

ProData Interface - *Assembly Instructions*

Feb 11, 2002

The ProData Interface is build on a double-sided printed circuit board with plated through holes, solder mask, and silk-screened component markings. All components are mounted to the silk-screened side of the PC board. **Controls and connectors must be mounted tight against the board with their top surfaces parallel to the board in order to ensure that they line up correctly with the front and rear panel cutouts.**

Parts Inventory

[] Check the supplied parts against the parts list in the manual to ensure that you have everything you need prior to beginning assembly.

PC Board Preparation

As released from the board manufacturer the substrate material may extend 0.01-inch or so beyond the edge of the foil. This small amount can make it impossible to fit the board into the case. Tape a piece of sand paper on a flat surface (rough side up) and slide each edge of the board back and forth until you sand down the substrate material to the same level as the foil ground plane. Check the width of the board to make sure that it will fit into the guides on each side of the case.

Next, make sure that the board has a notch in each corner. This is necessary to allow room for the plastic case bezels to fit around the board. If the notches are not present, use a coping saw or hack saw with a fine blade to cut the substrate material to match the notches in the ground foil. Use sand paper or a small fine file to trim up the edges of the material.

PC Board Assembly

NOTE: All components mount on the silk screened side of the PC board.

[] Mount a 3.5mm stereo phone jack at J3. It is most important that the three plastic legs are against the PC board in order to ensure that the jack shaft is parallel to the board. Be careful not to press the jack so hard against the PC board that the plastic case deformed. Be sure that the front edge of the jack is parallel to the edge of the PC board. It is best to tack solder only one lead into position in case you need to make alignment adjustments. Once the jack is lined up and in position, solder the remaining pins.

[] In a similar manner, solder the remaining two 3.5mm phone jacks into place at:

[] J4

[] J5.

[] Position the 4-pole, 2-position push button switch into the mounting holes at SW1. The switch shaft will face the front edge of the PC board. It is important that the feet of this switch are against the board so that the shaft is exactly parallel to the PC board. It is best to tack solder only one lead until you ensure that the switch is properly aligned. Once you have verified that the switch is in the proper position, solder the remaining leads.

ProData Interface - Assembly Instructions

[] Position an 8-pin female DIN connector at J2. Be sure that this connector is lined up with the rear edge of the PC board and that it is seated flat against the PC board. Tack solder the center ground pin in place and verify that it is positioned properly. Once the connector is in the correct position, solder the remaining leads and ground pins.

[] In a similar manner, solder the remaining 8-pin DIN connector into place at J1.

[] Place the SPST slide switch into position at SW2. Be certain that the edge of the switch is parallel to the edge of the PC board and that it stands exactly vertical (90 degrees to the board surface). Once it is in position, solder the two ground tabs. Recheck to be sure that the switch is vertical and then solder the remaining three pins into position.

[] Mount the 1K potentiometer at R7. Line up all the leads with the holes in the PC board and then carefully press the potentiometer down until it snaps into place. Verify that the mounting feet are against the board and that the shaft is parallel to the board surface. Solder the three component leads and two mounting tabs into place.

[] In a similar manner, mount the two remaining 25K potentiometers and solder all the leads and mounting tabs.

[] R9

[] R22

[] Solder the LED assembly into position at DS1. Make sure that the assembly is against the PC board and parallel to the front edge of the board. After soldering, clip off the excess leads.

CAUTION! Use extreme care when mounting T1 and T2 as it is easy to damage the transformers by bending the pins.

[] Position an audio transformer at T1 so that the primary winding is toward the front of the PC board and the secondary is towards J4. Be sure not to bend any pins when inserting them into the PC board holes. You may find that one of the mounting tabs (a part of the shielded case) is off center and does not line up correctly with the corresponding hole in the PC board. If this is the case, **DO NOT** twist the transformer (bending the pins) in order to force the tab to fit into the hole. One option is to trim the width of an off-center mounting tab so that it fits through the PC board mounting holes. If the offending tab is bad enough, it can be cut off and the other tab used for grounding the shielded case. Once everything lines up, press the transformer down towards the board. Do not apply too much pressure. It is only necessary to expose enough of the pins on the bottom of the board to get a good solder connections. It is quite acceptable to leave the transformer standing slightly above the board if necessary to prevent exerting too much pressure. Once everything is in place, solder the two grounding tabs and six pins to the board.

Note that T1 and T2 are positioned in opposite directions. The secondary of T1 is toward the connectors while the primary of T2 is towards the connectors.

ProData Interface - Assembly Instructions

In a similar manner, position the remaining audio transformer at T2 so that the secondary winding is toward the front of the PC board and the primary is towards J5. Solder the transformer into position.

The small 100 uH inductors look similar to resistors and are color coded brown-black-brown-gold. Since there are no 100 ohm resistors in the kit, there should be no confusion. Install and solder the small 100 uH inductors at the following locations:

L1 L2 L4 L5 L6
 L8 L9 L10 L11 L12
 L13 L14

Install and solder the large 100 uH inductors at:

L3 L7.

