Scope of Work

Total Project Summary

Labor and materials will be provided to install the following:

- **(523)** white plenum Cat-5E cables for voice/data applications.
- **(50)** gray nonplenum Cat-5E cables for warehouse connections applications.
- **(64)** blue plenum Cat 6A unshielded (10G) cables for lab applications.
- **(15)** green plenum Cat 6 cables for IP surveillance applications.

- **(10)** racks, **(1)** wall cabinet, **(5)** ladder runway sections, and related equipment for **(7)** Telecommunications Rooms.

Telecommunications Rooms will be connected with the following backbone cables:

Rm 107 Main Cross Connect to Rm 135 Main Equip Room
- 300 pairs of plenum Cat 3 cable.
- **(12)** blue plenum Cat 6A unshielded (10G) 4 pair cables.
- **(1)** 12 strand 50/125 OM3 plenum cable in 1" innerduct.

Rm 107 Main Cross Connect to Rm 213 IDF
- **(6)** blue plenum Cat 6A unshielded (10G) 4 pair cables.
- **(1)** 6 strand 50/125 OM3 plenum cable in 1" innerduct.

Rm 107 Main Cross Connect to Rm 325 IDF
- 200 pairs of plenum Cat 3 cable.
- **(6)** blue plenum Cat 6A unshielded (10G) 4 pair cables.
- **(1)** 6 strand 50/125 OM3 plenum cable in 1" innerduct.

Rm 107 Main Cross Connect to Loading Dock IDF
- 50 pairs of plenum Cat 3 cable.
- **(6)** blue plenum Cat 6A unshielded (10G) 4 pair cables.

Rm 107 Main Cross Connect to Lab IDF
- 25 pairs of plenum Cat 3 cable.
- **(12)** blue plenum Cat 6A unshielded (10G) 4 pair cables.
- **(1)** 12 strand 50/125 OM3 plenum cable in 1" innerduct.

Rm 107 Main Cross Connect to demarc
- **(5)** white plenum Cat-5E 4 pair cables.

Installation Practices

Cable Pathways and Support

Wherever practical, all cables will be installed running square with building structure.

Cable bundles will run down hallways or other accessible routes.

Cables will be supported at a maximum of 5 foot intervals using J-hooks, cable straps, conduit, trapeze, or cable tray depending upon the cable quantities and pathway conditions. *See materials list for proposal details.*

Cable support will be attached to the building structure using hanger wire or all thread dedicated for the purpose.

Labeling

Each cable will be labeled within 6" of each end with a self-adhesive, machine printed label. This label will correspond to the port labeling scheme at the workstation outlet.

Each workstation jack will be identified with a distinct identifier using a machine printed label. The preferred labeling scheme will identify where the cable terminates at the Telecommunications Room end. {ie. Room. ID - Rack ID - Patch Panel ID - Port Number} *Labeling method will be verified with the customer prior to installation.*

Floor plan locations will be marked with the corresponding jack numbers.

Cable Testing

All **Cat 3 multipair cables** will be tested for continuity and polarity.

All **Cat 5E four pair backbone cables** will be tested for Cat 5e compliance. A soft copy of test results will be provided upon completion of the project.

All **Cat 6A four pair backbone cables** will be tested for Cat 6A compliance. A soft copy of test results will be provided upon completion of the project.

All **Cat 5E workstation cables** will be tested for Cat 5e compliance. A soft copy of test results will be provided upon completion of the project.

All **Cat 6 workstation cables** will be tested for Cat 6 compliance. A soft copy of test results will be provided upon completion of the project.

All **Cat 6A workstation cables** will be tested for Cat 6A compliance. A soft copy of test results will be provided upon completion of the project.

All **multimode fibers** will be measured for attenuation using an Optical Power Meter and OTDR. Tests will be done at both 850nm and 1300nm wavelengths. A soft copy of test results will be provided upon completion of the project.

Grounding

Racks and related equipment will be connected to grounding busbar using a #6 CU green insulated ground wire.

Busbars in the intermediate communications rooms will be connected to the Main Telecommunications Grounding Busbar in the Rm 107 Main Cross Connect with the following grounding backbone cable:

- #1/0 CU

Refer to full scope of work for additional details. Customer should request an electrician to connect the grounding busbar to the building electrical ground.

As Built Drawings

A hard and soft copy of floorplans with workstation locations and numbers labeled electronically will be provided upon completion of the project.

