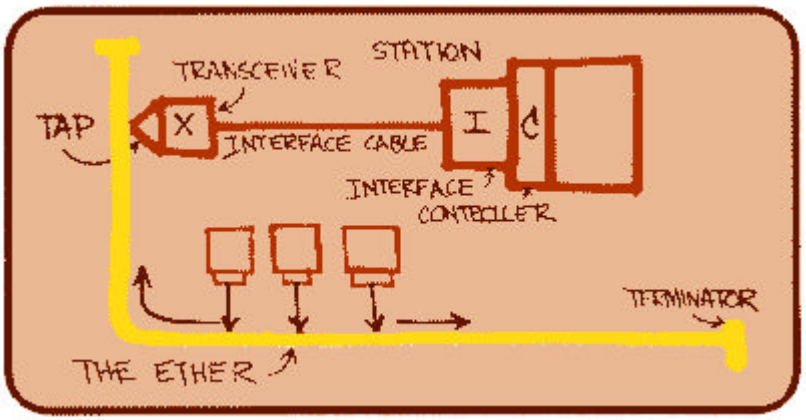
Ethernet History



"The diagram ... was drawn by Dr. Robert M. Metcalfe in 1976 to present Ethernet ... to the National Computer Conference in June of that year. On the drawing are the original terms for describing Ethernet. Since then other terms have come into usage among Ethernet enthusiasts."

Just as a reminder: in 1976, INTEL had just developed the 8080, which was running at an unbelievable speed of 4.77 MHz !!!

Thin Ethernet (10base2)

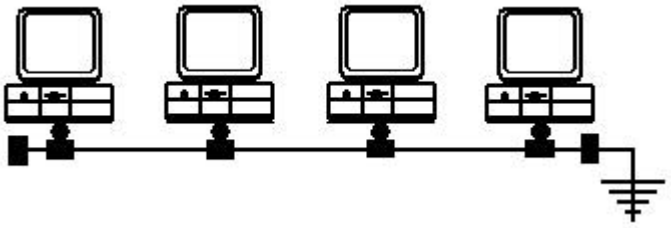
I have seen now so many messages on the News-Groups, and also received so many messages on this topic, that I am putting it up now like this:

on a 10base2 coax network-cable, there MUST be a 50 Ohm terminator

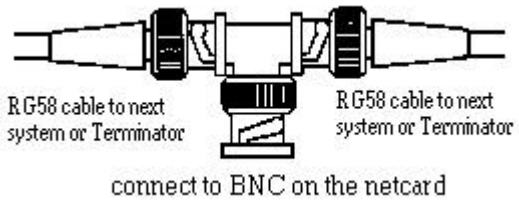
on each end : One terminator MUST be grounded, the other NOT !

(And it does NOT work to plug the BNC-connector of the coax-cable directly onto the BNC-connector of the NIC without T-connector !)

The dangerous issue: if you put on TWO not-grounded terminator or if you ground BOTH terminators, the network does NOT fail completely, but I can guarantee you problems: slow, unreliable, errors during data-transfer !



Thin Ethernet (10base2), sometime also called "Cheapernet", is based on using a coax-cable, which is specified as RG58 (please, do NOT use other type of coax-cable, it has other electrical properties and will not work properly) and which runs from system to system.



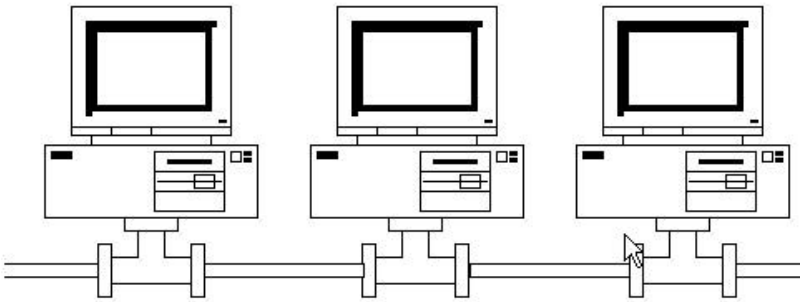
The cable is connected via BNC-T-connectors to the network card installed in the PC.

The T-connector must be put on the BNC-connector of the network card !

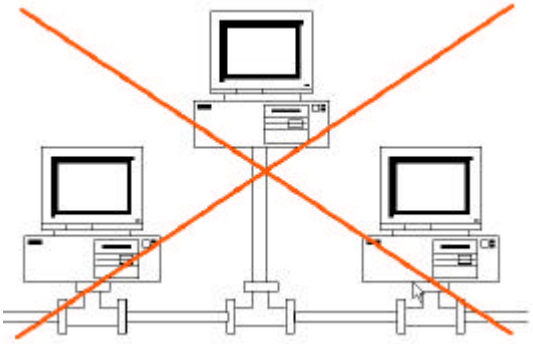
(if you have a Combo / Multi-Connector Board, check, if you need to select the BNC-port !)

