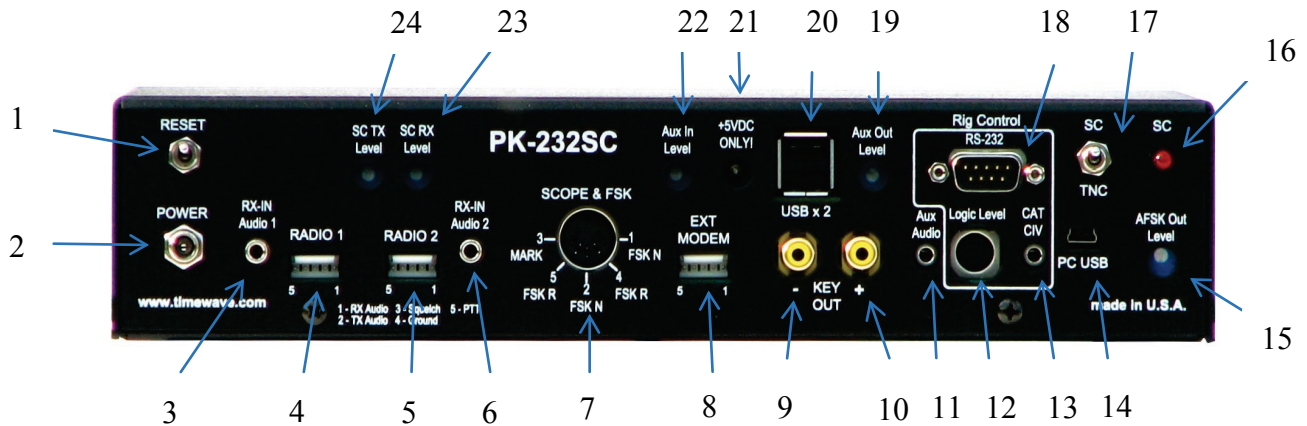
**b) Software has selected the SC mode (using SC command sequence)**

**2. Amber PK-232 LED on – The PK-232 mode is on if the switch is set to the right.**

**3. If both blue and amber LEDs are on at the same time, you have selected the SC mode with software control and have set the panel switch to PK-232 mode.**

*The sound card mode (blue LED) is active if it is selected with either the panel switch or the software control. The software control will override the front panel switch PK-232 mode selection.*

## Rear Panel



### 1) Reset

Resets PK-232 to factory default (baudot mode, erases memory)  
Press once momentarily with power off.

### 2) Power

Power jack for +13.5 VDC @ 750 Ma. (5.5mm x 2.1mm)

### 3) RX-IN Audio 1\*

3.5 mm mono phone jack  
Tip – receive audio from radio  
Ring & Sleeve – Ground

### 4) Radio 1\*

Five pin IDC flat connectors  
1 – receive audio from radio  
2 – transmit audio to radio  
3 – Squelch  
4 – Ground  
5 – PTT

### 5) Radio 2\*

Five pin IDC flat connector  
1 – receive audio from radio  
2 – transmit audio to radio  
3 – Squelch  
4 – Ground  
5 – PTT  
Ring – ground/shield



## 6) RX-IN Audio 2\*

3.5 mm mono phone jack

Tip – receive audio from radio

Ring & Sleeve – Ground

## 7) Scope & FSK\*

Five pin DIN connector

1 – FSK Normal output

2 – Ground

3 – Mark signal to oscilloscope

4 – FSK reverse output

5 – Space signal to oscilloscope

## 8) EXT Modem\*

Five pin IDC flat connector

## 9) Key Out - \*

Morse keying output to legacy transmitters with negative voltage on their Morse key inputs.

## 10) Key Out + \*

Morse keying output for newer transceivers and transmitters that use positive voltage on their Morse key inputs.

## 11) Aux Audio

3.5 mm stereo phone jack

Tip – Sound card audio out

Ring 1 – Sound card audio in

Ring 2 – ground/shield

## **Note 1 : Rig Control - 12), 13) & 18)**

Appears as an enhanced COM port on PC.

Connect only one of the three connectors at one time for proper RX/TX operation.

Exception: DTR connection from Logic Level port can be used with any RX/TX connection. Software determines function.

**12) Logic Level Rig Control – See Note 1!**

8 pin miniDIN female

- 1 – RXD - logic level data input from radio
- 2 – TXD - logic level data output to radio
- 3 – RTS – logic level data control output to radio
- 4 – CTS - logic level data control input from radio
- 5 – DTR – control output to radio from Rig Control COM port – use for PTT or positive CW keying – 30V/20mA *MAX!*
- 6 – Ground
- 7 - Short to pin 8 for older Kenwood logic level radios
- 8 - Short to pin 7 for older Kenwood logic level radios

**13) CAT/CIV Rig Control – See Note 1!**

3.5 mm stereo phone jack

- Tip –RX logic level data input from radio
- Ring 1 – TX logic level data output to radio
- Ring 2 – ground/shield

**14) PC USB**

**Five pin USB miniB**

Connect to PC USB port

**15) AFSK Out Level**

PK-232 Transmit data audio level adjustment

**16) SC LED**

Upgrade devices only – LED on indicates the sound card mode is selected.

**17) SC /TNC switch**

Upgrade devices only – switches between sound card and PK-232 modems.

**18) RS-232 rig control – See Note 1!**

DB-9 male

- 1 - NC
- 2 -RX
- 3 - TX
- 4 - NC
- 5 - Ground
- 6 - NC
- 7 – RTS
- 8 - CTS
- 9 - NC

**19) Aux Out Level**

Adjusts only sound card auxiliary output level

**20) USBx2**

Two USB Type B jacks for USB 2.0 compatible devices. Maximum 100 mA. each unless 5VDC power supply is connected.

**21) +5VDC ONLY!**

**Do not connect any other voltage to this jack!**

**Center of jack is positive polarity.**

5 Volts DC only @ 2A for powered USB hub operation only

Required only for USB devices that draw greater than 100 mA.

To use this jack, you must change a jumper inside the PK-232SC.

**22) Aux in Level**

Adjusts only sound card auxiliary input level

**23) SC TX level**

Adjusts only sound card output level

**24) SC RX level**

Adjusts only sound card input level

## Operation

**Note: This manual covers the features added with the SC version of the PK-232.**

**The main PK-232 manual describes the modes and features found in the original PK-232 and PK-232MBX. The DSP manual supplement describes the DSP board features.**

## PC USB Connection

Connect the PK-232SC to an USB 2.0 compatible port on a computer with a single USB cable (USB miniB to USB A). No other computer connections are required. The computer USB port must be capable of supplying full USB power (5.0 Volts @ 500mA.) If a USB hub is used, it must be a powered hub.