Install and solder 0.0047 Mfd, 50V ceramic capacitors at the following locations:

C1 C2 C3 C4 C5
 C6 C7 C8 C9 C10
 C11 C12 C13 C14

Install and solder a 1N4148 diode at D1. Be certain to orient the banded end of the diode as shown on the silk screen. Use extreme caution in bending the diode leads so as not to crack the glass case. Solder quickly to prevent overheating the diode.

In a similar manner, install and solder the four remaining 1N4148 diodes at the following locations:

D2 D3 D5 D6

Similarly, install and solder a 1N4007 diode at D4.

Install and solder 470 Ohm, 1/4 watt resistor (yellow, violet, brown) at the following locations:

R8 R16 R17

Install and solder a 4.7K, 1/4 watt resistor (yellow, violet, red) at R21.

Install and solder a 10K, 1/4 watt resistor (brown, black, orange) at the following locations:

R1 R5 R12 R15 R25

Install and solder a 22K, 1/4 watt resistor (red, red, orange) at the following locations:

R13 R20

Install and solder a 47K, 1/4 watt resistor (yellow, violet, orange) at R6.

Install and solder a 68K, 1/4 watt resistor (blue, grey, orange) at R29.

ProData Interface - Assembly Instructions

Install and solder a 100K, 1/4 watt resistor (brown, black, yellow) at the following locations:

R3 R4 R10 R11 R18
 R23 R24 R27 R28 R30

Install and solder a 220K, 1/4 watt resistor (red, red, yellow) at R26.

Install and solder a 1-Meg, 1/4 watt resistor (brown, black, green) at the following locations:

R2 R14 R19

Install a TL072 op-amp IC at U1. Be sure to orient the IC as indicated by the silk screen. The small dot should be located near the square pad (pin 1). Usually the pins of an IC are spread too wide to fit correctly into the PC board holes. Prior to inserting the IC, it is helpful to hold it with a pair of needle nose pliers and carefully bend the pins toward the IC body by pressing them gently against the work surface. Once you have verified that the IC is installed correctly, solder all the leads. It is often helpful to tack solder just one lead to hold it into position while you verify the proper orientation. When soldering, it is best to alternate pins (first solder a pin on one side then a pin on the opposite side) in an attempt to spread out the heat and avoid overheating the IC.

In a similar manner install the other TL072 op-amp IC at U3.

In a similar manner install the CD40106B IC at U2.

In a similar manner install the 4N29A opto-isolator IC at U4.

Install and solder a 0.1 Mfd, 50V metal film capacitor (104) at the following positions:

C15 C17 C19 C23 C24
 C26 C27 C28 C29 C31

The following capacitors are tantalum types which must be installed with the correct polarity. Be certain to position the capacitor with the positive lead orientated as marked on the silk screen. The positive lead should connect to the square pad. The positive lead is often the longer of the two capacitor leads.

Install and solder a 0.47 Mfd tantalum capacitor at C22.

Install and solder 1 Mfd, tantalum capacitors at the following locations:

C16 C20 C21 C25

Install and solder the 10 Mfd tantalum capacitor at C18.

Install and solder the 22 Mfd tantalum capacitor at C30.

Install and solder the 78L09 voltage regulator IC at U5. Be sure to orient the IC with the flat side as shown on the silk screen.

The following transistors must be installed with their flat sides orientated as shown on the silk screen. These devices can be damaged by static electricity discharges so it is advisable to use a wrist strap for grounding during removal from the package and installation into the board. As a minimum, be sure to touch something grounded to discharge

ProData Interface - *Assembly Instructions*

any static build-up prior to beginning work with these devices. Once the devices are soldered into the circuit they will no longer be so sensitive to static.

Install and solder 2N5486 transistors at the following locations:

Q1 Q2

Install and solder the ZVP2106A transistor at Q3.

Install and solder ZVN2106A transistors at the following locations:

Q4 Q5

Push the black switch cap onto the end of the push button switch.

Attach the 4-40 standoff to the bottom of the PC board at the center hole location. First place a #4 lock washer over the male end of the standoff and then insert the male end through the PC board hole from the bottom. Place a flat washer over the threaded end on top of the board and attach a 4-40 nut. Tighten the nut. The assembly from bottom to top is now standoff, lock washer, pc board, flat washer, and nut. It is important to place the lock washer between the board and the standoff in order to maintain proper spacing.

This completes the PC board assembly. Carefully inspect the board for solder bridges, cold solder joints, or unsoldered component leads. The next step will be the mechanical assembly into the case.

CASE MECHANICAL ASSEMBLY

Attached the rear panel and bezel to the back of the case using the two screws provided. The panel fits into the plastic bezel and the bezel fits into the end of the case.

Slide the PC board into the front opening of the case using the card guides on each side of the case. Use the two guides that permit the spacer to just touch the bottom of the case. This will be the third set below the faceplate mounting screw holes. The board should be parallel to the bottom of the case. Slide the board into the case until the DIN connectors touch the inside of the rear panel.

With the PC board pushed all the way back insert a 4-40 screw through a flat washer and the case into the spacer. Tighten the screw. This will provide a ground connection between the case and the PC board as well as holding the board in position.

Next place the front panel and bezel in position over the controls and attach it with the two screws provided.

Turn the case upside down and attach a self-adhesive foot in each corner.

