Building the Ecs Cable

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Technical Overview

You can skip this part if it bothers you, there is a pre-built adatper for a higher price mentioned below.
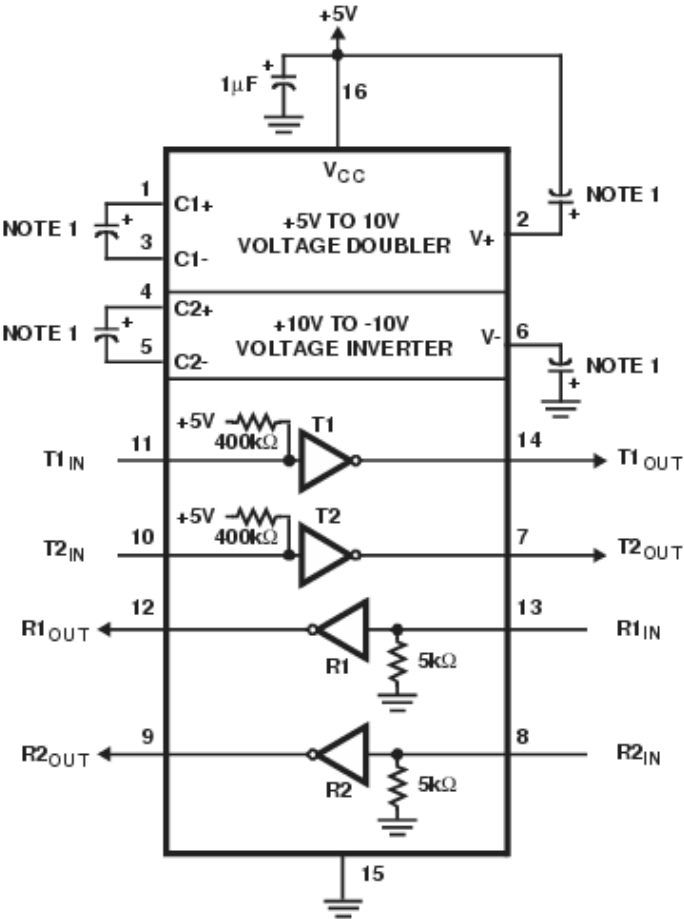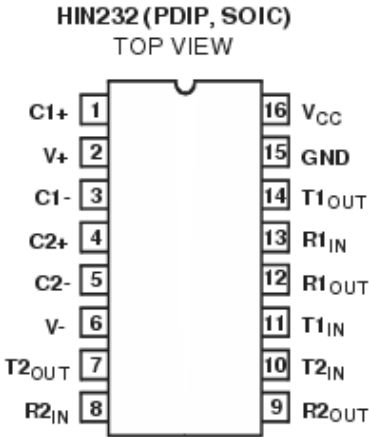
There is a four pin header on almost every new or high end sony monitor. (5+, GRND, TX,RX). The TX and RX are at **TTL** (Transistor Transistor Logic) volatge levels, in order to communicate with your computers serial port (**DB9** or **DB25**) those voltage levels must be inverted and converted to **RS232** levels.If you don't have serial, you can use a USB to serial converter.

A copy of the DOS Sony DAS program found on eservice.info contained a schematic of a simple circuit to do the conversion. The **TTL<>RS232 converter** used in the circuit is powerd by the +5v from the monitor. The TX and RX lines go right through the chip from the monitor to the TX RX of the serial port. The capacitors connected between other leads on the chip and GRND or the +5v are used by the chips internal inversion/conversion circuit, infact, there are some TTL<>RS232 chips that do not require external capacitors.

Though the schematic features the **max232t** there are many compatible chips, including the cheaper **HIN232** which I used.No matter which chip you end up using, the schematics don't really change, the external capacitors may vary from chip to chip, but the TX RX from the devices connect to one of the TX RX pairs on the chip.Just follow the **data sheet** for your respective chip, if you can build legos, you can easily follow the data sheet.

Here is an example of the info you find in a data sheet, remember, you can buy a pre-assembled adapter if this stuff bothers you. I'd still recommend that you conquer your fear.

Pinouts

HIN232 (PDIP, SOIC)
TOP VIEW

C1+	1	16	V_{CC}
V+	2	15	GND
C1-	3	14	$T1_{OUT}$
C2+	4	13	$R1_{IN}$
C2-	5	12	$R1_{OUT}$
V-	6	11	$T1_{IN}$
$T2_{OUT}$	7	10	$T2_{IN}$
$R2_{IN}$	8	9	$R2_{OUT}$

NOTE:

1. Either 0.1μF or 1μF capacitors may be used. The V+ capacitor may be terminated to V_{CC} or to GND.

Pin Descriptions

PIN	FUNCTION
V_{CC}	Power Supply Input 5V ±10%.
V+	Internally generated positive supply (+10V nominal), HIN239 requires +7.5V to +13.2V.
V-	Internally generated negative supply (-10V nominal).
GND	Ground lead. Connect to 0V.
C1+	External capacitor (+ terminal) is connected to this lead.
C1-	External capacitor (- terminal) is connected to this lead.
C2+	External capacitor (+ terminal) is connected to this lead.
C2-	External capacitor (- terminal) is connected to this lead.
T_{IN}	Transmitter Inputs. These leads accept TTL/CMOS levels. An internal 400kΩ pull-up resistor to V_{CC} is connected to each lead.
T_{OUT}	Transmitter Outputs. These are RS-232 levels (nominally ±10V).
R_{IN}	Receiver Inputs. These inputs accept RS-232 input levels. An internal 5kΩ pull-down resistor to GND is connected to each input.
R_{OUT}	Receiver Outputs. These are TTL/CMOS levels.
$\overline{EN}$	Enable input. This is an active low input which enables the receiver outputs. With $\overline{EN}$ = 5V, the outputs are placed in a high impedance state.
SHUTDOWN	Shutdown Input. With SHUTDOWN = 5V, the charge pump is disabled, the receiver outputs are in a high impedance state and the transmitters are shut off.
NC	No Connect. No connections are made to these leads.

Update 5/22/06:

It seems the majority of people are buying pre-built adapters. The issue now seem to be finding cheap shipping for your location.

Right now, a prebulit adapter goes for $19 with shipping included (eBay, see below).

Though the rs232<>ttl chip is only $1, the prices of solderless bread board, wires, a serial connector (optional) and shipping are pushing the total cost of the 'do it yourself' option closer to the 'just buy it' option. Ofcourse, if you already have some of the stuff handy, nothing compares with the 'do it yourself' option.

What is needed is an itemized list of parts and prices, and specific instructions with pictures. Else, the 'do it yourself' option doesn't save enough money to be worth mentioning.

I now suggest eBay as 'the place' to get your cable. In the case you can't find reasonable shipping (cost or time) check below to see if I've listed a regional seller. Better yet, check the thread, as I really can't keep up with all the locations.

Where to get it?

The difficult part is finding where to buy the parts, and what parts you want to buy,the only part you really need is the ttl<>rs232 converter chip. Everything else just makes connecting wires from the monitor to the serial port easier.

Most expensive but easiest, no assembly required, just one order.

Your choices are:

I do not recommend any one cable supplier. This list is not exhaustive or up to date. **The order of the list is irrelevant.** Search the web. Search ebay. If you don't live in the US, don't pay for international shipping. Everybody is selling a $1 chip with the same function, difference is physical connectors. Massmind.org suggests alternative suppliers on their page. I **highly** recommend buying a $1 chip and physically connecting it to montor/computer on your own, just as I explain on this page. (update 6/6/07)

1. *Update 07/07/07:*

   S.Winston has notified me that a kit costing $6.99 + $3.00 S/H contains everything needed. The wires that connect the 'reset' and 'on LED' of an old PC fit both the header pins on both the monitor and this kit nicely.

   It can be found by searching for 'RS232 to TTL 5V converter board KIT' on ebay. Or you can check out the kit being sold here:http://www.nkcelectronics.com/rs232-to-ttl-5v-converter.html This is substantially cheaper with almost negligible increase in difficulty.

2. *Update 1/07/07:*

   James Newton, from massmind.org , has offered a new US based source for a prebuilt cable!

   Just wanted to let you know, the RLC-1 RS232-TTL converter cable you mentioned at
   http://www.geocities.com/gregua/windas/cable.html
   is available from me at
   http://techref.massmind.org/techref/io/serial/RCL1.htm for $19 plus $6 S&H in the USA or internationally for $10 more. Faster shipping, lower price.

   The unit comes with the pins in the order: Vcc, GND, Tx, Rx (followed by RTS, CTS) and so needs to be re-arranged to GND, Vcc, Rx, Tx for use as an ECS cable. The pins are held in the socket with a simple metal spring which is visable through the side of the connector, so removing them is a simple matter of pushing the wire into the socket, pressing down on the spring with a thumb tack, and then pulling the wire out of the socket.

   Thanks!

3. There are usually adapters being sold on ebay. Here is a link to one on eBay. They sell out often, so be prepared to

search if this link has sold out already. So far, eBay has had the best deals on these adapters, this one prices in at $19 shipping included. Highly recommended.

4. Hobby Engineering apears to have a completed adapter that will requre no assembly for 24.50 + S/H. Pins are in wrong order, trivial to switch.

   [Completed adapter](#)

   WARNING: This adapter is sold out, the pins are confirmed to be in the wrong order, though re-ordering is not too much of a hassle. **I do not recommend this adapter** as there are cheaper alternatives on eBay.They have gotten quite a windfall of profit thanks to my mentioning of them. I'd remove this option, but I think it is a good example of some of the higher priced stuff you'll find online which may have the wrong pin order.
   There are lots of Hobby/Robotics/Electronics sites that sell this type of cable, assembled and disassembled. You usually have to switch pins. If you can't find good shipping on ebay, you may want to look for such a shop near you.