## USB device driver

The device drivers for Windows XP/VISTA/7 will load automatically when the PK-232SC is connected to your Windows PC if it is connected to the internet. The drivers are also found on the CD distributed with the PK-232SC and on the Timewave web site ([www.timewave.com](http://www.timewave.com).) Other drivers are available for Linux and Apple computers. Please contact Timewave or visit the Timewave website for further information.

Note: This device driver is different from previous PK-232/USB device drivers. The older drivers will not work for the PK-232SC.

## Power

Connect the PK-232SC to a +13VDC @ 750 mA. power supply. Press the PK-232SC power switch to the IN position. This connection is the same for all models of the PK-232.

## Radio

Connect your radio data audio input, data audio output and PTT line to the PK-232SC Radio 1 or Radio 2 ports. This connection is the same for all models of the PK-232. If you are upgrading your PK-232MBX to a PK-232SC, you can use your existing cable if you do not change radios. This connection is the same for all models of the PK-232.

## PK-232SC Ports

The PK-232Sc has two COM ports, a USB Audio sound card port and 2 USB ports.

- The PK-232 terminal program uses the “standard” COM port to control the PK-232SC operation.
- The PK-232SC rig control program uses the “enhanced” COM port to control your transceiver.
- The PK-232SC sound card mode programs use the “USB Audio Codec” to run sound card programs.
- The PK-232SC USB ports appear on your computer USB port list and can be used for USB 2.0 compatible USB devices.

Some programs will automatically identify the correct ports for their functions. Others may have limited ability to aid you in connecting the correct port to your software application. If you wish to identify or edit the various PK-232SC ports, use the Device Manager application found in Windows XP/VISTA/Win7. Go to Control Panel/System or Computer/properties to find Device Manager. You should learn to use Device Manager to help you understand and manage the hardware configuration of your PC for all your devices and programs.

## PK-232SC Control

The PK-232 terminal program uses the “standard” COM port to control the PK-232SC operation. You can use a variety of programs to control the PK-232SC. A “dumb” terminal program such as **Hyperterminal** (Windows XP) or **puTTY** allows you to control the PK-232SC in command mode. There is little or no automation so all commands must be entered manually. Some programs have macros that let you create commands by stringing together a series of commands that can be sent with one or two keystrokes.

Other programs offer complete control of the PK-232SC with standard Windows graphical commands, mouse actions and keystrokes. If you need a program with complete PK-232SC support, Timewave recommends Radio Operating Center (ROC) from W4PC Software, Inc. ([www.w4pcsoftware.com](http://www.w4pcsoftware.com)). We suggest you contact the author of your favorite program to determine its level of PK-232SC support.

Timewave has a free applet called “ModemSwitch” ([www.timewave.com/download.html](http://www.timewave.com/download.html)) that will switch the PK-232 from transmit to receive and from sound card to PK-232 mode. It also has a simple dumb terminal program for testing the PK-232.

## Rig Control

Connect your radio rig control port to the matching PK-232SC CAT/CIV, 8 pin miniDIN, or RS-232 connector. Only one of the three connectors may be connected at one time. You may also connect one of the two USB connectors to your radio if it supports USB rig control. Rig control is a connection for the PK-232SC only. Earlier models of the PK-232 do not have this connection.

Timewave has several standard rig control cables for popular models of radios. We can supply a cable for any compatible radio. Please contact us for details.

Your rig control software and your radio determine your rig control operating features. The PK-232SC rig control circuitry is an interface only and does not affect the actual rig control operation.

Timewave recommends Radio Operating Center (ROC) from W4PC Software, Inc. ([www.w4pcsoftware.com](http://www.w4pcsoftware.com)) and Ham Radio Deluxe ([www.ham-radio-deluxe.com](http://www.ham-radio-deluxe.com)) for rig control.

The PK-232SC operating COM port and the PK-232SC rig control COM port are independent.

You can use different PK-232SC operating and rig control programs simultaneously. For example, you may use Ham Radio Deluxe for rig control and ROC for operating a PK-232SC mode such as Pactor.

## USB Audio Sound Card

The USB audio sound card built into the PK-232SC appears as a separate audio device on your PC. It is called “USB Audio Codec”. No software driver is necessary when you use the USB Audio Codec. You must select the USB Audio Codec when you configure your terminal program to operate sound card modes such as PSK-31. Use the program settings window in Radio Operating Center or the soundcard settings in Digital Master 780 found in Ham Radio Deluxe.

## SC Board Jumper Settings

The SC board has several jumper options that may be changed by the user. In most instances the jumpers can be left at the factory default settings. The jumpers are located on the SC daughter board at the rear of the PK-SC.

### Rig Control

Not all transceivers have the same polarity settings for their logic level rig control ports. The PK-232SC polarity settings for RX, TX, RTS and CTS can be changed to meet the requirements of any specific transceiver. The factory default settings for JP1 (RX), JP2 (TX), JP3(RTS) and JP4(CTS) are pins 1 & 2 connected. Connecting pins 2 & 3 will invert the polarity for one line only. Change these settings only if you cannot your rig control program to recognize your transceiver. Most transceivers will not require any change!

### USB Jack Power

The two type B USB jacks on the PK-232SC default power output is 5 Volts @ 100 mA. This power is derived from the computer or powered USB hub upstream from the PK-232SC. If the jumper on JP5 is connected between pins 2 & 3 (factory default), the external power supply will not be connected. The USB circuitry will draw its power from the upstream USB device.

If you want to draw more than 100 mA. (500mA. max) from the PK-232 USB hub ports, you may connect a 5.0 VDC @ 2A power supply to the PK-232. To do so you must enable the 5.0VDC power jack in the middle of the PK-232SC back panel. Change the jumper on JP5 to pins 1 & 2. With the jumper in this position, you must use the 5.0 VDC power supply so the USB circuitry will work!

### USB Audio Sound Card Channel Combinations

The USB Audio sound card has two channels.

#### Receive Audio Input

In the factory default mode, the PK-232 sound card input (receive audio) is fed to both channels simultaneously. Connecting JP23 pins 1 & 2 enables the factory default combined channel mode.

In optional mode, the PK-232 sound card input (receive audio) is fed to the left sound card channel and the Aux Audio input (J10-ring on the SC connector board) is fed to the right sound card channel. Connecting JP23 pins 2 & 3 enables the optional split channel mode.

#### Transmit Audio

In the factory default mode, both USB Audio sound card output channels feed the PK-232 sound card output (transmit audio) simultaneously. Connecting JP3 pins 1 & 2 enables the factory default combined channel mode.

In optional mode, the left sound card channel feeds PK-232 sound card output (transmit audio) and the right sound card channel feeds the Aux Audio output (J10-tip) on the SC connector board.) Connecting JP2 pins 2 & 3 enables the optional split channel mode.

## Data Sheet

# PK-232SC

## Multimode Data Controller

Now with USB Audio, Rig Control and Single USB Computer Cable!