Scope Details

Horizontal Cabling

Workstation Cabling for voice/data

Workstation ports for voice/data will be supported by white plenum Cat-5E cables.

Cables for voice/data workstations will terminate on:

- data - blue Cat 5e RJ-45 jacks
- voice - ivory Cat 5e RJ-45 jacks

and on:

- flat 110 style patch panels in the Rm 107 Main Cross Connect.
- flat 110 style patch panels in the Rm 135 Main Equip Room.
- flat 110 style patch panels in the Rm 213 IDF.
- flat 110 style patch panels in the Rm 325 IDF .
- flat 110 style patch panels in the Lab IDF.

Workstation Cabling for warehouse connections

Workstation ports for warehouse connections will be supported by gray nonplenum Cat-5E cables.

Cables for warehouse connections workstations will terminate on:

- warehouse data - blue Cat 5e RJ-45 jacks
- warehouse voice - ivory Cat 5e RJ-45 jacks

and on:

- flat modular style patch panels in the Rm 107 Main Cross Connect.
- flat modular style patch panels in the Loading Dock IDF.

Workstation Cabling for lab

Workstation ports for lab will be supported by blue plenum Cat 6A unshielded (10G) cables.

Cables for lab workstations will terminate on:

- lab - yellow Cat 6A unshielded (10G) RJ-45 jacks

and on:

- flat modular style patch panels in the Lab IDF.

Workstation Cabling for IP surveillance

Workstation ports for IP surveillance will be supported by green plenum Cat 6 cables..

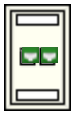
Cables for IP surveillance workstations will terminate on:

- camera - green Cat 6 RJ-45 jacks

and on:

- flat modular style patch panels in the Rm 107 Main Cross Connect.
- flat modular style patch panels in the Loading Dock IDF.

Workstation Outlet Count by Telecommunication Room

Description	**ivory 2 port faceplate** - **(1)** blue Cat 5e RJ-45 jack for data - **(1)** ivory Cat 5e RJ-45 jack for voice	**ivory 4 port faceplate** - **(2)** blue Cat 5e RJ-45 jacks for data - **(1)** ivory Cat 5e RJ-45 jack for voice - **(1)** ivory blank insert	**ivory 2 port faceplate** - **(2)** green Cat 6 RJ-45 jacks for camera
Location	Wall Outlet 	Wall Outlet 	Wall Outlet 
Rm 107 Main Cross Connect	35	3	3
Rm 135 Main Equip Room	3	0	0
Rm 213 IDF	6	0	0
Rm 325 IDF	11	0	0
Loading Dock IDF	0	0	0
Lab IDF	0	0	0

Description	**ivory 2 port faceplate** **- (1)** green Cat 6 RJ-45 jack for camera **- (1)** ivory blank insert	**ivory 2 port faceplate** **- (1)** blue Cat 5e RJ-45 jack for warehouse data **- (1)** ivory Cat 5e RJ-45 jack for warehouse voice	**stainless steel 2 port faceplate** **- (1)** blue Cat 5e RJ-45 jack for data **- (3)** stainless steel blank inserts
Location0	Wall Outlet 	Wall Outlet 	Wall Outlet 
Rm 107 Main Cross Connect	2	3	0
Rm 135 Main Equip Room	0	0	0
Rm 213 IDF	0	0	0
Rm 325 IDF	0	0	0
Loading Dock IDF	0	0	6
Lab IDF	0	0	0

Workstation Outlet Count by Telecommunication Room

Description	**stainless steel 1 port faceplate** - **(1)** blue Cat 5e RJ-45 jack for data - **(1)** ivory Cat 5e RJ-45 jack for voice	**stainless steel 6 port faceplate** - **(1)** blue Cat 5e RJ-45 jack for data - **(1)** ivory Cat 5e RJ-45 jack for voice - **(4)** yellow Cat 6A unshielded (10G) RJ-45 jacks for lab	**stainless steel 4 port faceplate** - **(4)** yellow Cat 6A unshielded (10G) RJ-45 jacks for lab
Location	Wall Outlet 	Wall Outlet 	Wall Outlet 
Rm 107 Main Cross Connect	0	0	0
Rm 135 Main Equip Room	0	0	0
Rm 213 IDF	0	0	0
Rm 325 IDF	0	0	0
Loading Dock IDF	3	0	0
Lab IDF	0	5	8