This completes the mechanical assembly of the ProData Interface. The next step will be the construction of the connecting cables.

ProData Interface - *Assembly Instructions*

ASSEMBLING THE CABLES

There are three two-conductor shielded cables, each with a 3.5mm stereo plug already molded onto one end. The other end consists of tinned leads. You will attach the appropriate connector to the end with the tinned leads. It should be noted that there will be no connection to the shield of these cables on the end where you are attaching the connector. Be sure to label the cables as you build them as it is important that the proper cable be used for line in and line out signals and that the molded end of the cable be connected to the ProData Interface. **The unconnected shields must go to the sound card end.**

[] Cut the shield wire from the end of one of the cables with the 3.5mm plugs. The shield wire should be trimmed at the end of the outer insulation.

[] Cut two 1/2-inch length of green heat shrink. Slide them over the wires and down the cable all the way to the molded connector. Do not shrink them until instructed to do so.

[] Slide the cover from one of the 3.5mm plugs onto the cable.

[] Cut a 1/4-inch length of green heat shrink and slide it over the wires and on to the cable so that 1/8-inch extends beyond the end of the cable's outer insulation. Shrink this piece of tubing.

[] Make and solder the following connections:

[] Red wire (ring on molded connector) to sleeve contact.

[] White wire (tip on molded connector) to tip and ring contacts.

[] Crimp the connector clamp around the end of the heat shrink and the cable.

[] Slide the cover over the end of the connector and thread it into place.

[] Slide one of the green pieces of heat shrink near each connector and shrink into place. These will serve to identify this as the line in cable.

NOTE! It is possible that the supplier may change the cable colors. Be sure to verify the color with an ohmmeter and change the instructions accordingly.

[] Repeat the above process for the line out cable using red heat shrink and making the following connections:

[] Red wire (ring on molded connector) to sleeve contact.

[] White wire (tip on molded connector) to tip only (no ring connection) contact.

[] Cut the shield wire from the remaining cable with a molded 3.5mm plug. This will be the PTT cable.

[] Cut a 1/2-inch length of blue heat shrink and slide it down the cable to the molded connector. Shrink it into place.

[] Cut a 2-inch length of blue heat shrink and slide it over the cable, leaving 1/8-inch extending beyond the end of

ProData Interface - Assembly Instructions

the cable's outer insulation. Shrink it into place.

[] Make the following connections from the cable to the AD@connector:

- [] Red wire (ring on molded connector) to pin 7.
- [] White wire (tip on molded connector) to pin 5.

[] Assemble the plastic shell over the AD@connector. Be sure to clamp the cable in place. Use electrical tape to increase the diameter of the cable as necessary in order for the clamp to grip it securely.

The remaining cable is an 8 conductor shielded cable with an 8-pin DIN connector already molded onto one end. The other end has tinned leads. Note that the shield connects to the metal DIN connector sleeve. Verify the color codes with an ohmmeter to ensure that the supplier has not changed them. Change the instructions accordingly if there are any differences.

[] Cut this cable to a length of 3-feet. Strip and re-tin the leads.

[] Slide the DIN connector housing over the end of the cable.

IMPORTANT! The pin numbers shown on the schematic match the Icom standard. The pin numbers stamped on the connector may be different. Use the schematic or Icom manual.

[] Solder the 8 colored leads in place as follows. Be sure that you use the correct view of the connector. The rear view shown on the right side of the schematic is generally the most logical as you will be looking at the connector from that side while soldering.

- [] Pin 6 - Brown
- [] Pin 1 - Red
- [] Pin 4 - Orange
- [] Pin 2 - Yellow
- [] Pin 5 - Green
- [] Pin 3 - Blue
- [] Pin 7 - Grey
- [] Pin 8 - Violet

Note: Looking at the rear of the connector, the colors begin with the Brown wire on the first pin to the right of the open space and proceed in clockwise rotation, ending with the Grey wire on the last pin and the Violet wire on the center pin.

[] Solder the shield wire to the shell.

[] Assemble the connector into the shell and slide the cover into place.

This completes the assembly of the cables. You are now ready to place your ProData Interface into service. The manual will provide instructions on how to connect and adjust the Interface.

PARTS LIST

ProData Interface

April 15, 2001

Reference	Description	Qty	Part Number
R8, R16, R17	470 Ohm, 1/4 Watt, 5% Resistor	3	Digi-Key 470QBK-ND
R21	4.7K, 1/4 Watt, 5% Resistor	1	Digi-Key 4.7KQBK-ND
R1, R5, R12, R15, R25	10K, 1/4 Watt, 5% Resistor	5	Digi-Key 10KQBK-ND
R13, R20	22K, 1/4 Watt, 5% Resistor	2	Digi-Key 22KQBK-ND
R6	47K, 1/4 Watt, 5% Resistor	1	Digi-Key 47KQBK-ND
R29	68K, 1/4 Watt, 5% Resistor	1	Digi-Key 68KQBK-ND
R3, R4, R10, R11, R18, R23, R24, R27, R28, R30	100K, 1/4 Watt, 5% Resistor	10	Digi-Key 100KQBK-ND
R26	220K, 1/4 Watt, 5% Resistor	1	Digi-Key 220KQBK-ND
R2, R14,R19	1-Meg, 1/4 Watt, 5% Resistor	3	Digi-Key 1.0MQBK-ND
R7	1K Potentiometer	1	Digi-Key CT2251-ND
R9, R22	25K Potentiometer	2	Digi-Key CT2255-ND
Rx	Not used	0	
C1 - C14	0.0047 Mfd, 50V Cerarmic Capacitor	14	Digi-Key P4950-ND