### Features

- **Digital Signal Processor**
- **18 DSP Filters**
- **Twin Peak RTTY Filters**
- **Adaptive PACTOR filters**
- **Works with all sound card modes**
- **USB Sound Card Audio**
- **RS-232, logic level & USB Rig Control for Icom, Yaesu & Kenwood radios**
- **Single USB Computer Connection**
- **Galvanic Computer Isolation**
- **SC Upgrades for all PK-232 models**

Timewave's customers swear by their DSP filters and PK-232 owners love the flexibility and reliability of the most popular data controller ever built. Now with the addition of a built-in sound card, rig control, computer isolation and total USB connectivity, the PK-232SC rolls it all into one! The PK-232SC brings a new level of performance to the legendary PK-232 with sharp, accurate DSP filters for all its internal data modes and dual transformer isolation for sound card data modes. Weak signals magically appear from the noise and QRM bounces off the new DSP filters for cleaner copy with fewer errors than the old analog filters.

### More Filters, Better Filters, Automatic selection

The PK-232SC brickwall filters have tighter bandwidth and steeper skirts for improved noise and QRM rejection. New PK-232 firmware (Ver. 7.2) allows a wider selection of filters than the original PK-232, so the filter can match the mode. The correct DSP filter is automatically selected when you choose an internal mode. In RTTY, Timewave's proven Twin Peak Filters pluck the mark and space tones from the noise and QRM for great copy. In PACTOR, the filter bandwidth automatically changes when the baud rate shifts in response to the error rate of the link. In Morse (CW), the operator can preset either 100 Hz or 200 Hz bandwidth. The PK-232SC is compatible with all Windows XP, Vista, and Windows 7 software terminal programs for the PK-232.

### Sound Card Interface and Rig Control

For maximum flexibility, Sound Card / TNC switching is both software and panel switch controlled. The sound card mode selection is software controlled. For example, when operating with Radio Operating Center software, changing to PSK31 from Pactor or MT63 is a simple menu click. The single USB cable from your PC also moves your logic level Kenwood RX/TX/RTS/CTS, Yaesu CAT, and Icom CIV, RS-232 and USB Rig Control interface to the back panel of your PK-232SC.

## All the Proven Modes + All the Sound Card Modes

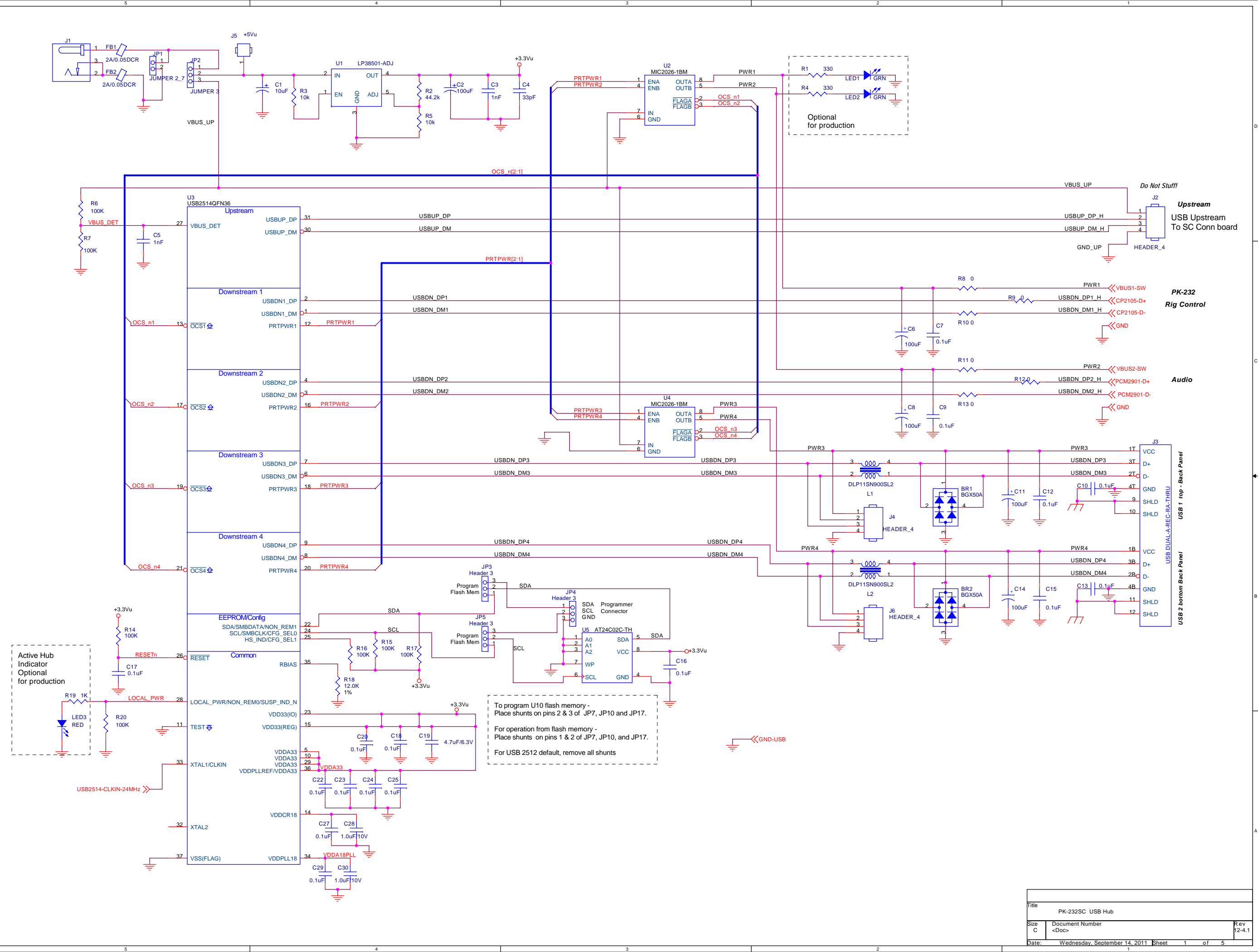
The PK-232SC supports all the new sound card modes in addition to all of the existing PK-232 modes - Pactor, VHF/HF Packet, AMTOR/SITOR, Baudot, ASCII, Morse, HF Weather FAX, TDM, and NAVTEX.

The PK-232SC comes with a complete cable and connector set in addition to Timewave's on-line and telephone support. As always, you can upgrade any PK-232 ever built to the latest PK-232SC!

