SPECIFICATIONS

- **Protocol:** IEEE 802.3, 10Base-T, 100Base-Tx, 100Base-Fx
- **Interface Connectors:**
  - **UTP:** (12/24) RJ45 pins 1-2, 3-6 active
  - **Fiber Optic:** (1) SC or ST
- **Cable Types:**
  - **UTP, 10Base-T:** EIA/TIA 568, Category 3, 4, or 5
  - **UTP, 100Base-Tx:** EIA/TIA 568, Category 5
  - **Fiber, Multimode (MM):** 50/125, 62.5/125, 100/140 um
  - **Fiber, Single-Mode (SM):** 9/125 um
- **Supported Distances:**
  - **UTP:** 100 m / 328 ft.
  - **MM, Extended:** 2 km / 1.2 mi.
  - **SM, Extended:** 25 km / 15 mi.
  - **SM, Long Haul (LH):** 58 km / 35 mi.
- **Indicators:**
  - **Hub:**
    - **Power:** LED (1), Yellow (10/100) or Green (100), power applied
    - **Activity 10:** LED(1), Green, activity detected
    - **Collision 10:** LED (1), Yellow, collision detected
    - **Activity 100:** LED(1), Green, activity detected
    - **Collision 100:** LED (1), Yellow, collision detected
    - **Link / Partition:** LED (12/24), Green, per port: device detected / port partitioned
    - **Port Speed:** LED (12/24), Green, per port: 10 / 100 / Searching
  - **100Fx and 10/100Tx Modules:**
    - **Data Received:** LED (1), Green, data received
    - **Link / Speed:** LED (1), Green / Yellow, device detected and 10/100 speed
    - **Duplex Mode:** LED (1), Green / Yellow, Full-Duplex / Half-Duplex
    - **Collision:** LED (1), Yellow, collision detected
- **Switches:**
  - **Hub:**
    - **UTP Crossover:** Straight / Crossed
    - **Stack Control:** Base / Stack
    - **Port Access Control:** 6/12 Switches, 2 per 4 ports: Auto-Sensing / 100Base-Tx / 10Base-T
  - **100Fx Module:**
    - **Duplex Mode:** Full / Half-Duplex
  - **10/100Tx Module:**
    - **UTP Crossover:** Straight / Crossed
    - **Auto-Sensing Mode:** Auto-Sensing / Manual
    - **Duplex Mode:** Full-Duplex / Half-Duplex
    - **Speed Control:** 100Base-Tx / 10Base-T
- **Dimensions / Weight:** W:19.0"xD:8.0"xH:1.75" / 7 lb.
- **Power:** 110 / 230 VAC, 50 / 60 Hz
- **Temperature:** 0 to 40 degrees C
- **Humidity:** 0-90% (non-condensing)

TECHNICAL SUPPORT

For assitance in installing this product, contact Omnitron's Technical Support Department:

Phone: (949) 250-6510, Fax: (949) 250-6514

Address: Omnitron Systems Technology, Inc.
27 Mauchly, #201
Irvine, CA 92618, USA

Email: support@omnitron-systems.com

URL: www.omnitron-systems.com

Omnitron Systems Technology, Inc.

FlexCenter™ 200

Auto-Sensing
Dual Speed 10/100 and 100 Stackable
Ethernet Hubs

User Manual

27 Mauchly #201, Irvine, CA 92618 (949) 250-6510 Fax: (949) 250-6514

Safety Considerations

Warning

The operating description in this Instruction Manual is for use by qualified personnel only. To avoid electrical shock, do not perform any servicing of this unit other than that contained in the operating instructions, unless you are qualified and certified to do so by Omnitron Systems Technology, Inc.

Caution

All user-required operations can be performed without opening the unit. Never attempt to open or remove the cover or tamper with the unit or tamper with the power supply module.

Warranty

This product is warranted to the original purchaser against defects in material and workmanship for a period of TWO YEARS from the date of shipment. A LIFETIME warranty may be obtained by the original purchaser by REGISTERING this product with Omnitron within 90 days from the date of shipment. TO REGISTER, COMPLETE AND MAIL OR FAX THE REGISTRATION CARD INCLUDED IN THIS INSTRUCTION MANUAL TO THE INDICATED ADDRESS. During the warranty period, Omnitron will, at its option, repair or replace a product which is proven to be defective.

For warranty service, the product must be sent to an Omnitron designated facility, at Buyer's expense. Omnitron will pay the shipping charge to return the product to Buyer's designated US address using Omnitron's standard shipping method.

Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate use and/or maintenance of the equipment by Buyer, Buyer-supplied equipment, Buyer-supplied interfacing, unauthorized modifications or tampering with equipment (including removal of equipment cover by personnel not specifically authorized and certified by Omnitron), misuse, operating outside the environmental specification of the product (including but not limited to voltage, ambient temperature, radiation, unusual dust, etc.), or improper site preparation or maintenance.

No other warranty is expressed or implied. Omnitron specifically disclaims the implied warranties of merchantability and fitness for any particular purpose.

Exclusive Remedies

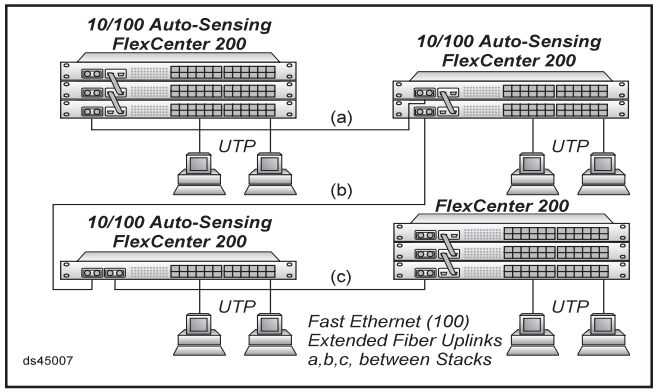
The remedies provided herein are the Buyer's sole and exclusive remedies. Omnitron shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

FCC Warning

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operating this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Any changes or modifications not expressly approved by the manufacturer could void the user authority to operate the equipment.

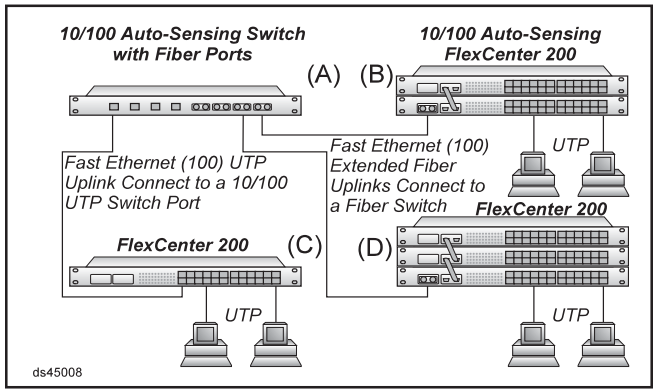
Application 7. Flat Fiber Backbone

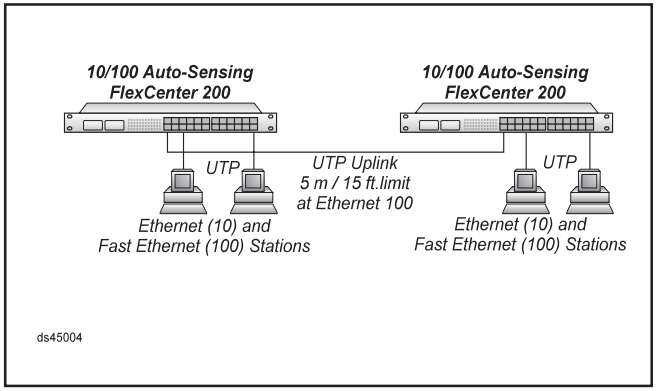
This application depicts a flat fiber backbone where hubs are stacked, and connected via extended fiber uplinks. As shown in this example, the module slots are used both for stacking as well as for fiber modules. Using the extended distance modules isolates the collision domains between each stack and facilitates a network that can span up to 58 km (35 mi.) per uplink.



