Serial Port Replicators

Originated by Alex Ren/LUMCON 19 Feb 14

I'm looking for recommendations for setting up serial port hubs in the labs on the Pelican. We're curious if anyone's recently found something off the shelf or if anyone has any instructions to build our own.

Our goal is to have at least 3 per lab, so 6 total.

I should clarify, I've looked through previous discussions and saw a couple about UDP and serial over ethernet. We've tried this and while it's great when it works, we've found it to be fickle from one scientist's computer to the next so we'd rather stick with supplying physical db-9 serial ports to the scientists' computers.

Thanks,
Alex

Reply from: Dale Chayes/LDEO 19 Feb 14

The COTS solution that I have used extensively are from Black Box. They are simple, big, relatively expensive, and very robust.

http://www.blackbox.com/Store/Detail.aspx/RS-232-Data-Sharer-8-Port/TL554A%C4%82R3

SIO has an in-house implementation that is physically smaller that they might be willing to provide.

-Dale

Reply from Bill Fanning/URI 19 Feb 14

Alex,

We have had great luck with Black Box TL159A
http://www.blackbox.com/Store/Detail.aspx/Data-Broadcast-Unit-RJ-11/TL159A

We have 10 of them in use full time, several have been running for 20 years. With 8 output ports, no setup required and rock solid they are a great investment at $312.

Bill

Reply from Kurt Schwehr 19 Feb 14

Why not serial over TCP? Â socat has the built in capability to fan out to N clients. Â You can even do filtering and other fun stuff. Â e.g. Â get something from port 31414, only get data from a particular sensor, and expose that on port 35001.

socat -u TCP:localhost:31414 - | grep 'r003669945' |Â socat -d -d -d -v -u - TCP4-LISTEN:35001,fork,reuseaddr

-kurt

Reply from Alex Ren 19 Feb 14

Yes, we've tried that as well but with mixed results. It works just fine for some guest scientists' computers but it doesn't work for others. We'd really like to find something that can provide us with extra DB-9 serial ports.

Alex

Reply from Tom Wilson/Stonybrook 19 Feb 14
Hi Alex,

What exactly are you trying to accomplish?

One RS232 transmit to many? Â I.e. broadcast NMEA0183 GPS or timeclock to all laptops?

Many RS232 concentrating to one? Â i.e. four instruments or systems all with RS232 outputs going to one RS232 input?

Command driven multiplexing? Â One master computer converses with any of a number of slave computers? Â If so buffered or unbuffered?Â

Same baud rate or different?

I've done all of these things through the years both with straight RS232 and serial over IP. Â

Black Box and B&B Electronics used to offer a lot of these solutions but some of the older ones are likely discontinued but maybe available on eBay. Â

There's always Arduino and Raspberry Pi and hacking (oh my) which can do almost anything (if you have the time & talent to do it or the money to pay a guru like me).

Let us know some more details and maybe I can give you some COTS solutions.

Tom

Reply from Alex Ren/ LUMCON 19 Feb 14

Thomas,

Yes, we'd like to take 1 RS232 to many. GPS, Gyro heading, motion reference unit, etc.

William,

Those look interesting! Are those RJ45 ports? While I'd prefer DB-9, I think we might be able to make something like that work.

Alex

Reply from Tom Wilson/Stonybrook 19Feb14

AHA and never mind my questions because I just remembered these:

http://www.bb-elec.com/Products/Serial-Connectivity/Serial-Data-Tools-Adapters/Serial-Data-Switches.aspx

Very flexible and reliable, does any of the things in my previous message right out of the box. Â I retired the last of these a few years ago after 10+ years of use, glad to see B&B still makes them.

Tom

Reply from Tom Wilson/Stonybrook 19Feb14

Alex,

On further consideration, the B&B box is outstanding when trying to concentrate serial data down to one port but Fanning's recommendation is what you need to go the other way.

Best,
Tom

Reply from Bill Fanning/URI 19Feb14

Alex,

They make a DB-25 version as well but it costs more. The box doesn't transmit control signals so the 4-wire RJ-11 connector is all you need. Buy yourself the RJ crimp tool with the money you save - you will never go back to the DB connectors again.

Bill

Reply from Robbie Laird/WHOI 19Feb14

I'll probably regret admitting this.....