## Specifications for the PK-232SC

DSP Filters, demodulator	16 bit Analog Devices 2104 with 16 bit A/D-D/A for Optimum filters for each mode, limiter, 4-pole discriminator, 5-pole post-detection low-pass filter
Modulator	Phase continuous sinewave, AFSK generator
Modulator output level	5-200 mV RMS
Processor system	Zilog Z-80, ADSP2105
Memory	32K Lithium battery-backed RAM, 128k ROM
Audio	Internal USB Audio sound card
Hardware HDLC	Zilog 85C30 SCC
Power requirements	+13 to +16 VDC @ 590 mA.
<b>Input/Output Connections</b>	
Radio interface	Two 5-pin connectors, front panel selectable
Direct FSK outputs	Normal/Reverse
Scope outputs	Mark, space
CW keying outputs	+100 VDC @ 200 mA max and -25 VDC @ 30 mA max
Terminal interface	USB (galvanic isolation from PK-232 circuitry)
Terminal data rates	Autobaud settings at 2400, 4800, & 9600 bps
Rig Control interface	Yaesu CAT, Icom CIV, Kenwood TX/RX/RTS/CTS logic level, RS-232, USB
USB Downstream Ports	Two USB 2.0, 100mA each (500 mA option available)
USB Computer Port	USB mini-B jack
<b>Physical</b>	
Dimensions	11" (279mm)W x 8.25" (210mm)D x 2.5" (64mm)H
Weight	3 lbs (1.35 kg)





**Do Not Stuff!**  
**Upstream**  
 USB Upstream  
 To SC Conn board

**PK-232**  
**Rig Control**

**Audio**

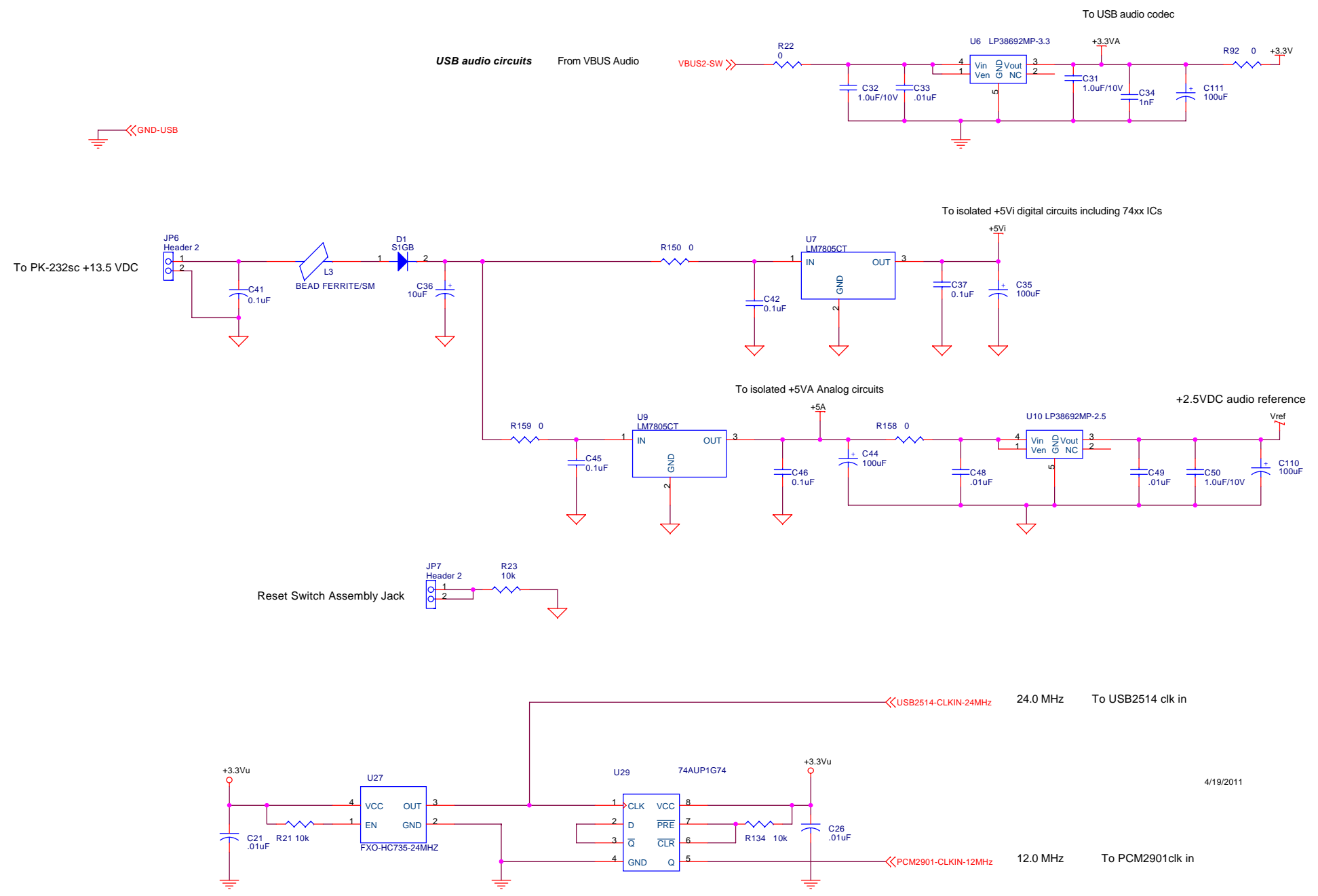
**USB 1 top - Back Panel**  
 USB DUAL-A-REC-RA-THRU  
**USB 2 bottom Back Panel**

To program U10 flash memory -  
 Place shunts on pins 2 & 3 of JP7, JP10 and JP17.  
 For operation from flash memory -  
 Place shunts on pins 1 & 2 of JP7, JP10, and JP17.  
 For USB 2512 default, remove all shunts