PARTS LIST

ProData Interface

C15, C17, C19, C23 C24, C26, C27, C28, C29, C31	0.1 Mfd, 50V Metal Film Capacitor	10	Digi-Key P4525-ND
C22	0.47 Mfd, 35V Tantalum Capacitor	1	Digi-Key P2057-ND
C16, C20, C21, C25	1 Mfd, 16V Tantalum Capacitor	4	Digi-Key P2105-ND
C18	10 Mfd, 16V Tantalum Capacitor	1	Digi-Key P2038-ND
C30	22 Mfd, 16 VDC Tantalum Capacitor	1	Digi-Key P2040-ND
L1, L2, L4, L5, L6, L8 - L14	100 uH Inductor, 125 mA	12	Digi-Key M7837-ND
L3, L7	100 uH Inductor, 760 mA	2	Mouser 542-5300-25
U1, U3	TL072CP Op-Amp	2	Digi-Key 296-1775-5-ND
U2	CD40106B Hex Schmitt Trigger	1	Digi-Key CD40106BCN-ND
U4	4N29A Darlington Opto-Isolator	1	Digi-Key 4N29ASHORT-ND
U5	78L09 Voltage Regulator	1	DigiKey NJM78L09A-ND
Q1, Q2	2N5486 FET	2	Mouser 610-2N5486
Q3	ZVP2106A FET	1	Digi-Key ZVP2106A-ND
Q4, Q5	ZVN2106A FET	2	Digi-Key ZVN2106A-ND
DS1	Bi-Color LED	1	Digi-Key L20048-ND

PARTS LIST

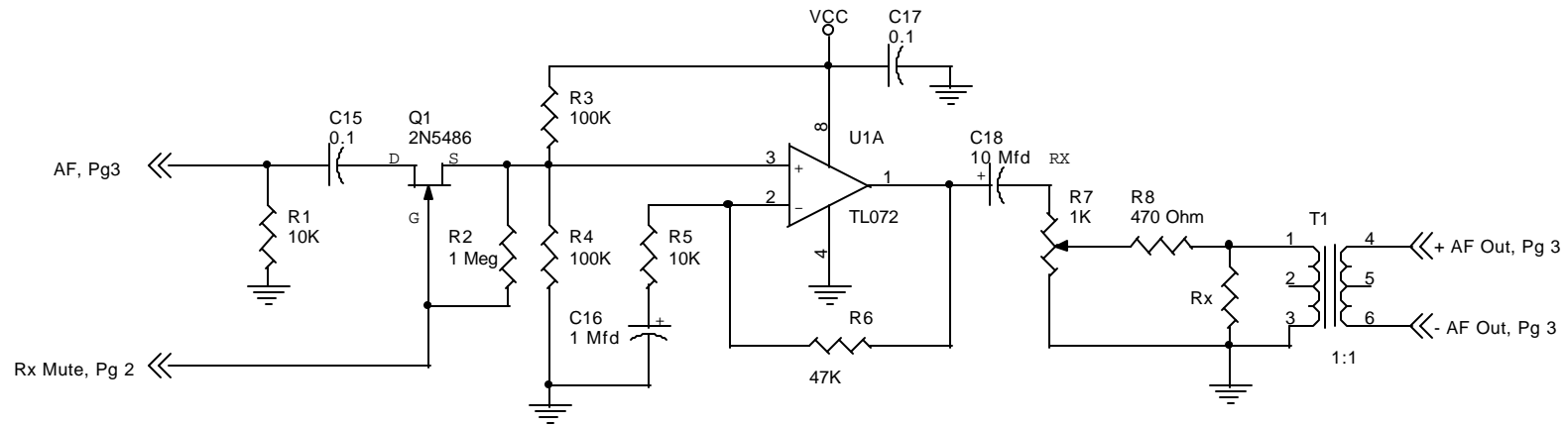
ProData Interface

D1, D2, D3, D5, D6	1N4148	5	Digi-Key 1N4148DICT-ND
D4	1N4007	1	Digi-Key 1N4007GICT-ND
T1, T2	1:1 Transformer	2	Mouser ME429-7216
SW1	4PDT Push Button Switch	1	Digi-Key CKN1195-ND
----	Black Switch Cap	1	Digi-Key CKN1199-ND
SW2	SPDT Mini Slide Switch	1	Digi-Key CKN5007-ND
J1, J2	8-Pin DIN Receptacle	2	Digi-Key 275-1027-ND
J3, J4, J5	3.5mm Stereo Jack	3	Digi-Key CP-3523NG-ND
----	Shielded cable with 3.5mm stereo plug	3	Mouser 172-2206
----	Shielded Cable with 8-pin DIN plug	1	Mouser 172-0008
J6	9-Pin female "D" connector	1	Mouser 156-1309
----	"D" connector hood	1	Mouser 156-3009
P2, P4	3.5mm stereo phone plug	2	Mouser 17PP004
P7	8-in DIN plug	1	Mouser 171-0278
----	4-40 x 1/4-inch male/female threaded standoff	1	Mouser 534-8712
----	4-40 x 1/4-inch machine screw	1	Mouser 561-P440.25
----	4-40 nut	1	Mouser 5721-440

