Networking Tools

Introduction: - Ever look at the price of network cables in your local retail store? What is that? A 6 foot cable for 10 bucks? And how many of you paid that? Ok, I'm not out to knock the person that needs one network cable, but what if you wanted to dabble in making cables for much cheaper than what you would pay retail? Well, you'll need a few things; cable, ends, a crimper, and possibly a tester. I'll be focusing on the crimper and tester of course. If that sounds remotely interesting, you can get the crimper and tester for really cheap

Network Cable Tester and RJ-45 Crimping Tool Kit

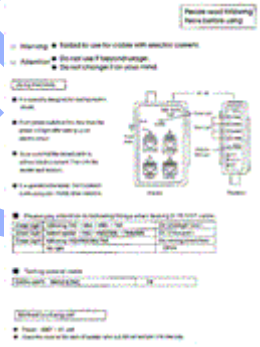
Installing a network requires the proper tool! Make and test a wide variety of network cables with this kit. This kit comes with RJ-45 Crimping Tool and 9V battery-operated network RJ-45 cable Continuity Tester. This tester also tests BNC network cables. This comes packaged in a plain box.

Crimper Features

- Made to crimp RJ-45 plugs
- All-steel handles (with padding) and crimp hammer
- Built-in cable cutter
- Built-in cable stripper with stop to ensure correct strip length
- Model SS-354/07 (without keep-closed lock)
- Continuity Tester Features
- Checks RJ-45 and BNC network cables
- Checks up to four pairs of conductors for continuity and correct polarity
- Some labels on the tester are in Chinese
- Model ST-45

The Tester: - Packaged in a plain white box, are the tester and crimper. As you can see, no money was wasted on making this look like a lovely retail box.

Below is the retail looking package for the tester? On the back is general information, and some warnings on how not to use the tester. If you like broken English, or Enrich, you'll appreciate the warning such as, "Do not change it on your mind." That almost makes my brain short circuit. Just what the hell does that mean, or possibly could mean? Enough about that...Whew...



Sliding the cardboard insert of the packaging, you will see something that closely resembles the following 3 pictures. The main part of the tester has a wiring scheme, which is hard to decipher if you didn't already know how to wire the total of 8, (4 twisted pair) wires. The receiver (remote) part of the unit does come off the tester for testing cables, well, remotely. It also supports BNC cable which is what those cylindrical shaped receptors on both the (sender) main unit and remote are. I personally haven't had to test a BNC cable, actually ever. The BNC networking is quite slow in comparison to 100 baseT which I'd say 98% of anyone that I know, or work with, uses.

The back of the main unit houses your 'not included' 9 Volt battery. As long as you didn't leave your unit on, your battery should last a long time. What I didn't mention thus far is how you turn it on. If you look at the main unit, (picture 4) on the left side, is a small switch. You turn it on, and it stays on.

Turn it off, and yeah...It's off. That would be very handy if you were trying to trace a wire. Just leave your main unit on the wire, and go to where your other end is. The lights will not light up if the main, and the receiver, (remote) are not hooked up to the same wire.

(4) Out of package

(5) Top

(6) Battery is found in me! Battery!

Testing a cable:

Easy enough, plug your finished network cable into the two RJ-45 (network connectors) on the main unit and remote, and turn it on. The red power LED flashes on the main unit, and the wire pairs flash in succession on the remote. A green LED indicates the wire pairs are good. No light means any connection, and the red light indicates a wiring problem. I'll delve into the wiring in brief a bit further down the page.

(7) Testing...

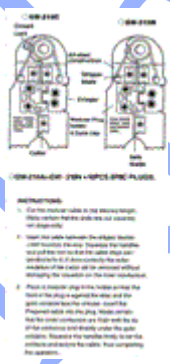
(8) Bad wiring!