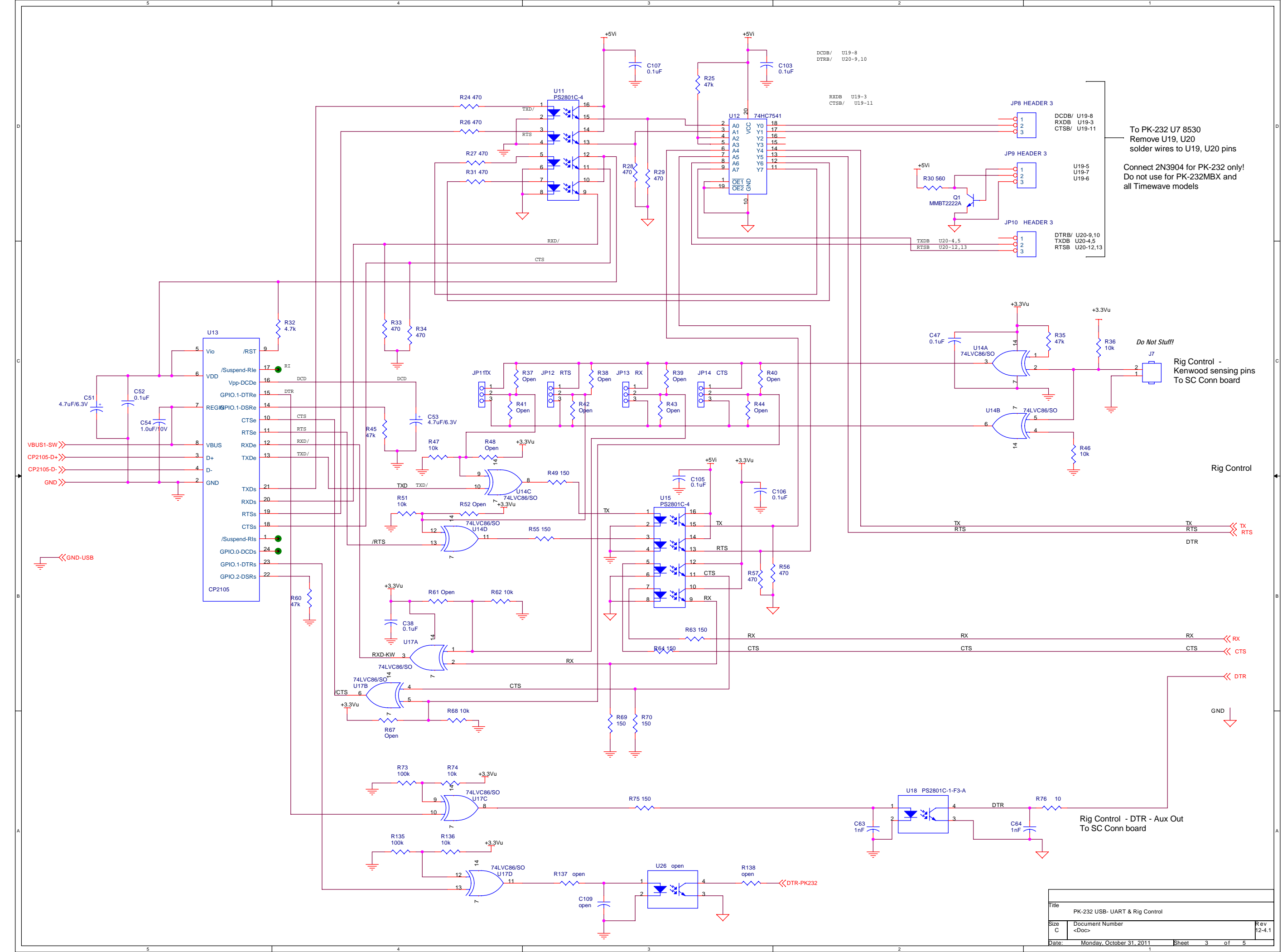
Active Hub Indicator  
 Optional  
 for production

Optional  
 for production

Title			PK-232SC USB Hub
Size	Document Number	Rev	
C	<Doc>	12-4.1	
Date:	Wednesday, September 14, 2011	Sheet	1 of 5



Title		
Power Supply & Reset		
Size	Document Number	Rev
C	<Doc>	12-41
Date:	Wednesday, September 14, 2011	Sheet 2 of 5



To PK-232 U7 8530  
Remove U19, U20  
solder wires to U19, U20 pins

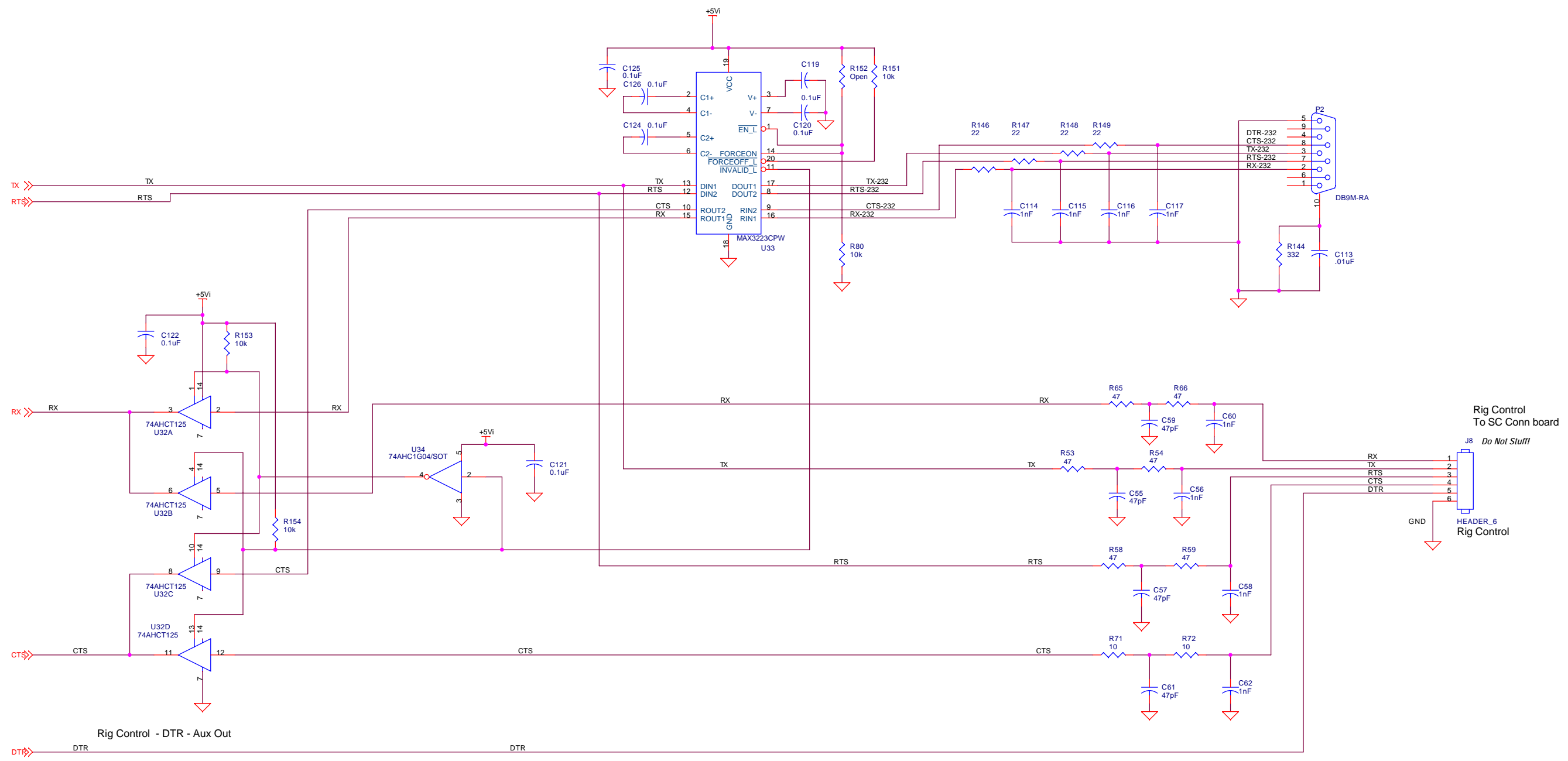
Connect 2N3904 for PK-232 only!  
Do not use for PK-232MBX and  
all Timewave models

