



CAT-5 Repeater-400™ REPEATER MANUAL

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A. Topology

Unibrain's CAT-5 Repeater-400™ provides an excellent low cost solution for extending the Firewire bus by using standard CAT-5e or CAT-6 (crossover) type cables. A typical configuration is shown in figure 1:

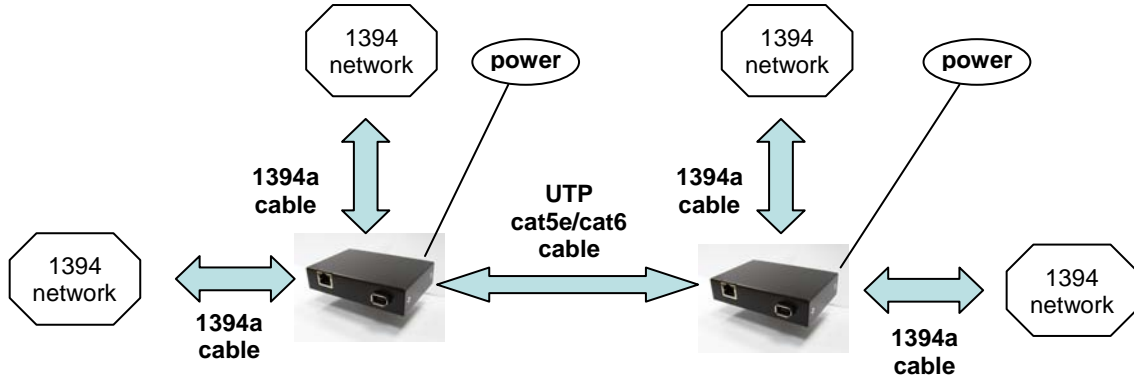


Figure 1: CAT5e/CAT6 Repeater typical configuration

The **CAT-5 Repeater-400™** utilizes its UTP RJ45 port and a **crossover** CAT5e/CAT6 to transfer 1394 signals over long distances. The pin out of crossover cable is shown in Figure 2:

10BASE-T or 100BASE-TX crossover

Pin	Connection 1: T568A			Connection 2: T568B			Pins on plug face
	signal	pair	color	signal	pair	color	
1	BI_DA+	3	white/green stripe	BI_DB+	2	white/orange stripe	
2	BI_DA-	3	green solid	BI_DB-	2	orange solid	
3	BI_DB+	2	white/orange stripe	BI_DA+	3	white/green stripe	
4		1	blue solid		1	blue solid	
5		1	white/blue stripe		1	white/blue stripe	
6	BI_DB-	2	orange solid	BI_DA-	3	green solid	
7		4	white/brown stripe		4	white/brown stripe	
8		4	brown solid		4	brown solid	

Figure 2: Crossover cable pin out

Crossover-CAT5 is the type of Ethernet cable that is used to connect computers with each other, not the cable you typically use to connect your computer with the wall Ethernet plug. You can find the crossover cables on typical electronics or computer store.

By plugging the CAT5e/CAT6 cable into RJ45 ports of two repeaters the transmission distance can be lengthened according to the following table:

Max 1394 Speed	UTP Cable Type	
	CAT5e	CAT6
S100	70m	70m
S200	70m	70m
S400	70m	70m

Table 1: Maximum cable distances vs various 1394 speed modes

Alternatively a pair of typical, non-crossover Ethernet cables can be used with a CAT5-crossover coupler. **Notice** that in this case, the maximum distances may decrease due to signal loss on the connections. A CAT5-crossover coupler is shown in Figure 3:



Figure 3: Crossover Ethernet coupler dongle

Connecting the RJ45 ports appropriately with one of the above ways, the yellow led on each port should turn on, indicating that the status of the connection is OK.

Each of the two 1394a 6 pin ports of the **CAT-5 Repeater-400** can deliver data to a 1394 network segment using 1394 cables as shown in figure 1. The maximum data speed between devices being at different sides of the UTP cable will be limited to 400Mbps.



Figure 4: CAT-5 Repeater with aluminum base

An aluminum base with screw holes is also provided in the repeater package in order for the device to become stable and mountable to other surfaces (Fig.4).

B. Power issues

Although CAT 5 repeater is powered up through a 1394 6 pin cable connected to a 1394 network, it is necessary for the repeater proper operation to be connected to an AC-DC power adapter with a DC output of 12V/2A.

It is also recommended to avoid powering up devices with total power consumption greater than 15W through the repeater 1394 ports. At normal operation the repeater requires less than 3W.

C. Driver issues and Unibrain software

CAT-5 Repeater-400 is essentially a 1394b (Firewire-800) device as it is based on a 1394b PHY (Physical Layer) chipset. This will result in a know speed limitation in Windows XP or Vista, when using the native Microsoft 1394 drivers.

Even if you use only 1394a adapters or devices, as soon as the CAT-5 repeaters are connected on the firewire bus, Windows will automatically set the bus speed in 100 Mbps (S100).

This will result in limited performance for firewire devices and limited bandwidth for firewire IIDC cameras or DV camcorders.

There are two solutions to overcome this limitation:

- a) For Windows XP SP2 or SP3 only: Install the following patch from Microsoft which restores the bus speed to S400 Mbps when 1394b devices are connected on the bus:

<http://support.microsoft.com/default.aspx?scid=kb;en-us;885222>

Note that there is no solution/patch for Windows Vista or 64 bit Windows XP/Vista editions as of this moment.

- b) Use Unibrain's ubCore™ 1394 drivers, which support natively the 1394b standard. The ubCore drivers can be download from our web site and for more details refer here:

<http://www.unibrain.com/Products/DriverAPI/ubcore.htm>

Note that the ubCore™ drivers replace completely the Microsoft 1394 stack and so proprietary or specific devices might not work afterwards. You can always revert back to Microsoft drivers by either uninstalling ubCore™ drivers or running the ubSwitch™ utility, installed with ubCore™ setup.

Windows 7 supports natively 1394b – 800 Mbps speeds and thus no patch or the ubCore™ drivers are required.

Mac OS X 10.4 or later and Linux provide native support for the 1394b standard, so there are no special driver requirements or limitations involved.