The crimper:

FYI, the crimper is the GW-210N. In other words, this model, unlike the GW-210C, the crimper is held open by the spring. Not a big deal really, but keep in mind that the sharp cutting blades will be exposed. So I'd consider storing your crimper in the original packaging, put a rubber band around the handles when not in use, or get yourself a nice carrying case of some sort,

that you can keep the crimper in its closed position. The stripping and cutting blades are very sharp. They are even replaceable, but I don't know off hand where to get such replacements. On my other metal "Radio Shack" Crimper, it did come with a metal wire that I can keep the handles closed with. I personally don't use the wire stripper part, or the cutting part. I carry around a good pair of kitchen snips. The scissors are easier to work with, and generally won't cut the insulation of the inner wire pairs. That is one thing you don't want...A wiring short. Lastly, the back of the crimper packaging briefly walks you though, although not visually, how to make a wire.

(9) The package



(10) The back, scanned

A closer look at the crimper:

In picture 11, you can see the crimper out of the packaging. Ok, the handle is blue, unlike the product thumbnail. I could really care less what the handle color is, but I'll take blue as a bonus. Look around the page here. Looks mighty blue anyway, near the top of the crimper is the stripping tool. It is a bit hard to use. For one, it's hard to get the wire past the blades. Two, it's very easy to cut the internal wires as well with any pressure. Which can be remedied as previously mentioned, I use scissors. Just below that, is where you insert your cable, with the RJ-45 end into for crimping? You'll see the other side of that in pictures 14 and 15.

(11) The crimper

(12) Top

Moving lower, a handy feature is the cutter. Insert your paired wires into that, and a squeeze on the handles cuts all 8 of your wires with ease. In pictures 14 and 15, the teeth are what push your connectors into the wires in your RJ-45 end. Those of course make contact with your network card, or other network device. In picture 15 is the wire stop that I mentioned before when I talked about the wire stripper. I usually strip off about an inch myself when I'm preparing to make a cable. But, if you have the skill to use the stripper without cutting up the internal wiring pairs, that distance is enough for you to straighten out your wires and give them a quick straight cut in the cutter.

(13) Lower...

(14) Crimp vision

(15) Another angle of teeth and the wire stop

A small section on wiring:

So how do you make a cable? Well, of course your need the cable. General use cable is available at some hardware stores of varying lengths. Generally they come as small as 100 feet, to say a 1000 ft spool in a variety of colors. You should be able to find cable at your local mom and pop computer place, or search online for some. Your 100 foot cable is probably going cost as

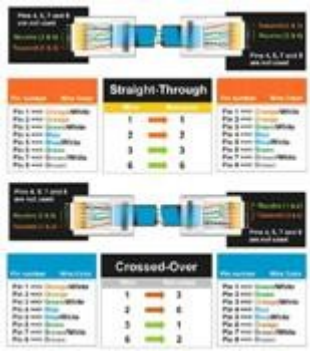
much, or slightly more than a pre-made 6 foot cable at an office, or even a department store. See where it starts to get cheaper? So next you'll need RJ-45 ends. They too can probably be purchased for 25 cents each maybe, at your local computer repair place. Radio Shack has them, and so should a hardware store that sells bulk RJ-45 cable. Be prepared to pay much more though. Probably close to a buck a piece. Ouch huh? Looking around online I'm sure you can buy in bulk, like get a 50 pack bag, and that should set you back more than $30 or so dollars. To give your cable a more professional look, some use boots, or covers. I personally don't. That drives the cost of the cable up. We want to keep this cheap don't we?

(16) Strip!

Above, the network cable stripped of its outer covering. Yeah, it's a bit out of focus, so feel free to skip it. Below is a general wiring chart that I found a couple years ago. The kind of cable you will probably be using is a straight through cable. In other words, the cable will have the same wires the same on both ends of the cable. The other type is called a crossed over, or cross over cable. One of the ends is wired differently. Those are generally used in connecting hubs together, or if you are too cheap to buy a hub, two computers can be hooked together for networking between the two network cards. In some cases, especially pre-Windows 2000, cross over cables didn't work all the time. That could be attributed to many things, such as, miss-configured network settings, and some network cards just plain didn't like the wiring that way. Both network cards have to manage all the packets sent back and forth, and in my experience really don’t work reliably enough for me to personally recommend to this day. Before anyone starts flaming me on that one, save it please. It's just my opinion. My advice would be to buy a cheap hub or a switch. That gives you the option for further networking expansion.