Do Not Stuff!  
Rig Control -  
Kenwood sensing pins  
To SC Conn board

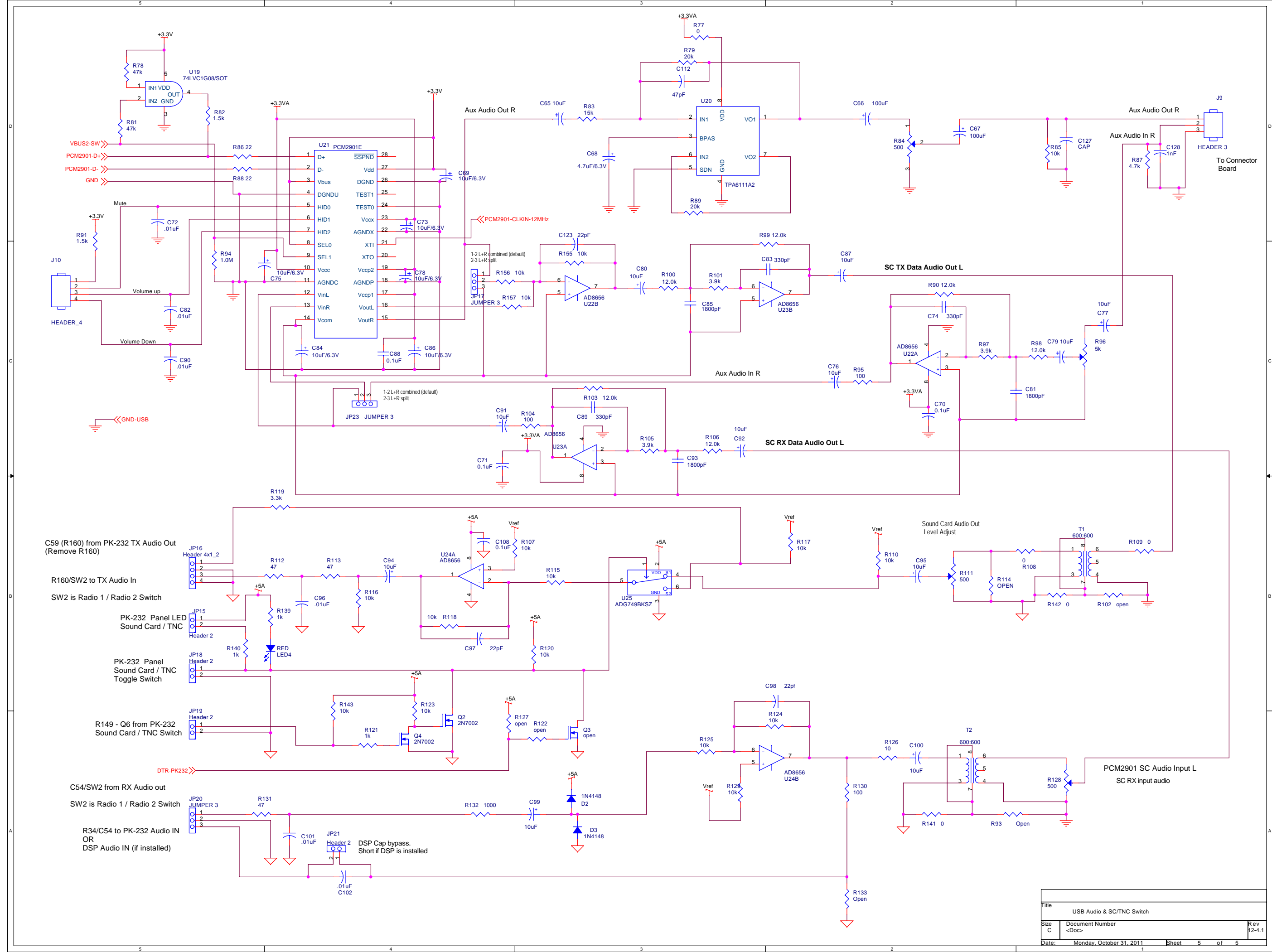
Rig Control

Rig Control - DTR - Aux Out  
To SC Conn board

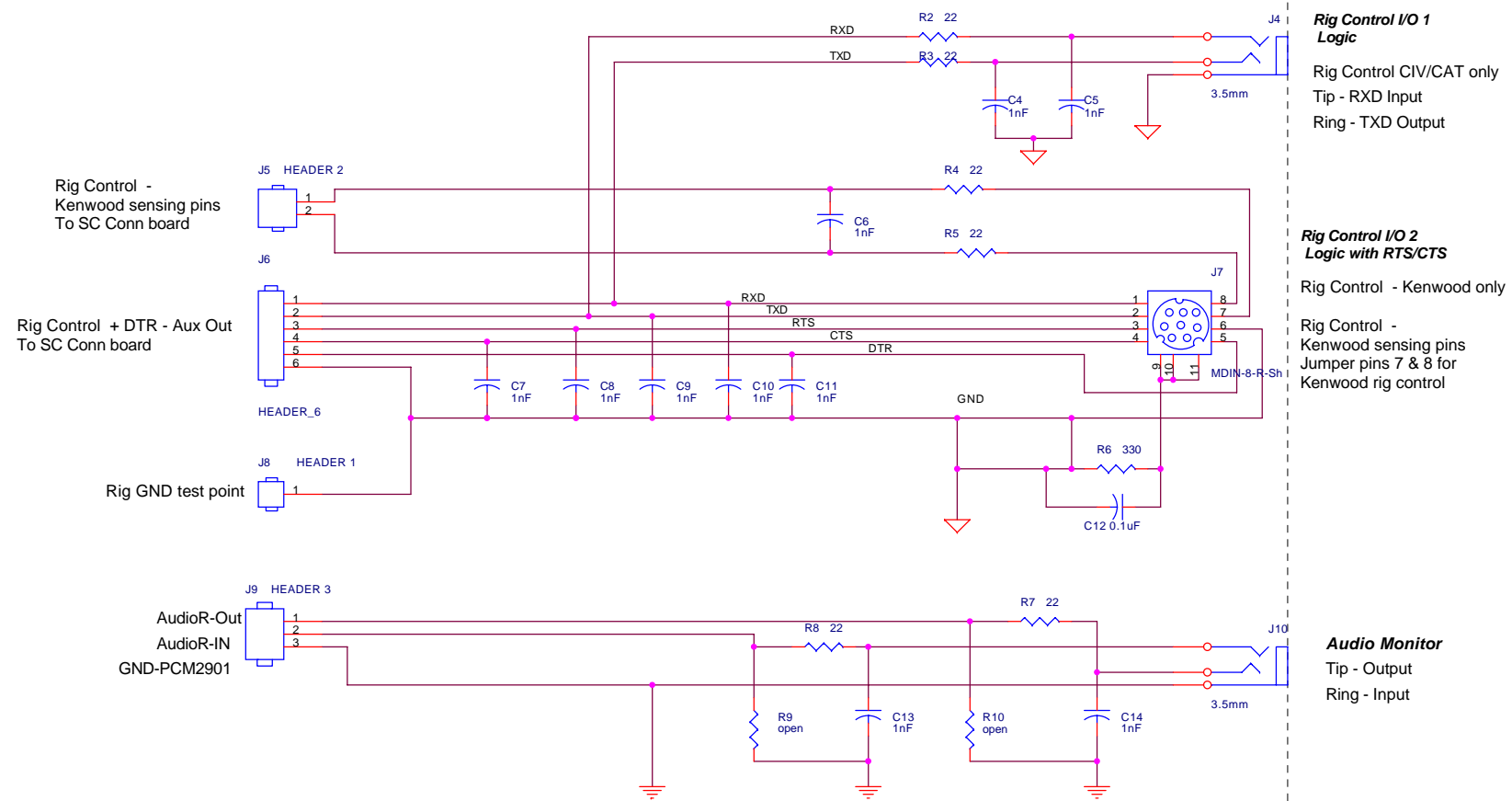
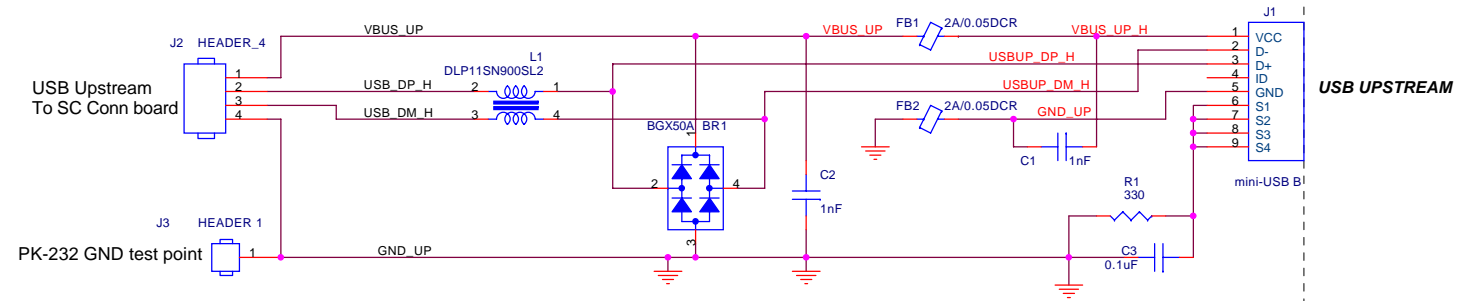
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PK-232 USB- UART & Rig Control		