Application 8. Collapsed / Switched Fiber Backbone

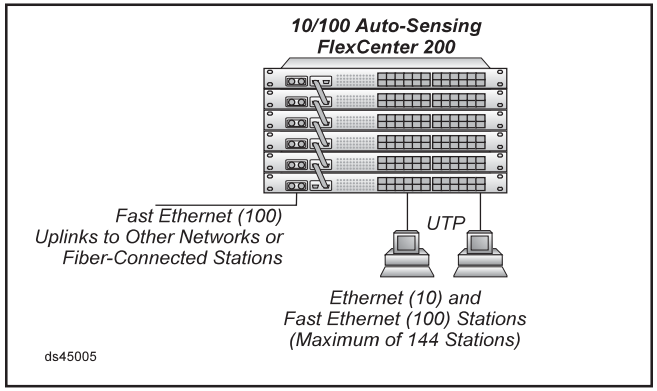
This application depicts a collapsed fiber backbone where hubs are stacked, and connected via fiber and UTP uplinks to a single location, 10/100 auto-sensing switch with fiber ports, in a star fashion. This application is similar to the flat backbone with the difference of being a single point of management and control for the different subnetworks. In this case two stacks of hubs, B and D, are connected via extended distance fiber modules to the fiber ports of the switch. The hub in location C is connected via UTP to a 10/100 UTP port on the switch and is able to reach a distance of 100 m (328 ft.).





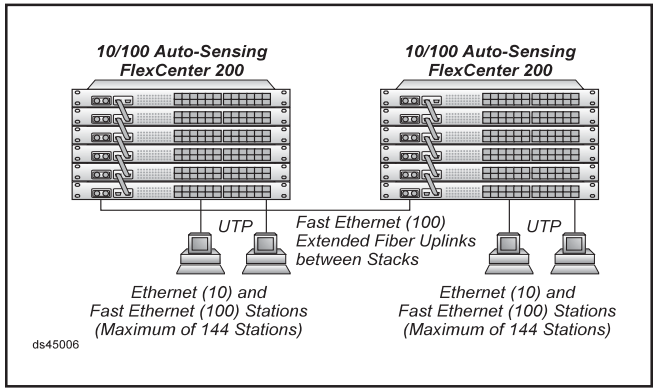
Application 5. Single Wiring Closet / Multiple Hubs

This application depicts a single-wiring-closet-based network. It is a typical stacking application of the FlexCenter 200. In this case six hubs are stacked, accommodating up to 150 stations (144 ports plus six modules).



Application 6. Multiple Wiring Closets / Multiple Hubs

This case depicts two stacks of hubs connected via a fiber uplink. Since an extended-distance-bridge-based module is used, full-duplex operation is possible for distances of 2 km (1.2 mi.) using multimode fiber, and 58 km (35 mi.) using single-mode fiber.



FlexCenter 200
Auto-Sensing Dual Speed 10/100 and 100 Stackable Ethernet Hubs

User Manual

GENERAL DESCRIPTION

The FlexCenter 200 is a family of 12/24 port dual speed 10/100 and 100 stackable workgroup Ethernet hub repeaters. They feature two optional interface modules used for stacking and uplink interfaces to multimode and single-mode fiber hubs, switches or workstations. This User's Manual describes the following base models:

Model	Description
4500	FlexCenter 200, 10/100, 12 Ports
4501	FlexCenter 200, 10/100, 24 Ports
4550	FlexCenter 200, 100, 12 Ports
4551	FlexCenter 200, 100, 24 Ports

The following modules are supported by the FlexCenter 200:

4570	10/100Tx, UTP, XD
4571	100Fx, Fiber, XD, SC/MM, 2 km / 1.2 mi.
4572	100Fx, Fiber, XD, SC/SM, 25 km / 15 mi.
4573	100Fx, Fiber, XD, ST/MM, 2 km / 1.2 mi.
4574	100Fx, Fiber, XD, ST/SM, 25 km / 15 mi.
4575	100Fx, Fiber, LH/XD, SC/SM, 58 km / 35 mi.
4576	100Fx, Fiber, LH/XD, ST/SM, 58 km / 35 mi.
4580	100Tx, UTP, SD, 100 m / 328 ft.
4581	100Fx, Fiber, SC/MM, SD, 100-200 m / 328-656 ft.
4582	100Fx, Fiber, SC/SM, SD, 100-200 m / 328-656 ft.
4583	100Fx, Fiber, ST/MM, SD, 100-200 m / 328-656 ft.
4584	100Fx, Fiber, ST/SM, SD, 100-200 m / 328-656 ft.
4590	STK, Stack Module

The FlexCenter's 12/24 RJ45 ports provide 10Base-T or 100Base-Tx unshielded twisted pair (UTP) wiring. Its fiber interface modules provide 100Base-Fx multimode or single-mode SC or ST connectivity options for a variety of applications. The stacking module provides cable connection between stacked hubs.