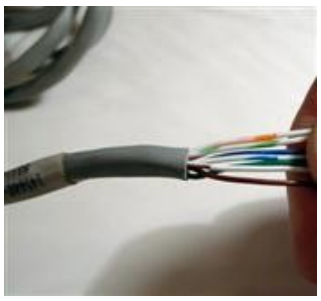
Below is the wiring scheme mentioned above in the "testing a cable

section." There are at least two standards for network wiring. One is 586A and the other is 586B. I was taught to use the B designation. Although it took me a while for some odd reason to memorize it, it is pretty easy. The wires should be in the following order, Orange stripe, orange, green stripe, blue, blue stripe, green, brown stripe brown. When I say stripe, most of the cables I have worked with have a stripe of white to differentiate one wire of the pair. Take a peep at the below pic. It'll make sense. And to be perfectly honest, you can wire the cables anyway you want, just as long as they are the same on each side. The problem is though, that depending on the shielding, or lack there of, wiring your cable in other ways besides a standard will lead to cross talk. Your cables runs cannot be as long and you will get flakey results. Also note that in the wiring below, you are looking at the bottom of the connector. It's the side with the teeth.



(17) How to do cables (courtesy of Linksys. I found it somewhere on their site...)

Getting back to the cable, picture 18 is the wires stripped, and unraveled to be in the proper order. Trim your wires to a proper length. I say that because the outer shield should go past the other part of your RJ-45 end that holds the outer cover, and wires in place. That's the red arrow in picture 19. Also, your wires should go to the end, or close to the end of your RJ-45 end. You want the metal teeth on the end to insert into the wire, thus making a connection. That'll be the yellow arrow in picture 19. Take a peek!



(18) Stripped!

(19) Read the arrows!

So that brings us back around to the crimper. Insert your end into the crimper, and press down firmly. I like to give it two good closings personally. A good thing to do also is look at your wires before you crimp it closed to make sure your wires are in the correct order. That saves you from having to cut the end off, and repeating the whole process again. Not to sound like a wimp, but depending on your personal finger strength, your fingers will get start to get sore squeezing and undoing the twisted pairs of wires at some point.

(20) Finished!

Overview of Tools

Tools

- **Digital Volt Meter (DVM)**
  - another name is a Volt /Ohm Meter
  - checks for resistance on cables, terminators and barrel connectors
    - cables and barrel connectors should provide 0 resistance
    - terminators in 10Base2 and 10Base5 networks should provide 50 ohms of resistance
  - Use as a continuity checker for cables.
  - a continuity check can reveal a short where:
    - two parts of the same cable are exposed and touching
    - part of cable is touching another conductor such as metal surface
- **Time-Domain Reflectometer (TDR)**

    - Sends sonar-like pulses down the cable to identify any kind of a break, short or imperfection that might affect performance
    - can locate a break within a few feet of the actual separation in the cable
- **Advanced Cable Testers**
    - Work at OSI layers 2, 3, and 4 and can display more complex information.
    - can indicate if a particular cable or NIC is causing problems
    - Can display:
        - Message and error frame counts
        - Excess collisions
        - congestion errors
        - beaconing
- **Oscilloscopes**
    - measures signal voltage per unit of time
    - Can identify
        - breaks,
        - shorts,
        - bends
        - opens (breaks in the cable)
        - and attenuation data.
- **Network Monitors**
    - Software that tracks all or part of network traffic.
- **Protocol Analyzers**
    - Can perform packet capture, decoding and transmission in **real-time**.
    - Most useful network analysis tool.
    - They look inside the packet to identify problems
    - They have a TDR in them
    - they can
        - identify the most active computers
        - identify computers sending error-filled packets
        - identify, view and filter certain types of packets
        - help analyze network trends
        - check various components, connections by generating test packets
        - set up alerts like Performance Monitor

Support Resources

- Microsoft TechNet
- BBS's
- User Groups
- Periodicals
- Internet
- Microsoft Network

Common Troubleshooting Situations

- Cable and other physical layer problems.

- Power fluctuations.
- Upgrades
- Changes in client computer configuration.
- Server crashes.
- Poor network performance resulting from some change or user application.