Size	Document Number	Rev
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Date:	Monday, October 31, 2011	Sheet 3 of 5

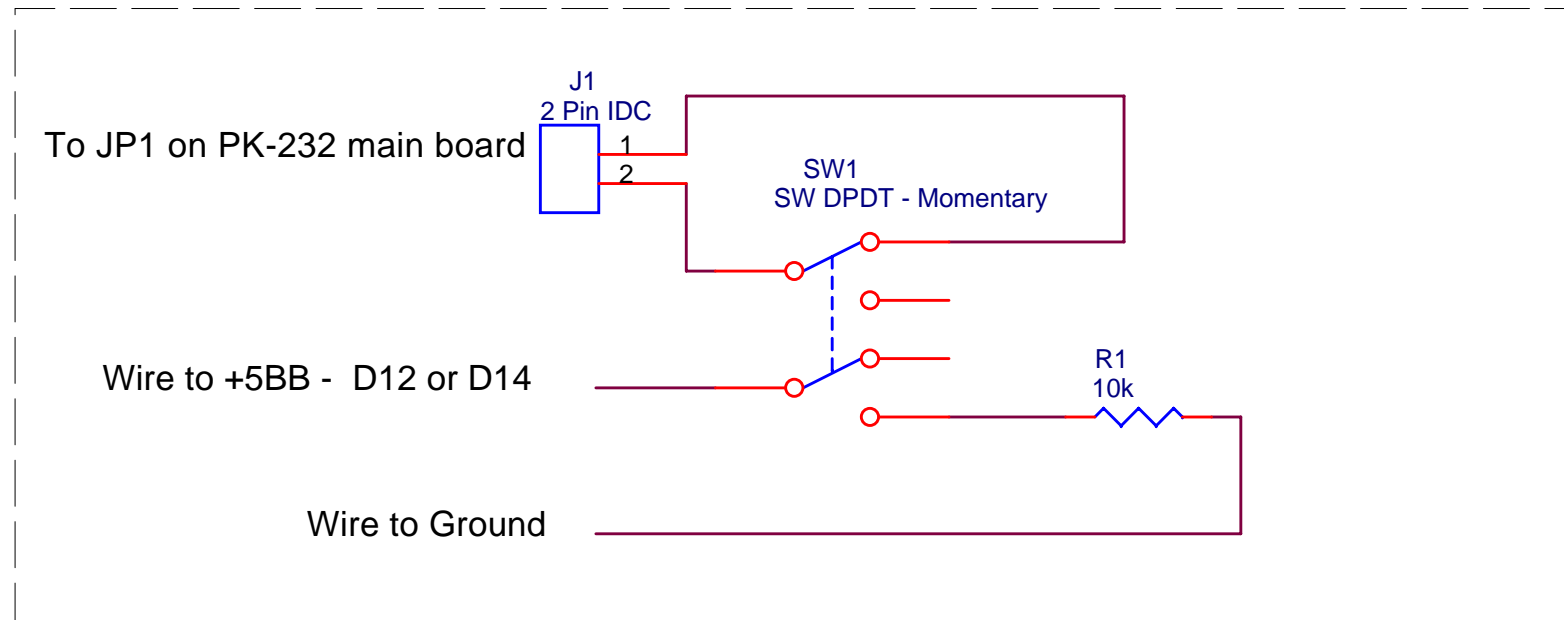


Title		
RS-232/Logic Rig Control		
Size	Document Number	Rev
C	<Doc>	12-4.1
Date:	Wednesday, September 14, 2011	Sheet 4 of 5