The FlexCenter monitors and reports port activity. It detects operational devices connected and displays their connection via a per-port green Link / Partition (L/P) LED. If a port violates transmission rules, it is disconnected automatically (partitioned) and the L/P LED starts flashing indicating the "Partition" error status. The port is reconnected only after normal behavior is restored. The per-port speed is indicated by a second per-port LED that flashes while not connected to a device, turns on "solid" when detecting a 100 station and turns "off" when detecting a 10 station.

The hub detects and displays per-segment activity (green LED) and collisions (yellow LED) for Ethernet and Fast Ethernet segments.

The FlexCenter features a special uplink Port 1 RJ45 connector. This uplink connector is equipped with a crossover switch that can switch between the receiving and transmitting wire pairs. This feature eliminates the need for a “crossed cable” which is otherwise required for connection between hubs.

The fiber and UTP uplink modules provide displays to show data speed, link and activity, half/full duplex status and collisions. Controls include half/full duplex, auto-sensing and speed. The UTP module also features a crossover switch.

CONTROLS AND INDICATORS

FlexCenter 200 Mainframe:

Port 1 Control Switch

This switch provides the crossover feature for port 1 of the hub. It should be set to the straight position for connection to a station or crossover position for connection to a hub or a switch.

Position	Description
Out	Straight, use when connecting port 1 to a PC or workstation.
In	Crossed-Over, use when connecting port 1 to another hub or switch.

Stack Control Switch

This switch controls the stacking features of the FlexCenter 200. When the FlexCenter 200 is used stand-alone, it must be set to the “Base’ position. When in a stack, the first hub in a stack (with the “Out” cable only in the STK module) must be set to the “Base”, and all other hubs must be set to the “Stack” position.

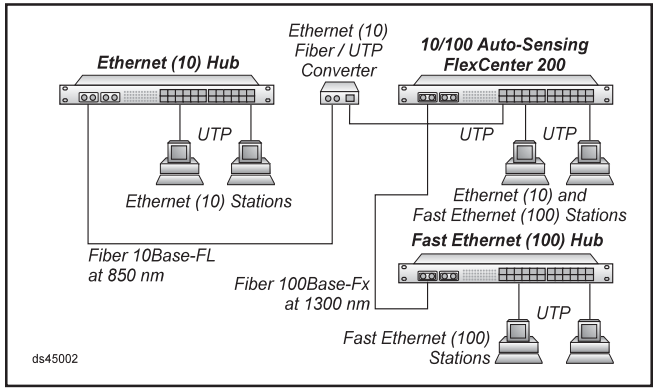
Position	Description
Up	Base, use when operating alone or as a base of a stack (the first hub).
Down	Stack, use when in a stack. All hubs should be set to this state except the first one in a chain.

Port Access Control Switches (6/12)

This set of switches is located in the back of the hub and control the operation of the 10/100 ports in groups of four ports; two switches per group. Normally, these switches should be left in their factory default setting, which sets them to automatic sensing of port speed and allows each port to auto-sense the highest level of service availble. They should be used when the user desires to force a particular speed.

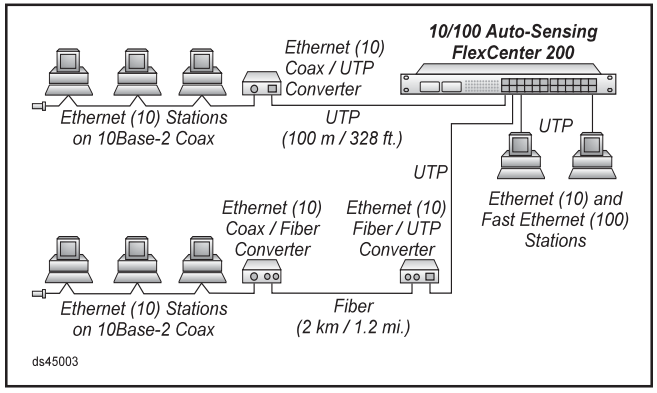
Application 2. 10Base-T and 100Base-Tx Integration via Fiber

In this case an Ethernet 10Base-T hub is connected to the FlexCenter 200 via a fiber uplink. Since the Ethernet 10Base-FL fiber is specified (by 802.3) as 850 nm and the Fast Ethernet 100Base-Fx fiber is specified as 1300 nm, they can never be connected. The 10Base-FL link must be converted to 10Base-T before being connected to the FlexCenter 200’s 10/100 UTP port. The 100Base-Fx uplink from the Fast Ethernet hub is connected to the FlexCenter 200’s extended fiber uplink module facilitating 100 to 200 m of fiber (depending on the Fast Ethernet hub’s network layout).