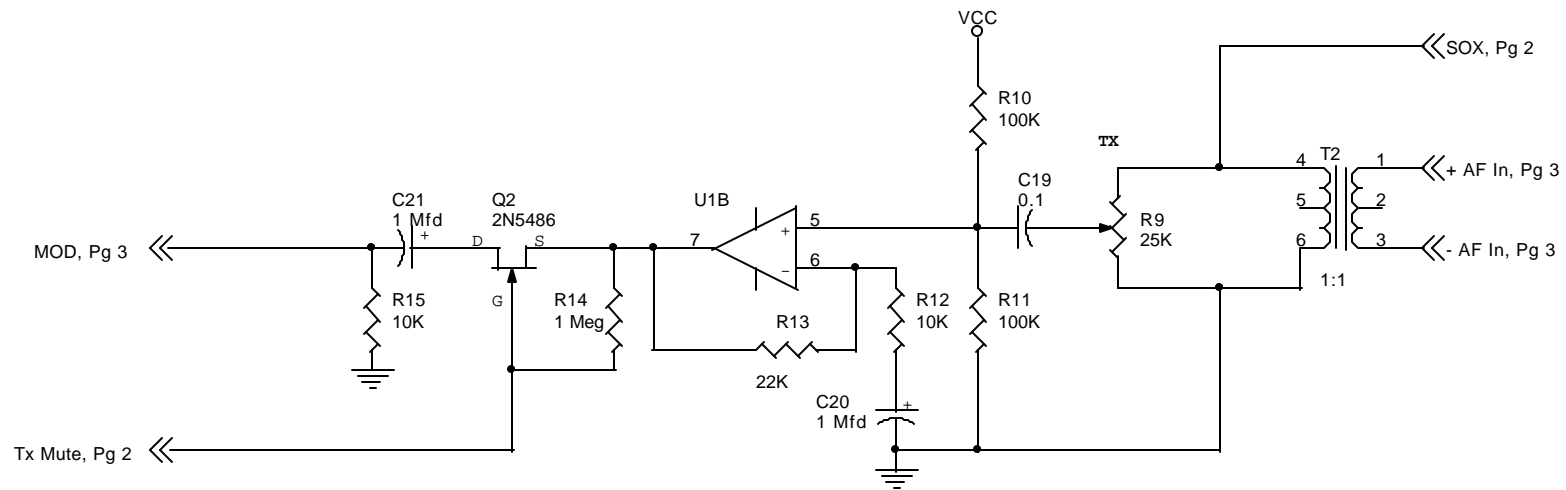
PARTS LIST

ProData Interface

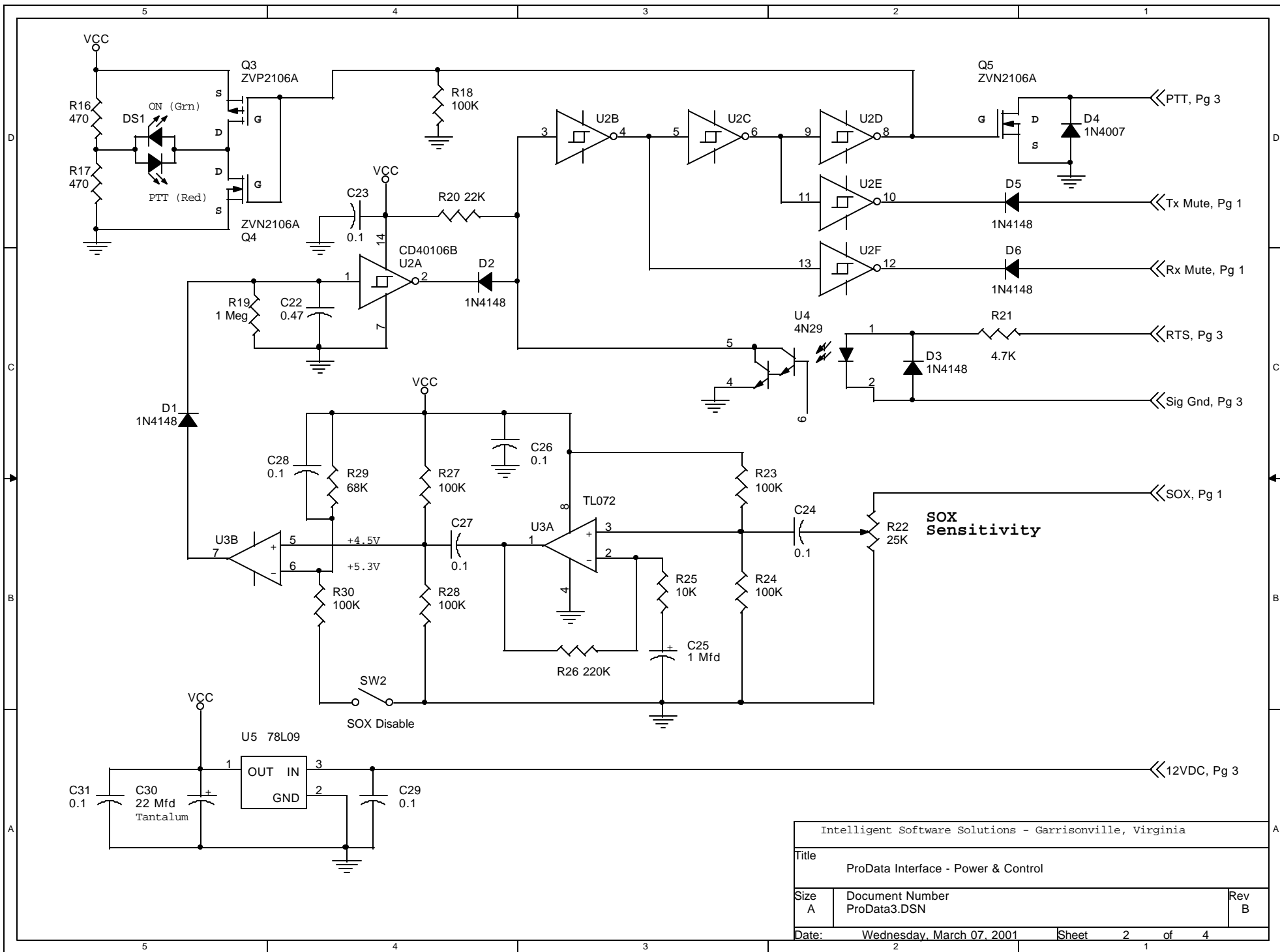
----	#4 lock washer	2	Mouser 5721-LWS-4
----	#4 flat washer	2	Mouser 524-11-142C
----	Polyurethane feet	4	Mouser 517-SJ-5007BK
----	Printed Circuit Board	1	-----