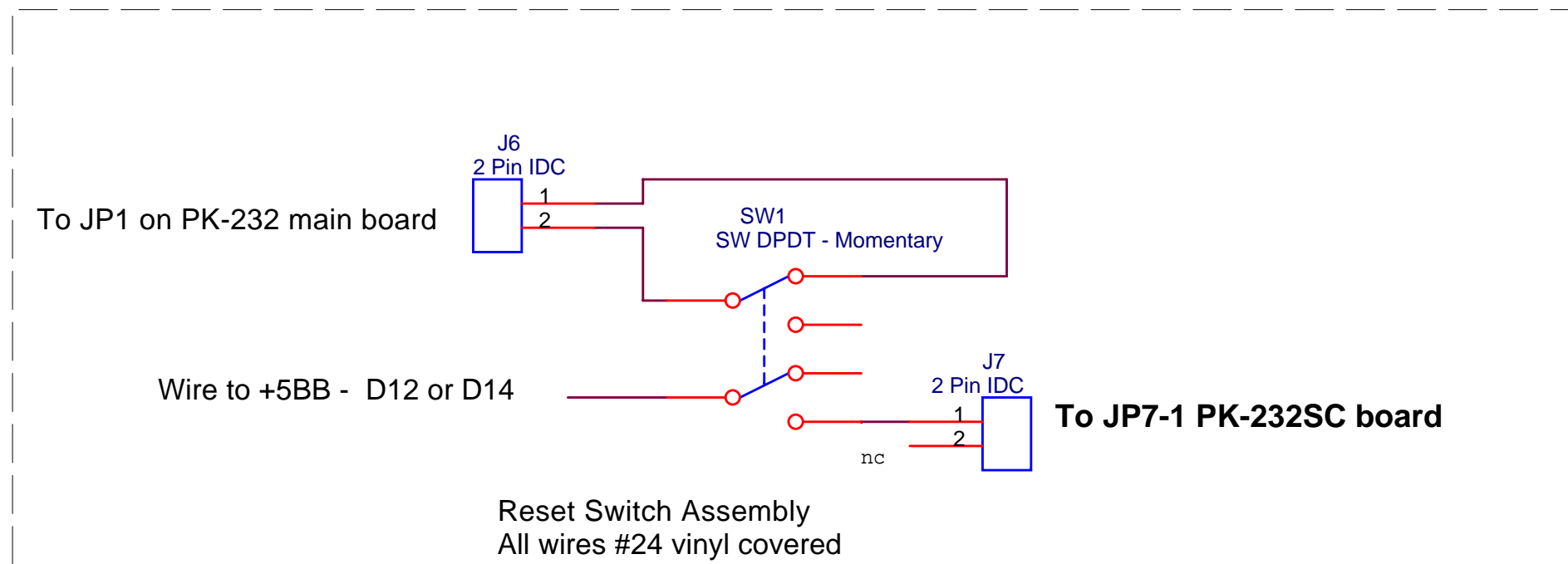


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USB Audio & SC/TNC Switch		
Size	Document Number	Rev
C	<Doc>	12-4.1
Date:	Monday, October 31, 2011	Sheet 5 of 5





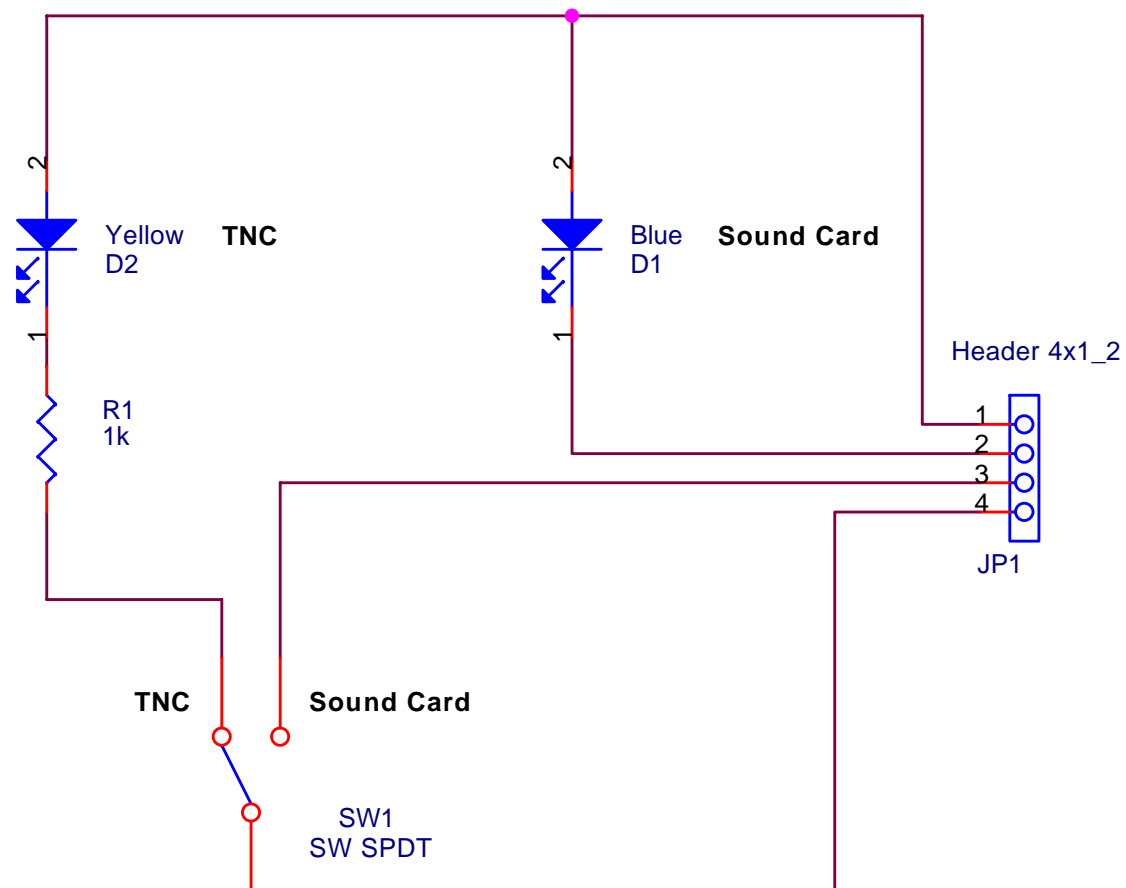
**Assembly for all PK-232 models without SC board**



**Assembly for PK-232SC board**

**To reset PK-232 to factory default,  
Press switch for 1 sec with power off**

Title		
PK-232 Reset Switch Assembly		
Size	Document Number	Rev
A	A.xxxxx	1
Date:	Wednesday, July 20, 2011	Sheet 1 of 1



Title			
SC/TNC LED-Switch board			
Size	Document Number	Rev	<Rev Code>
A	Assembly AP.40734	MPCB.40733	
Date:	Monday, June 06, 2011	Sheet	1 of 1