It is NOT allowed to put in any extension/cable between the T-connector and the BNC-connector on the network card !

If you do that, your network will either NOT work or becomes unreliable, working slow or sometimes failing !

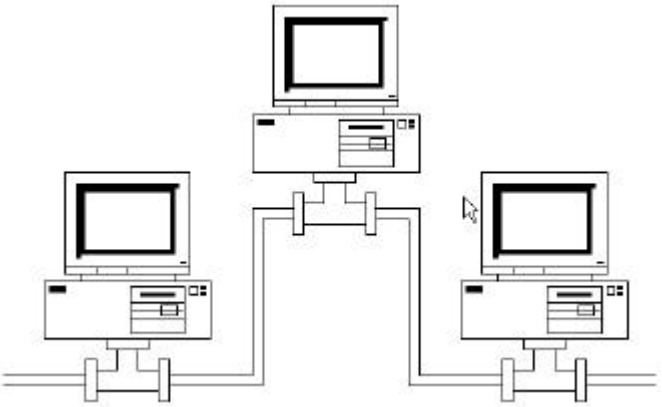


The T-connector is put directly on the BNC-connector of the Network board



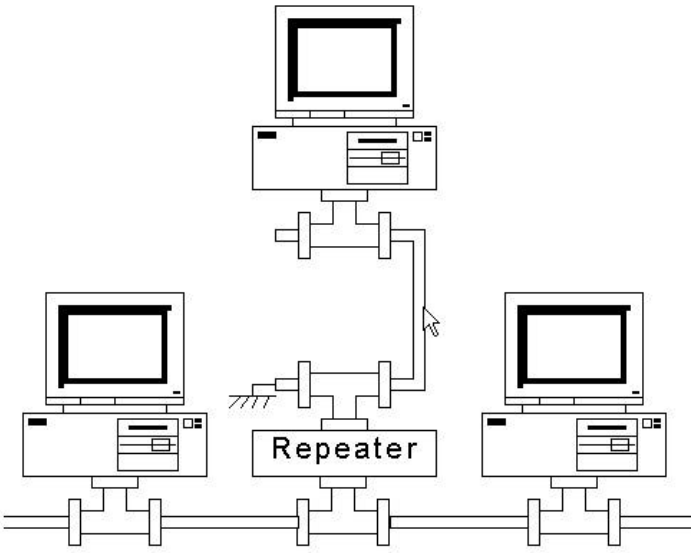
If one of the systems is located away from the cable, you CANNOT use a drop-cable from the t-connector to the BNC of the Network Card (NIC) ! It either does NOT work or works unreliable / slow !

Solution 1)



Run the cable to the system and then run it back (watch out NOT to exceed the Maximum allowed cable-length) !

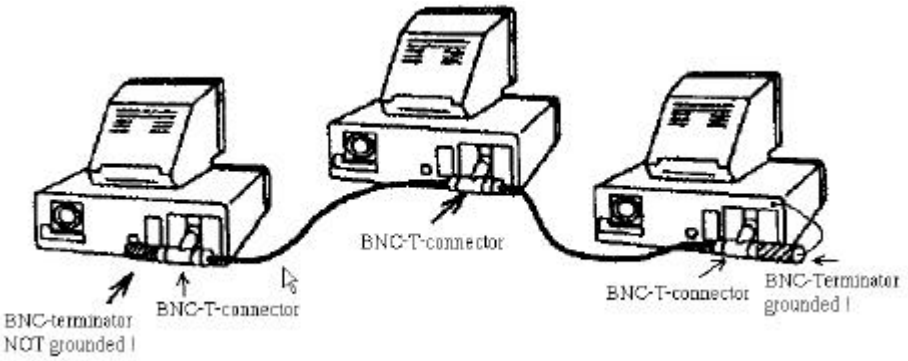
Solution 2)



Put in a separate "Repeater", which allows to connect the remote located system on its

own segment, which need to have its own terminators.

So, a more realistic view on an installation is:



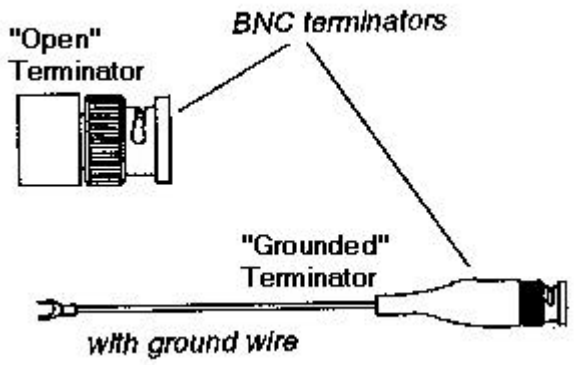
The cable swings from system to system (it is NOT allowed to put in "junctions" , to connect for example 3 PC's in a Y-configuration).

At the end of the cable, the coax-cable MUST be terminated, using a BNC 50 ohm terminator.

