

SCOPE OF WORK NJIT GITC 4th floor (Base Bid Area)

CAT6, CAT6A, Fiber, Voice Copper, Wireless Project in NJIT's Building GITC 4th floor.

Intent

The New Jersey Institute of Technology is seeking a contractor to provide and install Wireless, CAT6, CAT6A wiring, Fiber and copper backbone in GITC 4th floor being constructed at NJIT and to install NJIT provided wireless access points as per this bid specifications.

The work will be done in coordination with NJIT, Cambridge Construction Management and NJIT Telecommunications and Networks department, or its designees.

The contractor shall provide all necessary labor and materials to complete the installation. All of this work shall be performed in accordance with the detailed specifications set forth in the specifications for this project included which hereto becomes part of this bid package. The contractor is responsible to verify all conditions and identify any obstructions during the walkthrough.

Contractor is responsible for proper disposal of all scrap and debris.

NJIT requires a Registered Communications Distribution Designer (RCDD) to be assigned to this project. Contractor must also be Certified Systimax and Corning installer. Please provide proof of both certifications with bid response. Contractor must provide parts list that will be used for this project with the bid response. At the completion of wiring project wiring vendor provides 20 year installation warranty certificate from Systimax and Corning.

1. Fiber and Copper Riser Count Summary:

Fiber & Copper Count							
Locations	Single Mode Strands	OM 4 Multi Mode Strands	LC Terminations Each End	CAT6 Copper for Voice	Systimax Cat6 Panel Remote	Systemax Cat6 Panel	Wire Manager 1u 6"

2. Fiber Riser wiring specifications

2.1. New Fiber

No new fiber in this project

2.2. Termination

NJIT prefers both ends of fiber to be terminated with fusion splice pigtail LC style connector.

Contractor is also able to terminate fiber on LC connectors using heat cured liquid epoxy.

Unicam style factory finished connectors are NOT acceptable.

2.3. Labeling

Connectors shall be labeled on the identifying sheets.

2.4. Testing

Each terminated fiber strand must be tested. Test results should be provided in the documentation.

2.5. Documentation

At completion of the project a digital copy and one printed copy of the documentation should be provided to NJIT Telecom with following information. Inventory information must include but not limited to fiber cable label, fiber bundle label, fiber strand label and terminated LC connector label information.

- Fiber strand test results
- Inventory of un-terminated fiber labeling if any
- Inventory of terminated fiber labeling

3. Voice Riser Specifications

NJIT will provide IP Telephony. Therefore CAT6 cable for phones should be terminated per CAT6 specifications and pass CAT6 testing. **Spliced CAT6 and RJ11 Jacks are not acceptable.** NJIT will also provide a VoIP to standard POTS device, the handoff is Amphenol, see section 2.3 for items the contractor will provide.

3.1. Current Conditions

There no existing voice in the new construction.

3.2. New Voice Copper riser

Contractor will run Cat6 cables to be used as voice connects to each IDF as specified in above table. Each pair of the CAT6 should be terminated as phone (center pins) on individual RJ45's of a 19' CAT6 Systimax wiring panel.

3.3. Transition from CAT6 to VoIP device.

Contractor will provide one (1) Panduit Voice Patch Panel MFG # VP24382TV25Y, one (1) Amphenol 25 Pair Phone cable 5' M/M right angle, and 24 cat 6 jumpers of sufficient length to reach the 48 port CAT6 Systimax provided in Data Specification Summary.

3.4. Testing

Contractor will test all the copper provided in the GITC Construction Project.

4. Data Specifications Summary:

Location	6 DATA (CAT6)	4 DATA (CAT6)	2 DATA (CAT6)	1 DATA E-phone/ courtesy phone	2 DATA Wireless (CAT6A)	Install Access Point
GITC4 Base Bid Area	5	4	15	1	6	12
Total	5	4	15	1	6	12
Total Wall Plates:		25	Total CAT6 Runs:		77	
Total Access Points:		12	Total CAT6A Runs:		12	

5. Data Wiring Specifications

Contractor runs CAT6, and CAT6A plenum cables to various locations in GITC 4th floor as specified in Table above. Detail parts list will be provided later in this document.