Application 3. 10Base-2 Coax to 100Base-Tx Integration

This application depicts the integration of legacy coax 10Base-2 network segments to a modern 10/100 FlexCenter 200 hub. The first case (top) depicts connection via a 10Base-2 Coax to 10Base-T UTP converter to a 10/100 FlexCenter 200 port. In the second case (bottom), the distance between the coax segment and the FlexCenter 200 is more than 100 meters and it requires fiber conversion. A 10Base-2 coax to fiber converter is used to convert coax to fiber, and a 10Base-FL fiber to 10Base-T UTP converter is used to convert fiber to UTP which is connected to a 10/100 FlexCenter 200 port.



Application 4. Single Wiring Closet / Two Hubs Application

This application depicts the basic connection between two 10/100 auto-sensing FlexCenter 200 hubs. A straight-through patch cord connects between Port 1 of both hubs. (The crossover switch on one of them is set to the crossed mode.) This application is cost-effective and simple, and it limits the distance between the hubs to 5 m / 15 ft. Only two hubs can be connected this way thus limiting the station count to 46.

b. When using in a stack, connect the stack cables “out” to “in” and set the first unit’s Stack Control Switch to the “Base” position. All other stack units should be set to the “Stack” position.

c. Plug the power cord into the FlexCenter 200 and the other side to the appropriate AC outlet.

d. Plug any Ethernet 10Base-T or 100Base-Tx workstations into the RJ45 connectors. The corresponding Link LED should turn ON.

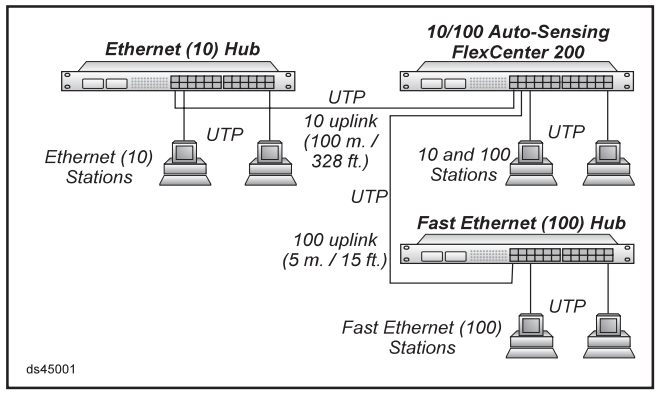
e. Connect port 1 to a workstation or another hub. When connecting to a workstation set the Crossover switch to its “Out” (Straight) position (factory setting). When connecting to another hub set the switch to the “In” (Crossed) position. When the device at the far end has become active, the port 1 Link LED should become ON.

f. Connect any fiber uplink cables to a fiber workstation, converter or another fiber hub. Connect the Transmit (Tx) fiber of the FlexCenter to a Receive (Rx) fiber on the connected device. Connect the Receive (Rx) fiber of the FlexCenter to a transmit (Tx) fiber on the connected device.

SAMPLE APPLICATIONS

Application 1. 10Base-T and 100Base-Tx UTP Integration

This application depicts a 10Base-T, a 100Base-Tx and a 10/100 FlexCenter 200 hub configuration. Both the 10Base-T and the 100Base-Tx hubs are connected to the FlexCenter 200’s 10/100 UTP ports via uplink wires. The 10Base-T uplink can be category 3,4 or 5 grade and can be 100 m (328 ft.) maximum length. The 100Base-Tx uplink must be category 5 grade, and because it connects to a shared 10/100 port, it is limited to five meters (15 ft.).



Position	Description
Up, Up	Forced 100Base-Tx mode.
Up, Down	Reserved for test, do not use.
Down, Up	Forced 10Base-T mode.
Down, Down	Auto-Sensing (Auto-Negotiating) mode (factory setting).

Common LEDs Display

Function	Color/State	Description
Power	Yellow / ON	Power applied.
Activity 10	Green / ON	Ethernet (10) link / activity detected.
Collision 10	Yellow / ON	Collision condition detected on the Ethernet (10) segment.
Activity 100	Green / ON	Fast Ethernet (100) link / activity detected.
Collision 100	Yellow / ON	Collision condition detected on the Fast Ethernet (100) segment.

Per Port LEDs Display

Function	Color/State	Description
Link / Partition (L/P)	Green / ON	Device detected on UTP.
	Green / Flash	Port is partitioned.
Link (Lnk)	Green / ON	Fast Ethernet (100) device.
	Green / OFF	Ethernet (10) device.
	Green / Flash	No link detected.