You don't really need a buffer. It's surprising just how much stuff you can pile onto a single serial feed before the voltage drops to the point where something stops working. Obviously this has to be done with some care, but in reality, we have been doing it this way for years, and never felt the need to change. It Just Works.

Of course, maybe you put your critical items on a separate feed. But even then, you can still have 2-3 items on the same line.

The RJxx system works well. We use RJ12 connectors, (6 wire, but everyone calls them rj11), somewhere in the past there is probably an ISA serial board that used 6 wire connectors. We use these http://search.l-com.com/search?keywords=ra096 from L-com (or search l-com for ra096) We also use these: http://www.l-com.com/patch-panel-server-rack-350-32-port-panel-rj12-6x6-straight-thru Again, we just wire a bunch in paralell and it works. With the 16 port version, (not sure they still make it though), you can have, say, 5 gps, 5 gyro, 3 posmv, 3
whatever....

Kramer makes 4 way buffer/splitter thingy, the VP14. http://www.kramerelectronics.com/products/model.asp?pid=194 Note, this one has a unique ability to cause trouble because it does exactly what it says it does. "It sends data from any port to the other three." So DON'T give the user access to the TX line, because if the send any data, it comes out the other ports. (and tries to talk to your gps, the other users, etc..)

Other buffer/splitters.

General Electric makes one, but I cannot find the part number.
http://www.overland.no/device.html makes some. I'm not familiar with these, but they look nice.
http://www.marinelektronik.se/lemming.htm has some as well. I'm not sure how easy these are to locate.
while the above items are mostly 422, they also have 232.

The UDP over ethernet has some very cool features, but it's true that going directly into the users computers does not work very well, mostly because the software is not set up for it. (opencpn is set up for it, and it works great.) But you could use a four port Moxas http://www.moxa.com/product/NPort_5410.htm to provide serial at the user. They are not cheap, but neither are the other solutions. With one moxa "upstairs" to broadcast the data, any moxa anywhere else on the network can pick up the data. There is also a cool trick you can do, which is to broadcast more that one data string one a single udp port. Because TCP is magic, they will not step on each other. And when you read the same UDP port, you get all the data on one port. (and one serial port, if you want) So it can multiplex the data. One drawback is that you cannot guarantee the order. With some thought, the moxa's are very powerful. You can also do baud rate conversions.

Robbie Laird
WHOI/SSSG

Reply from Toby Martin/OSU 19Feb14

> From: rlaird@whoi.edu
> Date: Wed, 19 Feb 2014 17:10:22 -0500
>
> I'll probably regret admitting this.....

Yeap :-)

> You don't really need a buffer. It's surprising just how much stuff
> you can pile onto a single serial feed before the voltage drops to the
> point where something stops working. Obviously this has to be done
> with some care, but in reality, we have been doing it this way for
> years, and never felt the need to change. It Just Works.

Until it doesn't. Then you have a REALLY FUN time attempting to figure out why the system that has been working fine is now FUBAR.

Toby

Rely from Dale Chayes/LDEO 19Feb14

>> From: rlaird@whoi.edu
>> Date: Wed, 19 Feb 2014 17:10:22 -0500
>>
>> I'll probably regret admitting this.....
>
> Yeap :-)

But it does serve to stimulate the discussion. We can all use it as a learning opportunity. Thank you.

>>
>> You don't really need a buffer. It's surprising just how much stuff
>> you can pile onto a single serial feed before the voltage drops to the
>> point where something stops working. Obviously this has to be done
>> with some care, but in reality, we have been doing it this way for
>> years, and never felt the need to change. It Just Works.
>
> Until it doesn't.

Such as when someone inadvertently connects a power source or an electrostatic discharge to an improperly protected serial line and kills all the devices.

Have a look at: http://www.analog.com/static/imported-files/tech_articles/571756556RS-232Transceivers.pdf You can be sure that there are manufacturers of serial port devices that don't provide appropriate protection.

> Then you have a REALLY FUN time attempting to figure out
> why the system that has been working fine is now FUBAR.

Been there, done that. It's a lot easier when there are only two devices in the movie.

-Dale

Reply from Webb Pinner 19Feb14

We used these on the Okeanos without issue. Pretty much just like what Bill recommended but maybe a little more suited for the marine environment.

http://www.actisense.com/products/nmea-0183/nbf2.html

Cheers,
- Webb