Description	**stainless steel 2 port faceplate** - **(2)** yellow Cat 6A unshielded (10G) RJ-45 jacks for lab	**wallphone faceplate** - **(1)** ivory Cat 5e RJ-45 jack for voice	**black 4 port snap in furniture faceplate** - **(1)** blue Cat 5e RJ-45 jack for data - **(1)** ivory Cat 5e RJ-45 jack for voice - **(2)** black blank inserts
Location	Wall Outlet 	Wall Outlet 	Modular Furniture Outlet 
Rm 107 Main Cross Connect	0	2	15
Rm 135 Main Equip Room	0	1	0
Rm 213 IDF	0	5	75
Rm 325 IDF	0	5	86
Loading Dock IDF	0	7	0
Lab IDF	3	6	0

Workstation Outlet Count by Telecommunication Room

Description	**black 4 port snap in furniture faceplate** **- (2)** blue Cat 5e RJ-45 jacks for data **- (1)** ivory Cat 5e RJ-45 jack for voice **- (1)** black blank insert	**black 4 port snap in furniture faceplate** **- (3)** yellow Cat 6A unshielded (10G) RJ-45 jacks for lab **- (1)** black blank insert	**black 4 port snap in furniture faceplate** **- (1)** blue Cat 5e RJ-45 jack for data **- (3)** yellow Cat 6A unshielded (10G) RJ-45 jacks for lab
Location	Modular Furniture Outlet 	Modular Furniture Outlet 	Modular Furniture Outlet 
Rm 107 Main Cross Connect	0	0	0
Rm 135 Main Equip Room	0	0	0
Rm 213 IDF	3	0	0
Rm 325 IDF	4	1	0
Loading Dock IDF	0	0	0
Lab IDF	0	0	2

Description	**black 2 port 106 mounting frame** **- (1)** blue Cat 5e RJ-45 jack for data **- (1)** ivory Cat 5e RJ-45 jack for voice	**- 1 port no faceplate** **- (1)** blue Cat 5e RJ-45 jack for data	**- 1 port no faceplate** **- (1)** green Cat 6 RJ-45 jack for camera
Location	Floor Fed Outlet 	Ceiling Outlet	Ceiling Outlet
Rm 107 Main Cross Connect	0	2	0
Rm 135 Main Equip Room	0	0	0
Rm 213 IDF	2	2	0
Rm 325 IDF	3	0	0
Loading Dock IDF	0	0	4
Lab IDF	0	0	0

Workstation Outlet Count by Telecommunication Room

Description	**- 1 port no faceplate** **- (1)** blue Cat 5e RJ-45 jack for warehouse data	**not used**	**not used**
Location	Ceiling Outlet		
Rm 107 Main Cross Connect	0	0	0
Rm 135 Main Equip Room	0	0	0
Rm 213 IDF	0	0	0
Rm 325 IDF	0	0	0
Loading Dock IDF	5	0	0
Lab IDF	0	0	0

Backbone Cabling

Rm 107 Main Cross Connect to Rm 135 Main Equip Room

Multipair Copper Backbone - (300) pairs of Cat 3 plenum cable will be installed between the Rm 107 Main Cross Connect and the Rm 135 Main Equip Room.

The multipair cable will terminate with a wall mounted 110 blocks at both ends.

Fiber Backbone - A 12 strand 50/125 OM3 plenum fiber cable cable in 1 inch innerduct will be installed between the Rm 107 Main Cross Connect and the Rm 135 Main Equip Room.

The fiber cable will terminate with LC simplex OM3 MM connectors in a fiber enclosure on a floor rack at both ends.

Four pair Copper Backbone - (12) blue plenum Cat 6A unshielded (10G) cables will be installed between the Rm 107 Main Cross Connect and the Rm 135 Main Equip Room.

The four pair cables will terminate with a yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel at both ends.

Rm 107 Main Cross Connect to Rm 213 IDF

Fiber Backbone - A 12 strand 50/125 OM3 plenum fiber cable cable in 1 inch innerduct will be installed between the Rm 107 Main Cross Connect and the Rm 213 IDF.

The fiber cable will terminate with LC simplex OM3 MM connectors in a fiber enclosure on a floor rack at both ends.