All Data locations are to be home run using plenum rated CAT6 cable from individual room wall plate locations and terminated in the Communications closet assigned to that floor. The data locations should be terminated on the rack mounted 19" CAT6 48 Port Systimax wiring panels. Wiring Contractor also provides horizontal wire manager for each network switches.

Room wall plates, rack mounted 19" CAT6 48 Port Systimax wiring panels, and wiring managers are to be provided by the wiring contractor.

Contractor will be responsible for connecting every Data 1 in the wall plate in the project and additional Data jacks in Office, Classrooms or Labs to the Network Switch provided by NJIT Telecom department. Additional activation may be determined once the project starts. By end of the project 80% of the ports will be activated by the wiring contractor. Wiring contractor will also provide and label patch cables from rack mounted CAT6 panels to network electronics. The label will have Network Switch name, port number on the Network Switch, jack information. A sample template for the cable labeling will be provided at the beginning of the project. Contractor is responsible for measuring the length of the patch cable and minimizing slack. Typical length is less than 1.5 meters.

5.1. Racks and Cable Tray

Wiring Contractor will provide and install 19" Chatsworth 45U rack with Vertical Wiring Management on both sides. Detail layout of each IT Room will be provided.

5.2. Additional info:

In the locations where a cable tray is not provided wiring needs to be tied to hall ceiling slab with hangers. Wiring contractor provides CAT6 rated hangers. Wiring contractor is responsible for securing cables and hangers to slab; 5' of maximum distance between two hangers. Cable will proceed down the hall to the assign communication closet. Communication Closet assignment can be found in Table at the end of the document.

5.3. Wall plates, Termination Point and Labeling

Contractor must use Systimax Wall plates and Systimax Jacks for termination. Each wall plate should allow for six cables; empty slots should have blanks in the wall plate. Voice and Data RJ45 ports will be color coded: Data 1 RED, Data 2 White, Data 3 Blue, Data 4 Green, Data 5 Violet and Data 6 Black. E-Phones or Wall Phones will be terminated on Data1 RED.

Locations in wire mold will require Decora style wall plates. If the wall plates call for 4 port outlet contractor will have to split wall plate with 2 ports each Decora style insert for the wire mold.

In the communications closet Voice and Data1, Data2, Data3, Data4, Data5, Data6 are terminated sequentially on CAT6 patch panels. All wall plates must be terminated and labeled in sequential order in the room and in the communications closet. Sample label information can be found in Table at the end of the document.

5.4. Voice

The Voice locations are to be home run using plenum rated CAT6 cable from individual wall plate locations to designated IDF. **Room ends will be terminated on RJ45 wall plates and not on a RJ11 wall plate.** In the communications closet voice cable will be terminated on rack mounted 19" 48 port CAT6 Systimax wiring panel in line with the data connections. The wiring contractor provides the room wall plates, wiring panels and horizontal wiring management.

5.5. E-PHONES/Courtesy Phones

The e-phones/courtesy phones should be center at 44 inches above the floor. The top of the phone should not be higher than 48 inches. Contractor will provide metal face plates to support VoIP and analog phones.

6. Wireless Wiring Specifications Project

Contractor runs CAT6A plenum cables to various locations in NJIT as specified in this document. Detail parts list will be provided later in this document. All access points should be mounted using Cisco AIR-AP-BRACKER-2=, provided by NJIT. Outdoor Mounting kits will be provided by NJIT. Contractor is responsible for screws, anchors and other items need for surface and/or wall mount access points.

6.1. Wireless

All locations are to be home run using plenum rated CAT6A cable from individual Wireless Access Point locations and terminated in one of the Communications Closets of the building as specified in this document.

The Wiring Contractor will run 2 data cables to each Wireless Access Point wall plate locations. Majority of the wall plates for wireless will be above the door of each room. In some large open rooms or large lecture halls Wireless Access Point wall plate might be located in ceiling in middle of the room. A separate ceiling layout of wireless access point wall plates and wireless access point locations will be provided at the beginning of the project. Contractor will run plenum patch cable from designated wall plate to Wireless Access Point. A minimum of 3 feet maintenance loop is required for all Access Point Patch cables. For Electrical box mount installation, the maintenance loop must be wrapped around the electrical box. For Suspended Ceiling installation, the maintenance loop should be tied above the ceiling tile. The Wireless Access Point will be provided by NJIT Telecom Department. On hard ceiling the penetration for CAT6 should be small and hidden behind the Access Point.