Note: Rx not used

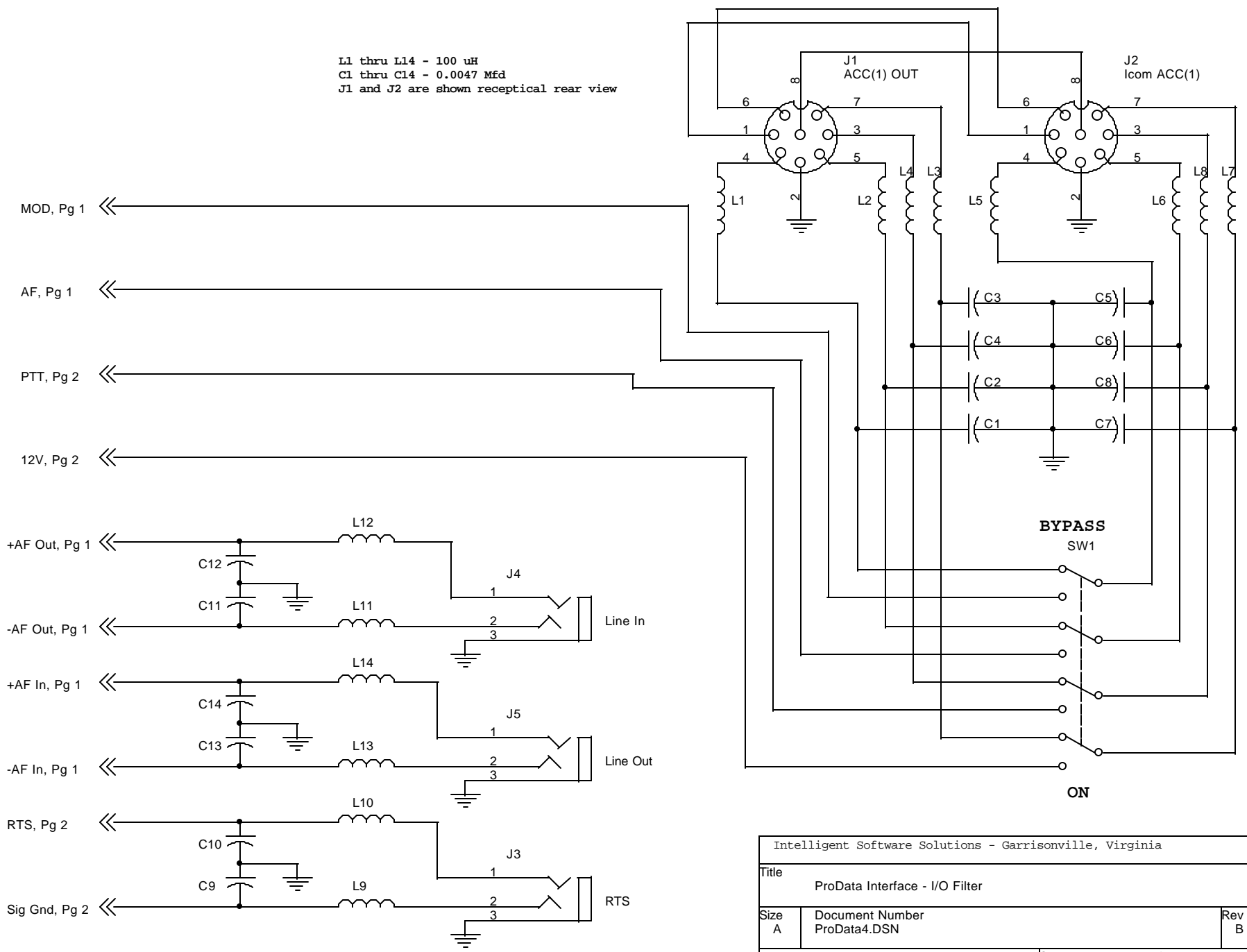


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Title ProData Interface - Audio		