Let me repeat that:

50 ohm terminators ! (and not 75 or any other value !)

There are 2 different type of terminators:



The original Thin-Ethernet specifications state, that the cable has to be terminated at one end with an "open terminator" and on the other side with a "grounded terminator", a wire or small chain, which has to be connected to a metal-part on the back of the PC to get a grounding.

I know, that a lot of documentation shows only 2 "open" terminators,and that "grounded" terminators are sometimes difficult to find. One small networks, it even works "somehow", but not reliable and not at top- speed.

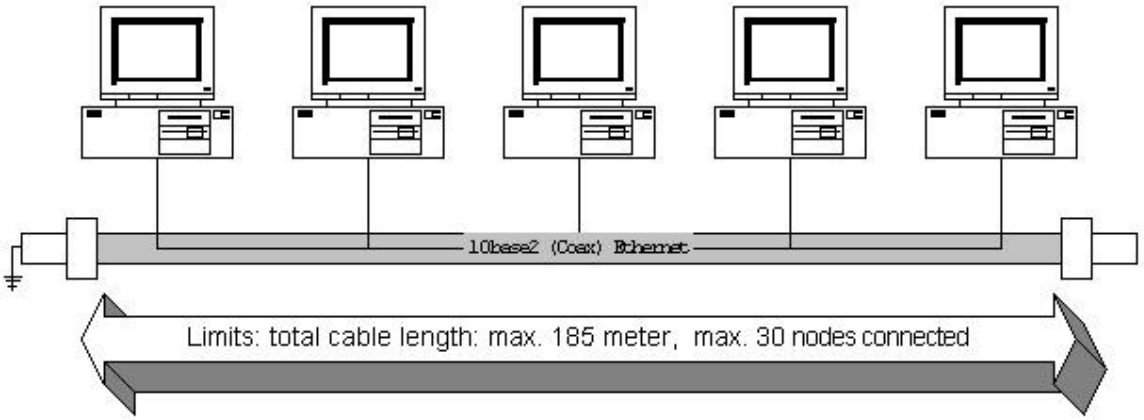
I have been asked several times:

"How do I recognize an OPEN and a GROUNDED Terminator ?"

	No wire or chain : open terminator !
	A wire or chain: a Grounded Terminator !

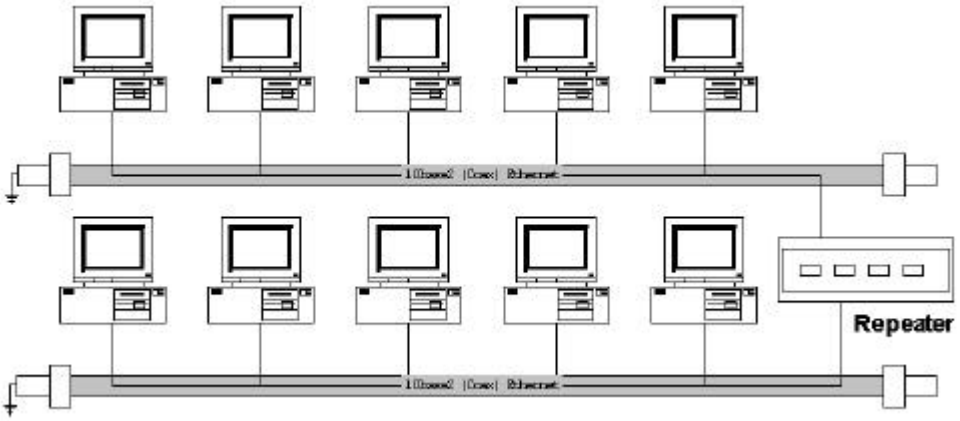
Don't forget to connect it to a metal part of the computer box, otherwise it is NOT grounded !

Limitations:



Each connection to an Thin-Ethernet RG-58 cable is called a "node", which can be a system like a PC, a UNIX-workstation or a Fileserver, but also anything else connecting via a BNC-connector counts a a node (network printers, repeaters,....).

- maximum 30 nodes on one Thin-Ethernet segment
- minimum 0.5 meter distance between nodes
- maximum total cable-length of 185 meter



If more than 30 nodes need to be connected or if the total cable-length needs to be longer than 185 meters, a repeater is the solution:

Multi-Segment network:

For each cable-segment, you need to be within the 10base2 limitation (max. 185 meter, 30 nodes), but this box called "Repeater" connects now the 2 (or even more) segments (some Multi-port repeaters can connect 4 or even 8 cables), which in view of the users extends the cable-length beyond the 185 meters. More than 1 repeater can be used in a network, but there are limits (see Large Networks: 5-4-3 Rule). On very large networks, it will be required to install Switches to optimize network utilisation.

You want a "healthy" network ? you need one "open" terminator at one end of the cable and one "grounded" terminator at the other end of the Thin Ethernet cable ! Without proper "termination", the network may not work, it may work, but then unreliable or slow.