Depending on the area there will be different types of Wireless Access Point installations: Above the suspended ceiling, below the suspended ceiling or/and a solid ceiling or wall. **All indoor access point mounting brackets/plates are designed to mount to standard octagonal electrical boxes.**

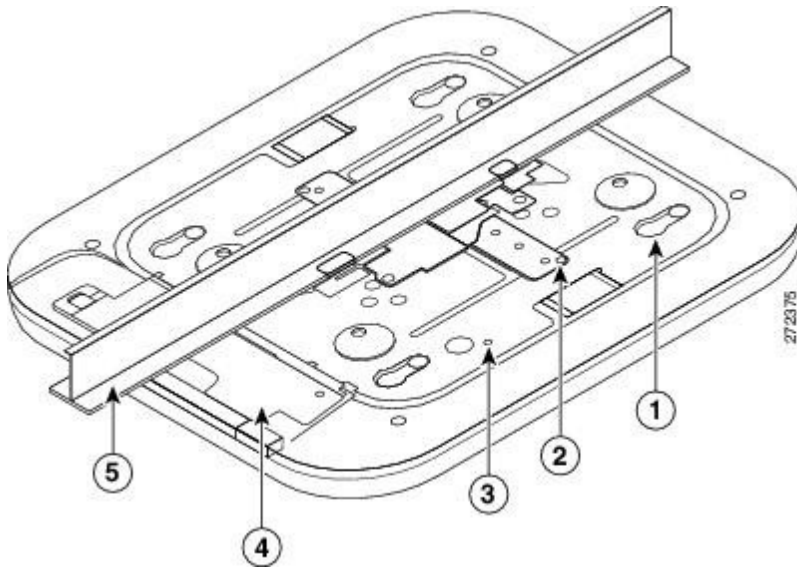
The Wiring Contractor will be responsible for connecting every D1 port to the Network Switch provided by NJIT Telecom Department and verify the Wireless Access Point is properly connected and powered. AP serial port connects to white port, but left unconnected in IDF.

All wiring should be terminated on rack mounted 19" 48 port CAT6A Systimax wiring panels. The Wiring Contractor provides the rack mounted 19" 48 port CAT6A Systimax wiring panels, horizontal and vertical wiring management. Contractor also provides horizontal wire manager for the patch panels and network equipment as specified in at the end of the document.

Wiring Contractor will label the Wireless Access Point wall plate and 2 patch cables. Wiring Contractor will also provide and label patch cables from rack mounted CAT6A panels to network electronics. The label will have Network Switch name, port number on the Network Switch, jack information. A sample template for the cable labeling will be provided in the table at the end of the document.

6.2. Mounting the Wireless Access Point below the Suspended Ceiling:

Wiring Contractor will be responsible for mounting Wireless Access Points to the T-rail ceiling rail using the ceiling grid clip and mounting bracket provided with the Wireless Access Point. Ceiling grid clip and mounting bracket will be provided by NJIT Telecom Department.



6.3. Mounting the Wireless Access Point on solid ceiling:

Wiring Contractor will be responsible for installing Wireless access point to electrical box. Electrical box and path to it will be provided by others for this project. See Access Point Additional Information Section at end of document.

For additional mounting instructions and information please see the Cisco Access Point The Mounting Instructions can be found in the following link:

http://www.cisco.com/en/US/docs/wireless/access_point/mounting/guide/apmount.pdf

Final Location of Wireless Access Points, installation type and conduit run information will be provided during the walkthrough and when the project begins.

6.4. Mounting the Wireless Access Point with an Oberon Mounting bracket on wall:

Wiring Contractor will be responsible for providing, installing and securing Oberon mounting bracket to 2 port wall plate. See Access Point Additional Information Section at end of document.

The Mounting Instructions can be found in the following link:

http://www.oberonwireless.com/WebDocs/Model1029-00_Installation_Instructions.pdf

6.5. Mounting the Wireless Access Point outdoors

In this project there are outdoor access points, (see port location diagram). Before installing the access points wiring contractor will coordinate exact location, height of the access point with NJIT Telecommunications department. NJIT Telecom will provide location and height information and will show existing installations around the campus to demonstrate outdoor access point installation. Wiring contractor must use outdoor rated patch cable to connect the outdoor access point. See Access Point Additional Information Section at end of document.