Four pair Copper Backbone - (6) blue plenum Cat 6A unshielded (10G) cables will be installed between the Rm 107 Main Cross Connect and the Rm 213 IDF.

The four pair cables will terminate with yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel at both ends.

Rm 107 Main Cross Connect to Rm 325 IDF

Multipair Copper Backbone - (200) pairs of Cat 3 plenum cable will be installed between the Rm 107 Main Cross Connect and the Rm 325 IDF .

The multipair cable will terminate with a wall mounted 110 blocks at both ends.

Fiber Backbone - A 12 strand 50/125 OM3 plenum fiber cable cable in 1

inch innerduct will be installed between the Rm 107 Main Cross Connect and the Rm 325 IDF .

The fiber cable will terminate with LC simplex OM3 MM connectors in a fiber enclosure on a floor rack at both ends.

Four pair Copper Backbone - (6) blue plenum Cat 6A unshielded (10G) cables will be installed between the Rm 107 Main Cross Connect and the Rm 325 IDF .

The four pair cables will terminate with yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel at both ends.

Rm 107 Main Cross Connect to Loading Dock IDF

Multipair Copper Backbone - (50) pairs of Cat 3 plenum cable will be installed between the Rm 107 Main Cross Connect and the Loading Dock IDF.

The multipair cable will terminate with a wall mounted 110 block in the Rm 107 Main Cross Connect and with rack mounted 110 block in the Loading Dock IDF.

Four pair Copper Backbone - (6) blue plenum Cat 6A unshielded (10G) cables will be installed between the Rm 107 Main Cross Connect and the Loading Dock IDF.

The four pair cables will terminate with yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel in the Rm 107 Main Cross Connect and on yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel in the Loading Dock IDF.

Rm 107 Main Cross Connect to Lab IDF

Multipair Copper Backbone - (25) pairs of Cat 3 plenum cable will be installed between the Rm 107 Main Cross Connect and the Lab IDF.

The multipair cable will terminate with a wall mounted 110 block in the Rm 107 Main Cross Connect and with a rack mounted 110 block in the Lab IDF.

Fiber Backbone - A 12 strand 50/125 OM3 plenum fiber cable cable in 1 inch innerduct will be installed between the Rm 107 Main Cross Connect and the Lab IDF.

The fiber cable will terminate with LC simplex OM3 MM connectors in a fiber enclosure on a floor rack at both ends.

Four pair Copper Backbone - (12) blue plenum Cat 6A unshielded (10G) cables will be installed between the Rm 107 Main Cross Connect and the Lab IDF.

The four pair cables will terminate with yellow Cat 6A unshielded (10G) RJ-45 jacks in a patch panel at both ends.

Rm 107 Main Cross Connect to demarc

Four pair Copper Backbone - (5) white plenum Cat-5E cables will be installed between the Rm 107 Main Cross Connect and the demarc.

The four pair cables will terminate with a red Cat 5e RJ-45 jacks in a patch panel in the Rm 107 Main Cross Connect and on a red Cat 5e RJ-45 jacks in a surface mount box in the demarc.

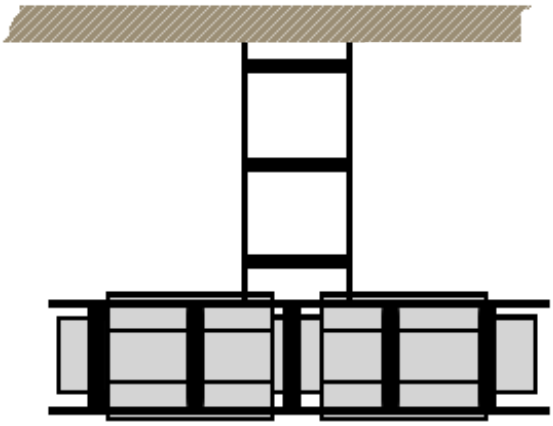
Configuration of the Rm 107 Main Cross Connect

The following support hardware will be installed in the Rm 107 Main Cross Connect:

- **(2)** black 19" x 7' equipment racks.
- **(1)** vertical cable managers installed between racks.
- **(2)** vertical cable managers installed on the ends of racks.
- **(1)** section of black 12" wide ladder runway.

The ladder runway will be installed on top of the floor standing racks.

The racks will be arranged as shown below.



The following wall mounted support hardware will be installed:

- **(1)** wall mount Cat 5e 300 pair 110 block with C-5s for multipair backbone to the Rm 135 Main Equip Room.