Size A	Document Number ProData1.DSN	Rev B
Date:	Wednesday, March 07, 2001	Sheet 1 of 4

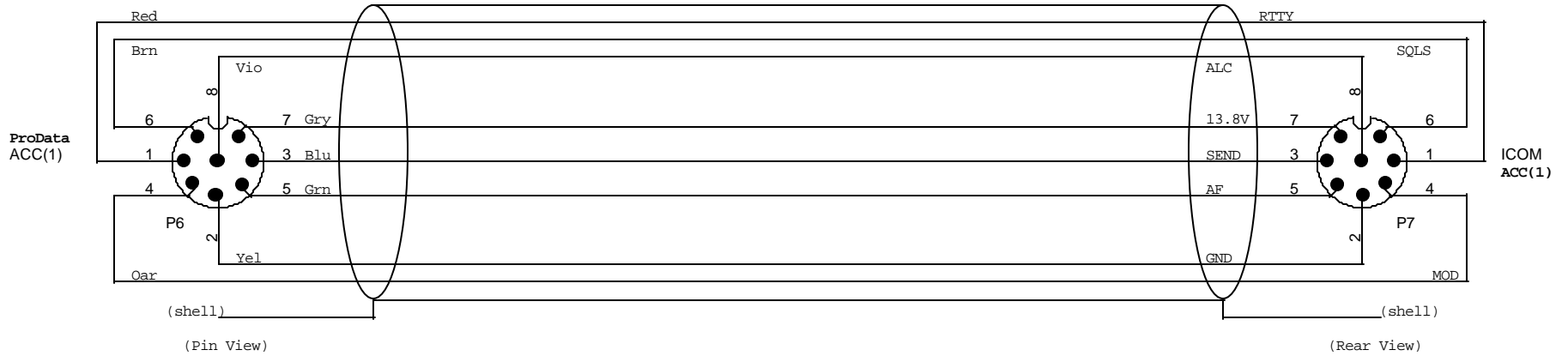
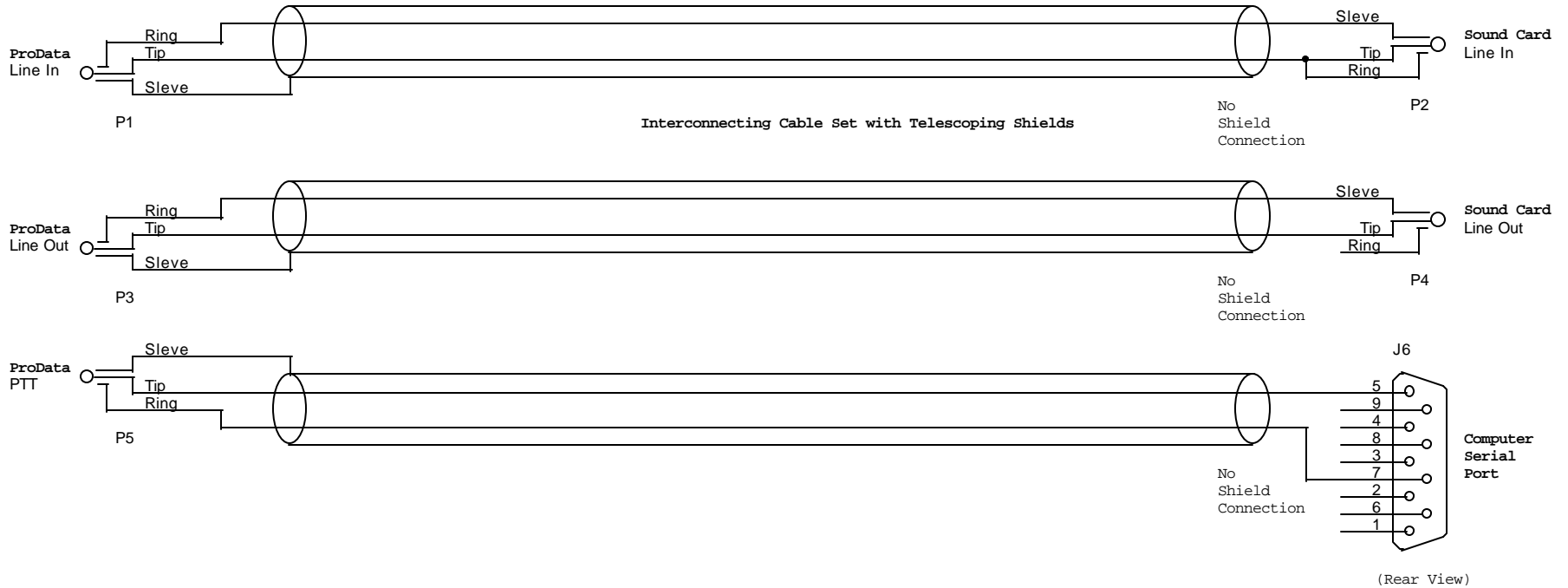