6.6. Additional info:

In the locations where a cable tray is not provided wiring needs to be tied to hall ceiling slab with hangers. Wiring contractor provides CAT6A rated hangers. Wiring contractor is responsible for securing cables and hangers to slab; 5' of maximum distance between two hangers. Cable will proceed down the hall to the assigned communication closet. Communication Closet assignment can be found in Table at the end of the document.

Wireless AP locations on the Floor plan are for representation only. Exact location will be identified at installation time by NJIT.

Access points in double high locations showed in E-200S will be wired thru open ceiling and installation needs to be coordinated with General Contractor.

6.7. Wall plates, Termination Point and Labeling

Contractor must use Systimax Wall plates and Systimax Jacks for termination. Each wall plate should allow for six cables in all other locations, empty slots should have blanks in the wall plate. Voice and Data RJ45 ports will be color coded: Data 1 RED, Data 2 White, Data 3 Blue, Data 4 Green, Data 5 Violet and Data 6 Black. In the communications closet Voice and Data1, Data2, Data3, Data4 are terminated sequentially on CAT6 or CAT6A patch panels. **All wall plates must be terminated and labeled in sequential order in the room and in the communications closet.**

6.8. Outdoor access points

There are several outdoor access points on the exterior of the building. These are noted in the plans E-199S and E-200N. See Access Point Additional Information Section at end of document.

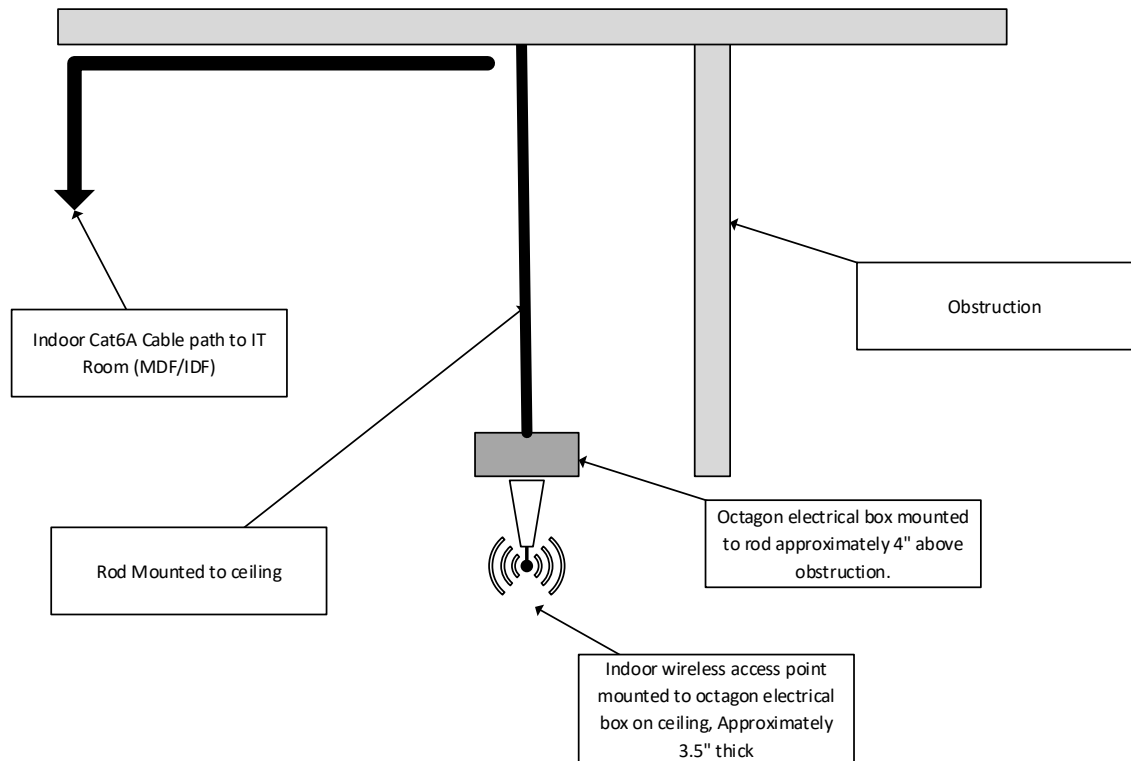
7. General Fiber and Copper Wiring Equipment Specifications:

- Systimax MGS400 for CAT6 RJ45 for in wall data and voice drop termination
- Systimax MGS600 for CAT6A RJ45 for wireless drop termination
- Systimax Wall plates – White or Beige – Should match electrical wall plate, coordinate with Construction Management.
- Systimax 1100 19" 48 port CAT6 panels
- Systimax 1100 19" 48 port CAT6A panels for Wireless
- Systimax CAT6A plenum cable, Gray for Wireless. (TBD by Contractor)
- Systimax CAT6 plenum cable, White for Data. (TBD by Contractor)
- Panduit Voice Patch Panel MFG # VP24382TV25Y
- Amphenol 25 Pair Phone cable 5' M/M right angle
- Horizontal Wire Management Leviton 49253-6PM (Horizontal Manager, 6" metal rings. Total quantity is # of patch panels in each IT room +1 *2) (*Estimated Quantity*)
- Chatsworth 55053-703 Rack Black
- Vertical Wire Management: Chatsworth 11729-703 Double-side Wide Vertical Cabling manager Black
- Ladder trays and connecting hardware 8-10 feet (TBD by Contractor)
- CAT6 and CAT6A patch cables grey or white. CAT6A cables are only for Wireless Access point locations. (80% of total ports) *Length of patch cable will be determined distance from termination point network switch.* Cable stack is to be minimized. Boots are optional. If boots are used; boots should be compatible with high density electronics.
- CAT 6 jumpers for voice transitions of sufficient length for each 48 port CAT6 Systimax provided in section 2.2.
- All fiber is Corning and Armored.
- Plenum fiber should be used in plenum locations. Indoor/outdoor plenum is permitted.
- Contractor is permitted to use larger or smaller strand count fiber if it reduces cost to NJIT and the minimum strand count is provided per **Fiber and Copper Riser Count Summary** above. Any extra strands created will remain unterminated in enclosures.
- Fusion splice pigtail LC style connector for SM and OM4 MM fiber.
- 19" Rack Mountable Corning Fiber enclosure that can support LC connectors. Enclosure should support termination of all strands brought into the enclosure. (TBD by Contractor)
- Wall Brackets Oberon Model # 1029-00

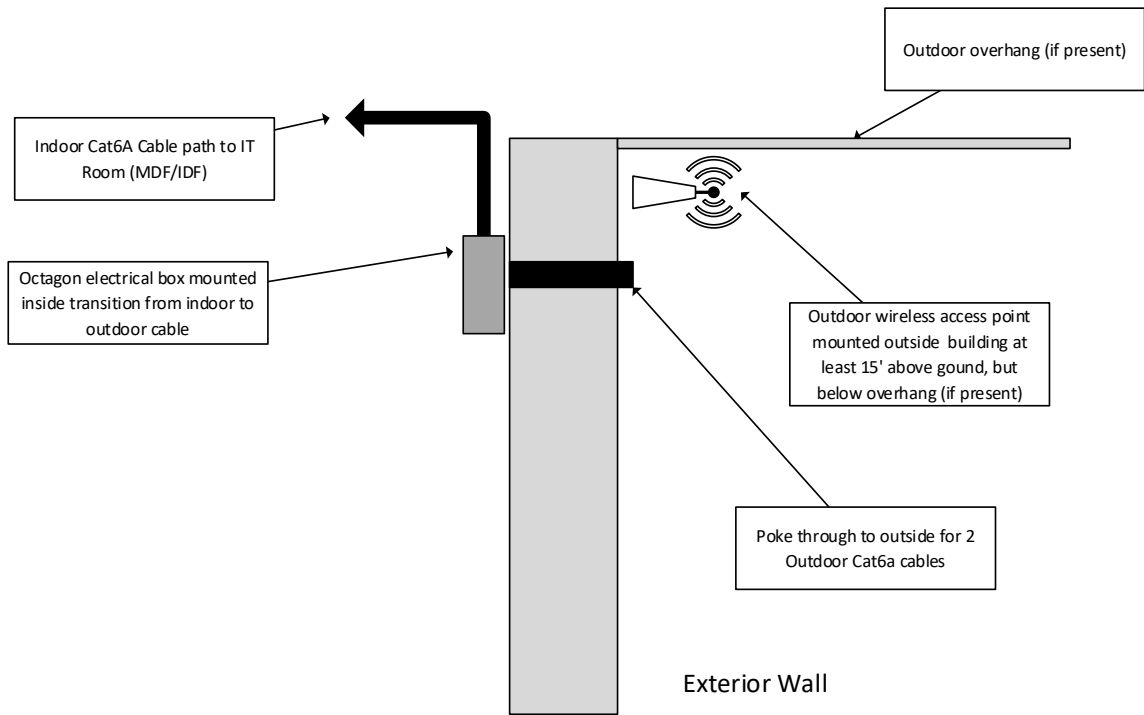
8. Access Point Additional Information Section.