- **(1)** wall mount Cat 5e 300 pair 110 block with C-5s for multipair backbone to the Rm 325 IDF .

- **(1)** wall mount Cat 5e 100 pair 110 block with C-5s for multipair backbone to the Loading Dock IDF.

- **(1)** wall mount Cat 5e 100 pair 110 block with C-5s for multipair backbone to the Lab IDF.

- **(1)** grounding bus bar.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

All racks and ladder runway will be grounded to the grounding bus bar with #6 CU ground wire.

Termination Panels on Floor Racks

The following termination panels will be installed on 19" x 7' equipment racks in the Rm 107 Main Cross Connect:

Rack 1 will have the following panels installed starting at the top.

- (1) 6 panel 2RU rack mount fiber enclosure loaded with the following adapter panels:

(1) 12 strand LC OM3 MM fiber adapter panel for fiber to the Rm 135 Main Equip Room
(1) 12 strand LC OM3 MM fiber adapter panel for fiber to the Rm 213 IDF
(1) 12 strand LC OM3 MM fiber adapter panel for fiber to the Rm 325 IDF
(1) 12 strand LC OM3 MM fiber adapter panel for fiber to the Lab IDF
(2) blank panels

- (1) 1RU horizontal cable manager

- (1) 48 port patch panel blank for 4 pair backbone to the

- Rm 135 Main Equip Room with cables terminating on **(12)** yellow Cat 6A unshielded (10G) RJ-45 jacks
- Rm 213 IDF with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks
- Rm 325 IDF with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks
- Loading Dock IDF with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks
- Lab IDF with cables terminating on **(12)** yellow Cat 6A unshielded (10G) RJ-45 jacks

- (1) 2RU horizontal cable manager

- (3) 48 port Cat 5e patch panels for voice/data cables
Alternating with
- (3) 2RU horizontal cable managers

Rack 2 will have the following panels installed starting at the top.

- (1) 1RU horizontal cable manager

- (1) 24 port patch panel blank for 4 pair backbone to the demarc with cables terminating on **(5)** red Cat 5e RJ-45 jacks

- (1) 1RU horizontal cable manager
- (1) 24 port patch panel blank for warehouse connections cables with Cat 5e jacks to match the workstation jacks

Starting at the middle of **Rack 2** the following panels will be installed.

- **(1)** 1RU horizontal cable manager
- **(1)** 24 port patch panel blank for IP surveillance cables with Cat 6 jacks to match the workstation jacks

Open ports for termination of additional cables

There are **(31)** open ports for additional voice/data cables.

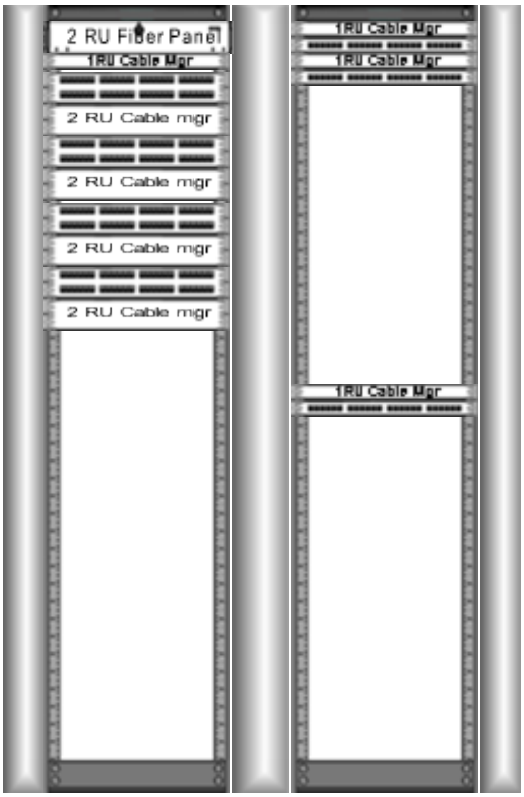
There are **(18)** open ports for additional warehouse connections cables.

There are **(16)** open ports for additional IP surveillance cables.

There are **(6)** open ports for additional 4 pair backbone cables to the Rm 135 Main Equip Room , Rm 213 IDF , Rm 325 IDF , Loading Dock IDF , Lab IDF .