FlexCenter 200 10/100Tx UTP Module:

Crossover Control Switch

This switch provides the crossover feature for the UTP port module. It should be set to the straight position for connection to a station or crossover position for connection to a hub or a switch.

Position	Description
Out	Straight, use when connecting port to a PC or workstation.
In	Crossed-Over, use when connecting port to another hub.

Mode Control Switches

These three switches control the operation of the UTP port. When set to “Auto-Sensing”, the hardware auto-senses the connected devices’ supported features and automatically configures itself to the highest level of service possible (100Base-Tx and Full-duplex). When specific operation is desired, the auto-sensing feature can be disabled and specific speed (100 or 10) and full- or half-duplex modes can be forced.

Function	Position	Description
Auto-Sensing / Manual mode:		
AN/MN	Up	Auto-sensing mode enabled.
	Down	Manual mode enabled.
Forced Full-Duplex / Half-Duplex (effective when in Manual mode):		
FD/HD	Up	Forced Full-Duplex (when connecting to a switch or a station with full-duplex capability).
	Down	Forced Half-Duplex (when connecting to a hub or a station with half-duplex capability).
Forced Fast Ethernet / Ethernet (effective when in Manual mode):		
100/10	Up	Forced Fast Ethernet.
	Down	Forced Ethernet.

LEDs Display

Function	Color/State	Description
Rx	Green / ON	Received data on UTP line.
Lnk	Green / ON	Fast Ethernet Link detected.
	Yellow / ON	Ethernet Link detected.
Dpx	Green / ON	Full-Duplex operation.
	Yellow / ON	Half-Duplex operation.
Col	Yellow / ON	Collision detected.

FlexCenter 200 100Fx Fiber Module:

Since the IEEE 802.3 standard defines the Ethernet 10Base-FL fiber (850 nm) differently than the Fast Ethernet 100Base-Tx (1300 nm), it should be noted that they are incompatible. The 100Fx module supports 100Base-Fx and can be operated in half- or full-duplex modes of operation.

Mode Control Switches

This switch controls the half / full-duplex operation of the fiber port. Half-duplex should be used when connecting to another hub (with a shared / non-switched fiber port) or a workstations fiber NIC that supports only half-duplex. Full-duplex can be used when connecting to a switch or a NIC card that supports full-duplex operation.

Function	Position	Description
Full-Duplex / Half-Duplex Mode:		
FD/HD	Up	Forced Full-Duplex.
	Down	Forced Half-Duplex.

LEDs Display

Function	Color/State	Description
Rx	Green / ON	Received data on UTP line.
Link	Green / ON	Fast Ethernet Link detected.
Dpx	Green / ON	Full-Duplex operation.
	Yellow / ON	Half-Duplex operation.
Col	Yellow / ON	Collision detected.

FlexCenter STK Module:

Does not require any switches or displays.

SITE PREPARATION

The following are the minimal physical location preparations needed:

a. Power - A power outlet should be available within 5 feet of the unit.

b. Cabling - The following cabling should be used:
   1. 10Base-T / UTP - Ideally the site should be cabled with category 5 wiring to maximize performance but a category 3 or better is acceptable (100 ohms, 24 AWG solid copper).
   2. 100Base-Tx / UTP - The site should be cabled with category 5 wiring to maximize performance (100 ohms, 24 AWG solid copper).
   3. 100Base-Fx / Fiber - Use 50/125, 62.5/125 or 100/140 micron multimode fiber or 9/125 micron single-mode fiber.

UNPACKING

a. Visual Inspection - Before unpacking, a visual inspection should be conducted in order to detect any physical damage to the equipment. Any evidence of damage should be noted and reported immediately.
b. Unpacking - Place shipping container on a flat surface, cut straps or tape, open top. Take out each item carefully and place securely on a clean flat surface. Return all packing material into container (foam, boxes etc.), close and store away for future reuse.
c. Inspection - Inspect each item for any apparent damage. Any evidence of damage should be noted and reported immediately.

INVENTORY

Review content; the following items should be included:

(1) FlexCenter 200 unit.
(1) Power cord.
(1) User Manual (this document).

Please note any missing items or discrepancies and report them immediately.

INSTALLATION

Cabling and Power-Up

a. When using the hub “stand alone”, set the Stack Control Switch to the up “Base” position (factory setting).