Intelligent Software Solutions - Garrisonville, Virginia		
Title ProData Interface - Power & Control		
Size A	Document Number ProData3.DSN	Rev B
Date:	Wednesday, March 07, 2001	Sheet 2 of 4

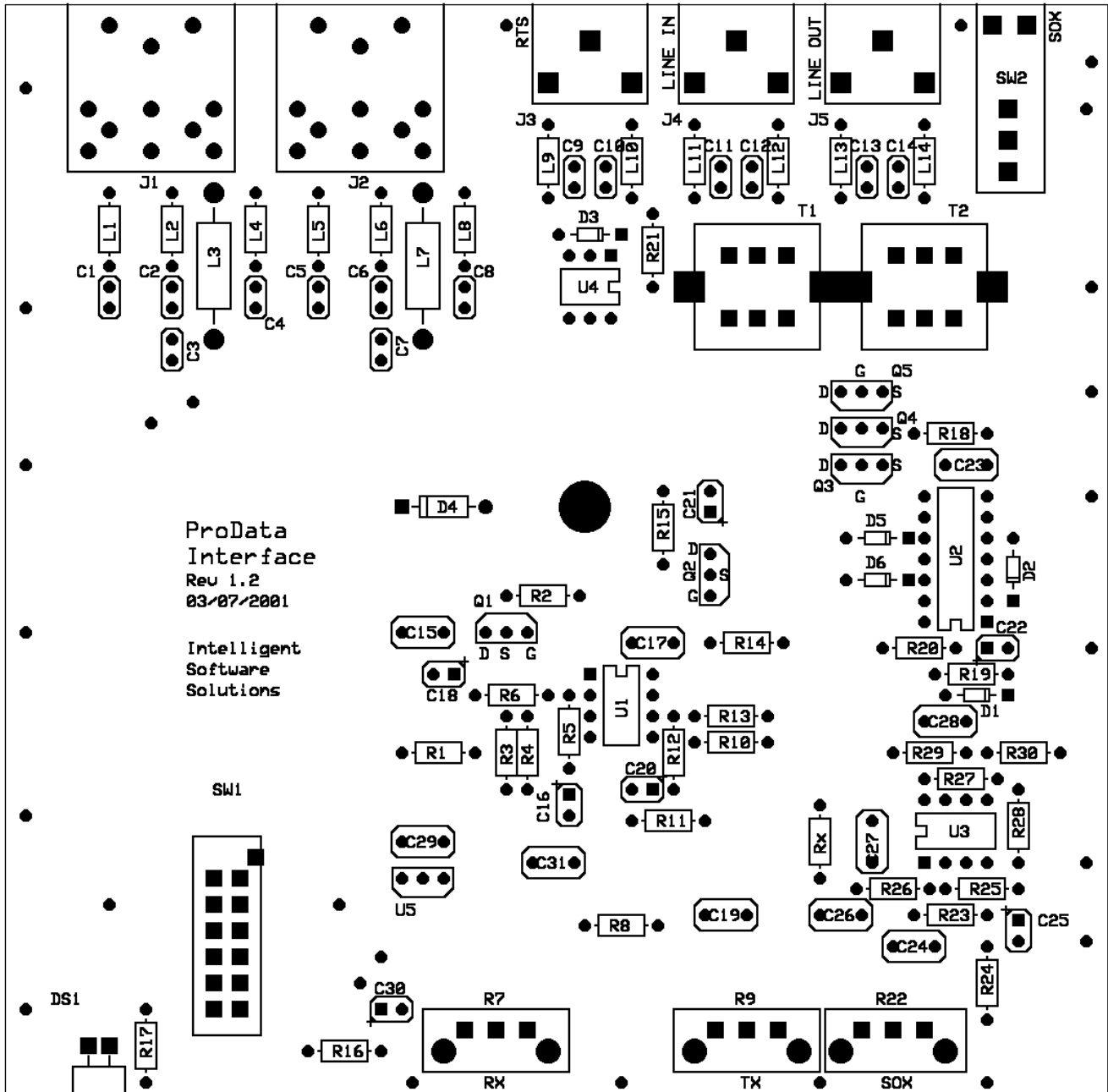
L1 thru L14 - 100 uH
 C1 thru C14 - 0.0047 Mfd
 J1 and J2 are shown receptical rear view



Intelligent Software Solutions - Garrisonville, Virginia		
Title ProData Interface - I/O Filter		
Size A	Document Number ProData4.DSN	Rev B
Date:	Friday, February 16, 2001	Sheet 3 of 4



Intelligent Software Solutions - Garrisonville, Virginia		
Title ProData Interface - Computer Interconnect Cables		
Size A	Document Number ProData5.DSN	Rev B
Date:	Friday, March 09, 2001	Sheet 4 of 4



ProData Component Layout