There are **(19)** open ports for additional 4 pair backbone cables to the demarc.

RACK ELEVATION - Rm 107 Main Cross Connect



RACK 1 RACK 2

Cable managers provided may look different than those shown. Refer to the bill of materials for managers that will be provided.

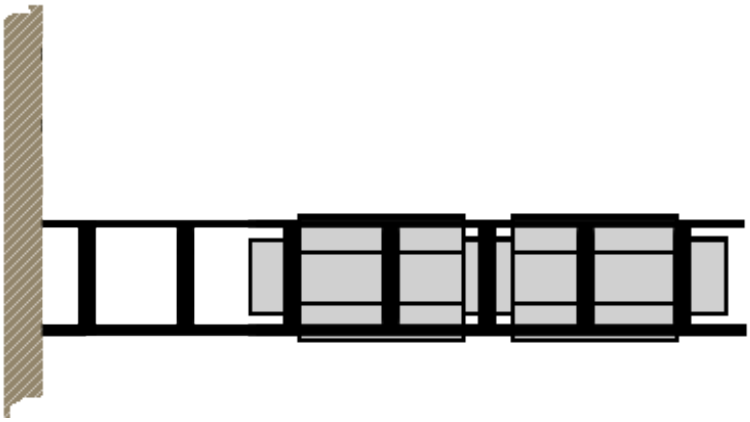
Configuration of the Rm 135 Main Equip Room

The following support hardware will be installed in the Rm 135 Main Equip Room:

- **(2)** black 19" x 7' equipment racks.
- **(1)** vertical cable managers installed between racks.
- **(2)** vertical cable managers installed on the ends of racks.
- **(1)** section of black 12" wide ladder runway.

The ladder runway will be installed on top of the floor standing racks.

The racks will be arranged as shown below.



The following wall mounted support hardware will be installed:

- (1) wall mount Cat 5e 300 pair 110 block with C-5s for multipair backbone to the Rm 107 Main Cross Connect.

- **(1)** grounding bus bar.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

All racks and ladder runway will be grounded to the grounding bus bar with #6 CU ground wire.

Termination Panels on Floor Racks

The following termination panels will be installed on 19" x 7' equipment racks in the Rm 135 Main Equip Room:

Rack 1 will have the following panels installed starting at the top.

- (1) 3 panel 1RU rack mount fiber enclosure for fiber backbone to the Rm 107 Main Cross Connect The enclosure will be loaded with **(1)** 12 strand LC OM3 MM fiber adapter panel and **(2)**

blank panels

- (1) 1RU horizontal cable manager

- (1) 24 port patch panel blank for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(12)** yellow Cat 6A unshielded (10G) RJ-45 jacks

- (1) 1RU horizontal cable manager
- (1) 24 port Cat 5e patch panel for voice/data cables

Rack 2 will have the following panels installed starting at the top.

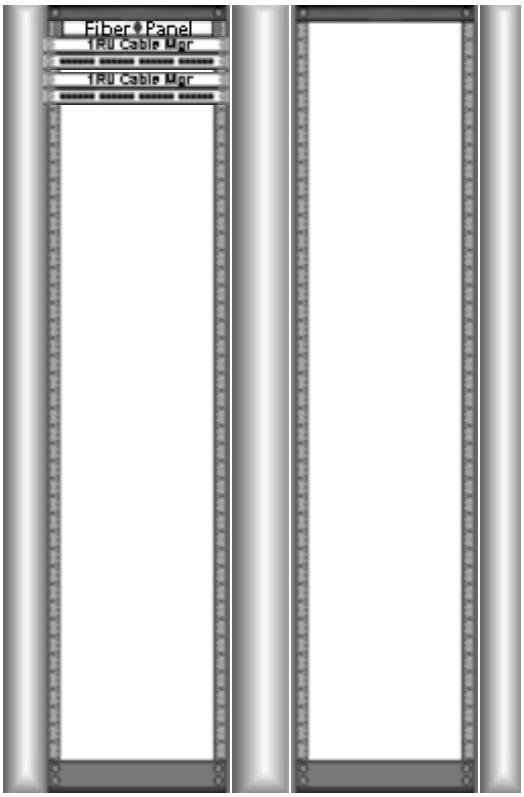
No termination panels will be installed here

Open ports for termination of additional cables

There are **(18)** open ports for additional voice/data cables.