Most access points will be mounted to a suspended ceiling per previous section. The following pages explain various access point mounting scenarios other than suspended ceiling.

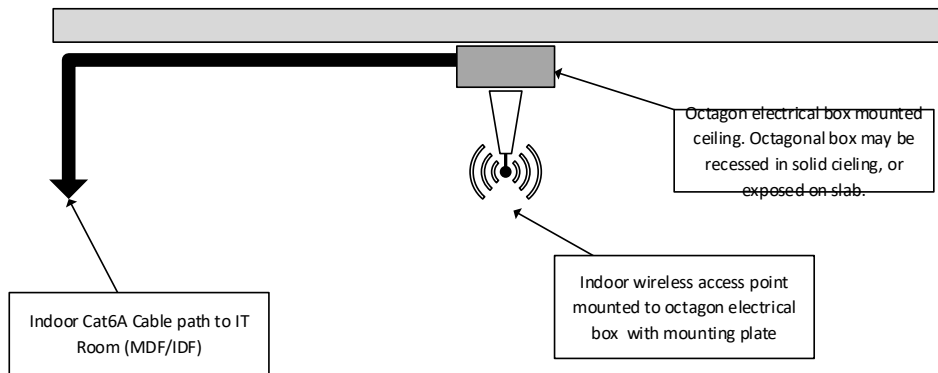
Indoor Wireless Access Point Ceiling Mounted with Obstruction



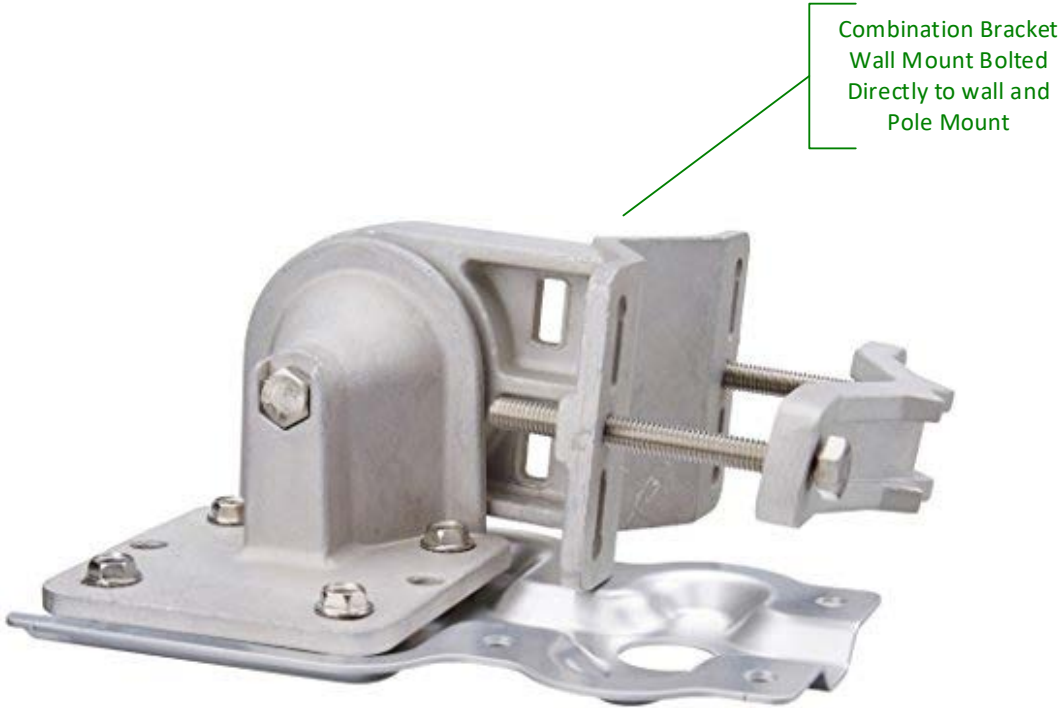
Outdoor Wireless Access Point Wall Mounted



Indoor Wireless Access Point Mounted to Solid Ceiling



Cisco Outdoor Access Point Mounting



NJIT mounts outdoor access points using adapter plate.