5. Ross has sugested http://www.digitalnemesis.com/products/rlc1/.

   It is $20 + $4 S/H

   Here is the message that he posted:

   I got my cable from a guy called Ashley Roll in Australia and delivery was very quick(uk).

   http://www.digitalnemesis.com/products/rlc1/

   They can make the cable up to your own specs.

   config is(from pin 1) GND/5+/RX/TX

   This cable worked perfectly with my Dell P1110's with the config above. This is exactly the kind of thing to look for when eBay fails you.

Cheaper, but you'll have to do some 13yrs + difficulty lego style work.

Jameco has the chips, the capacitors it may require (in the max232 and hin232 cases it's 5 1uf 16v caps), and breadboard and wires. I couldn't find a DB9 to breadboard adapter though, I probably didn't search right. If you have a spare serial cable, you can just cut it to get your wires and DB9 connector for cheap.Check out the cable Atomist built , shows how little you need. If you go the Jameco route, make sure to get:

1. pcb board or sodderless bread board
2. a max232*, go for the cheapest one
3. 5x 1uf(micro farad) capacitors rated to at least 16v.
4. You can get jumper wires and a DB-9/DB-25 connector by cutting up a serial cable from a garage sale.

Sodderless breadboard is more expensive, but easier to work with than PCB board. Jameco caries the 4pin connector and other things to make your adapter fancy, best of all their prices are very cheap.Jameco is probably your best overall bet.

Actually, max 233 uses internal capacitors, and may be easier/cheaper than the max232 or it's derivatives when you factor in the cost of the capacitors.

If you live in the UK, Maplin would be your equivalent of Jameco.

Ebay is always an option, but if you need many different parts that aren't carried by one seller, shipping will kill you.I think they'd have cheap wires, jameco only sells a big kit for $9.99

Again,Hobby Engineering has an RS232 kit with 5 capacitors, a max232 a DB-9 connector for $6.99 + S/H.You still need wires and PCB board though, and that will run you about $12 more.Not recommended. RS232 kit.

Purchasing Locally

Do you live near Torronto, Canada? Despotic has found a local electronics store with everything neded for under $12 canadian including tax!

His post:

Here are a few pics of my kickass cable ... was easy to make, thanks again p991 ... used 1uf 50V capacitors, small breadboard, female db9 connector with an easy clamp, 4-pin connector, and a bunch of wire ... all were purchased @ Supremetronic located in downtown Toronto, Canada: [Google Maps Link](#) for under $12CAD (tax included) ... (this price actually included a bunch of resistors in case the windas fix didnt work ...glad I didn't have to use them since I don't have a soldering iron here).

Check your phone books for local electronics stores, you may hit the jackpot like Despotic.

Slightly more difficult, possibly cheaper.

There are some TTL<>RS232 circuits that don't include an IC (chip/Integrated Circuit), but require resistors and transistors or diodes. It doesn't matter how you do it, it's a very common task with many cheap solutions.Look it up on google if you're interested.

Warning! Don't get ripped off.

I've seen a few of these prebuilt RS232<>TTL converters with a builtin DB9 connector for $30 or something, problem is, you still need to connect it with your own wires to the 4 pin header on your monitor, and worse still, they will try to sell you a power supply which you don't need (your monitor supplies the +5v). I've seen some people ask as much as $40!!!Don't be fooled, this is a very common circuit and even when buying all optional parts shouldn't cost more than $15.

Information on pinouts.

Here is some info on what pin mean what on your computers DB9 or DB25 serial ports, if you only have USB you could

use a Serial<>USB converter.

You will need this information to find out what serial port pin is TX RX GRND etc.Unless... you bought the complete adapter from eBay, or some other store.

http://www.lammertbies.nl/comm/cable/RS-232.html
http://www.loop-back.com/rs232_std.html
http://en.wikipedia.org/wiki/D-subminiature

Step by step

It depends on what parts you use. Check the thread for many step by step photographed adapters. I may put them up here so that you do not have to wade through other posts to find them. There are as many ways to do this as there are people, be creative!

Generally, it goes as follows.

1. buy TTL<>RS232 IC and any required capacitors
2. Find a way to connect the computer DB9 or DB25 serial ports RX TX etc. (specified by info) to the RX TX on the chip.

   Possible Solutions:
   (a)cut a serial cable, long ones can yield extra wires for step 2
   (b)buy wires and poke them into the connector
   (c)buy wires and db25 or db9 connector (if using bread board, use breadboard adapter)
   *All options present choice of using breadboard/prototyping board, or just pinched wire and household tape to connect wires to leads on chip.

3. Find a way to connect the monitor to the TX RX on the chip
   *same options as step 3, you can find the 4 pin connector and things to crimp the wires on Jameco
4. Get the data sheet for your IC
5. Follow the data sheet and connect the external caps (if any), then connect the monitor and serialport with your chosen method to the chip.

I will make a better howto if it's needed, post to the forum and tell me how you think it should be, thanks for reading!

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