There are **(12)** open ports for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

RACK ELEVATION - Rm 135 Main Equip Room



RACK 1 RACK 2

Cable managers provided may look different than those shown. Refer to the bill of materials for managers that will be provided.

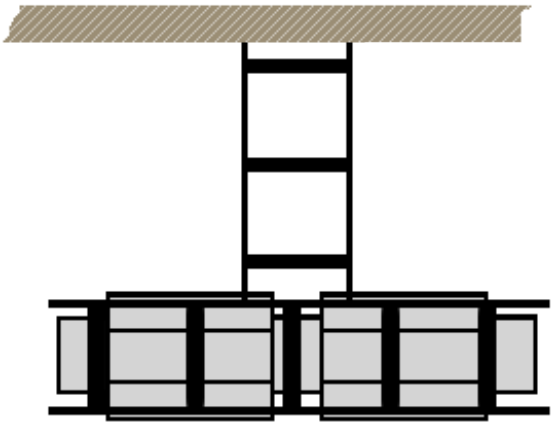
Configuration of the Rm 213 IDF

The following support hardware will be installed in the Rm 213 IDF:

- **(2)** black 19" x 7' equipment racks.
- **(1)** vertical cable managers installed between racks.
- **(2)** vertical cable managers installed on the ends of racks.
- **(1)** section of black 12" wide ladder runway.

The ladder runway will be installed on top of the floor standing racks.

The racks will be arranged as shown below.



The following wall mounted support hardware will be installed:

- **(1)** grounding bus bar.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

All racks and ladder runway will be grounded to the grounding bus bar with #6 CU ground wire.

Termination Panels on Floor Racks

The following termination panels will be installed on 19" x 7' equipment racks in the Rm 213 IDF:

Rack 1 will have the following panels installed starting at the top.

- (1) 3 panel 1RU rack mount fiber enclosure for fiber backbone to the Rm 107 Main Cross Connect The enclosure will be loaded with **(1)** 12 strand LC OM3 MM fiber adapter panel and **(2)** blank panels

- (1) 1RU horizontal cable manager

- (1) 24 port patch panel blank for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks

- (1) 1RU horizontal cable manager

- (2) 48 port Cat 5e patch panels for voice/data cables
Alternating with
- (2) 2RU horizontal cable managers

Rack 2 will have the following panels installed starting at the top.

- (1) 1RU horizontal cable manager

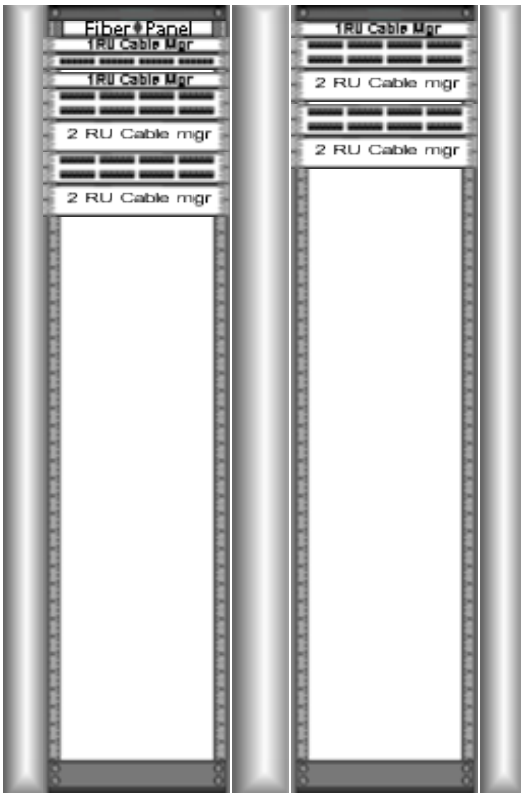
- (2) 48 port Cat 5e patch panels for voice/data cables
Alternating with
- (2) 2RU horizontal cable managers

Open ports for termination of additional cables

There are **(15)** open ports for additional voice/data cables.

There are **(18)** open ports for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

RACK ELEVATION - Rm 213 IDF



RACK 1 RACK 2

Cable managers provided may look different than those shown. Refer to the bill of materials for managers that will be provided.