Pole Mounted (Bracket around pole)



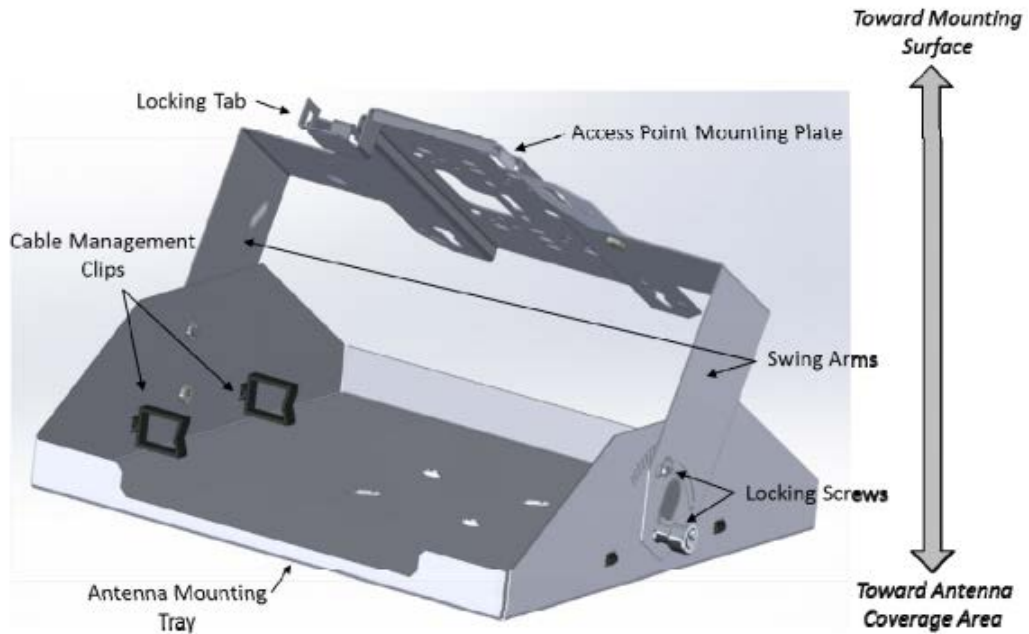
- 90°downtilt possible w/ adapter plate included
- Better Omni Coverage

Wall Mounted (No Bracket, vendor provided screw to wall surface)

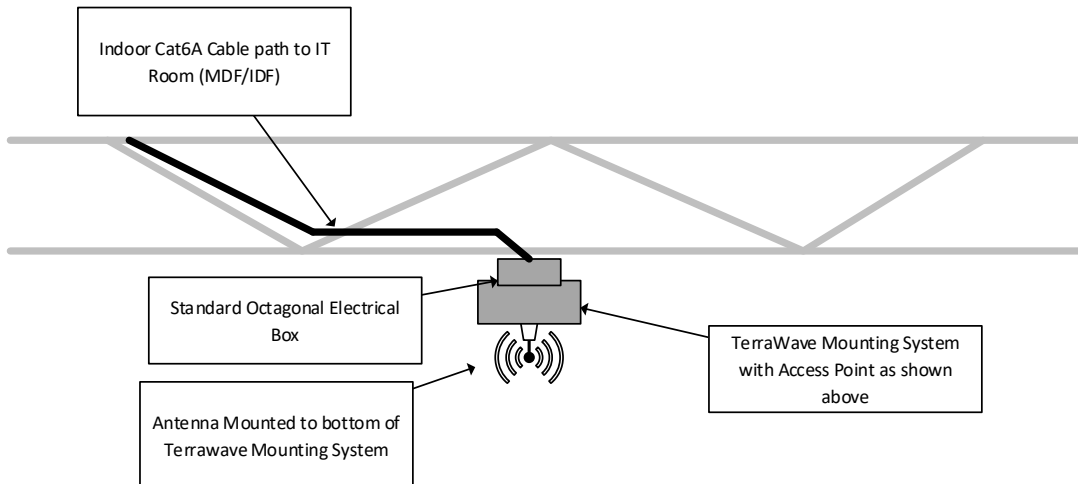


- 90°downtilt possible w/ adapter plate included
- Better Omni Coverage

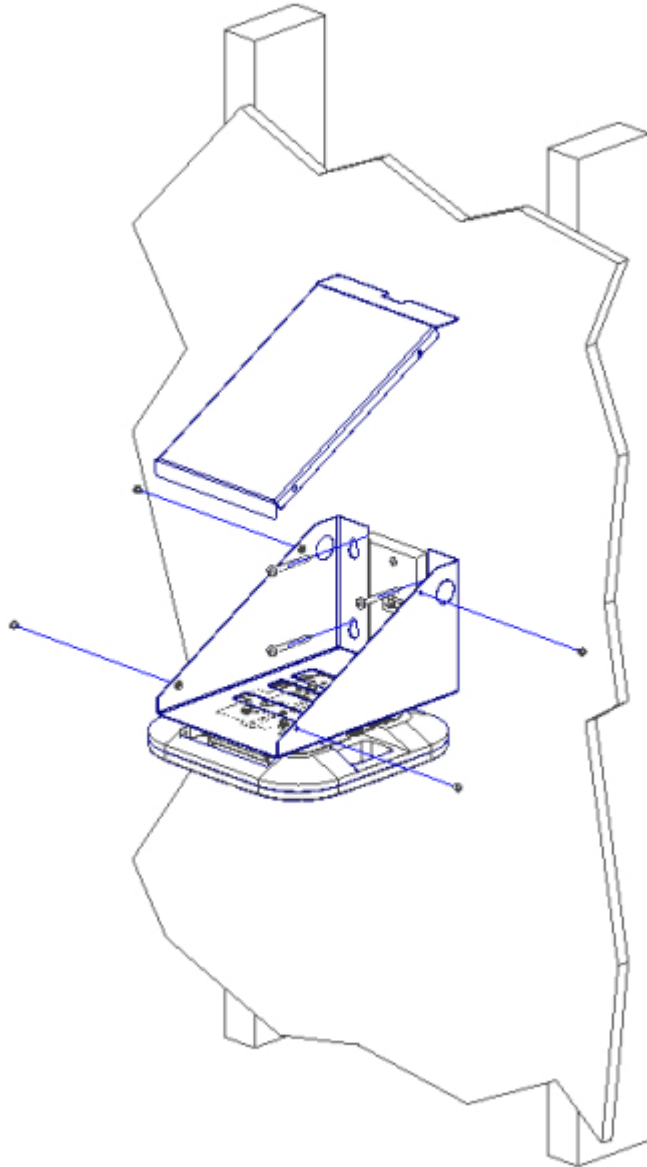
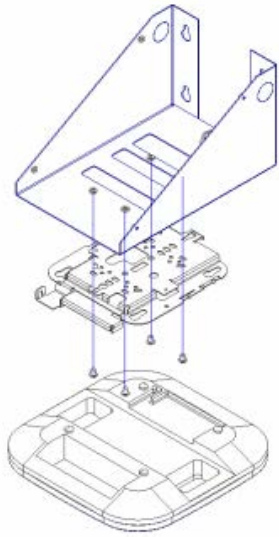
High Ceiling mounting of Access Points and Directional Antenna Using TerraWave Colocated Access Point Mounting System



An additional Antenna mounting plate is required for our antenna.



Wall Mounted with Oberon Bracket Model # 1029-00



Label Example:

For the wall plates, label would be closetID-Room#-Seq#, for example, in basement of FMH, room 005, the label would be like "2F-005-03", if 2F-005-02 is the last existing wall plate ID.

For the patch panel in closet, label would be Room#-Seq#-color ,where the color would be R for red, B for blue, W for white, G for green and etc., for example, for the wall plate "Red" port with label "2F-005-03", the label on patch panel would be 005-03R