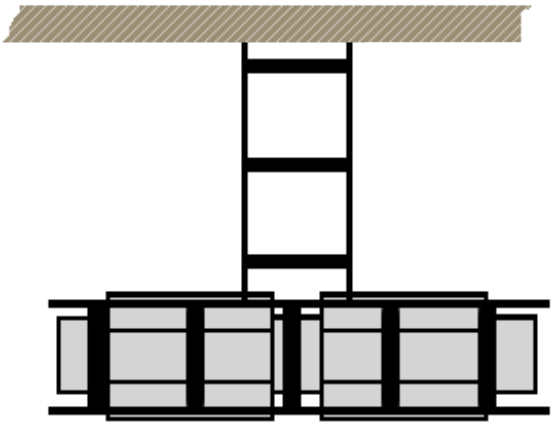
Configuration of the Rm 325 IDF

The following support hardware will be installed in the Rm 325 IDF :

- **(2)** black 19" x 7' equipment racks.
- **(1)** vertical cable managers installed between racks.
- **(2)** vertical cable managers installed on the ends of racks.
- **(1)** section of black 12" wide ladder runway.

The ladder runway will be installed on top of the floor standing racks.

The racks will be arranged as shown below.



The following wall mounted support hardware will be installed:

- (1) wall mount Cat 5e 300 pair 110 block with C-5s for multipair backbone to the Rm 107 Main Cross Connect.

- **(1)** grounding bus bar.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

All racks and ladder runway will be grounded to the grounding bus bar with #6 CU ground wire.

Termination Panels on Floor Racks

The following termination panels will be installed on 19" x 7' equipment racks in the Rm 325 IDF :

Rack 1 will have the following panels installed starting at the top.

- (1) 3 panel 1RU rack mount fiber enclosure for fiber backbone to the Rm 107 Main Cross Connect The enclosure will be loaded with **(1)** 12 strand LC OM3 MM fiber adapter panel and **(2)**

blank panels

- (1) 1RU horizontal cable manager

- (1) 24 port patch panel blank for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks

- (1) 1RU horizontal cable manager

- (2) 48 port Cat 5e patch panels for voice/data cables
Alternating with
- (2) 2RU horizontal cable managers

Rack 2 will have the following panels installed starting at the top.

- (1) 1RU horizontal cable manager

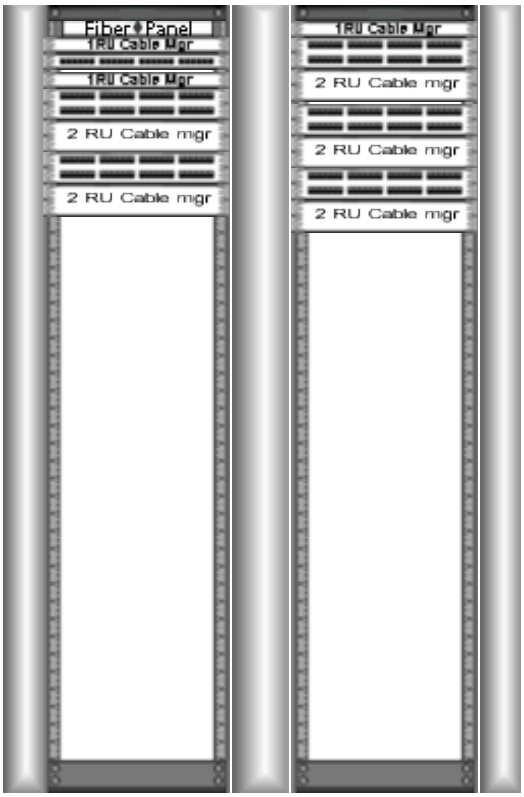
- (3) 48 port Cat 5e patch panels for voice/data cables
Alternating with
- (3) 2RU horizontal cable managers

Open ports for termination of additional cables

There are **(25)** open ports for additional voice/data cables.

There are **(18)** open ports for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

RACK ELEVATION - Rm 325 IDF



RACK 1 RACK 2

Cable managers provided may look different than those shown. Refer to the bill of materials for managers that will be provided.

Hardware and Termination Equipment for the Loading Dock IDF

Exact room layout is not included in this scope.

The following wall mounted support hardware will be installed:

- **(1)** wall mounted cabinet 38Hx19Wx18D with

  - (1) 24 port patch panel blank for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(6)** yellow Cat 6A unshielded (10G) RJ-45 jacks.

  - (1) rack mount Cat 5e 200 pair 110 block with C-5s for multipair backbone to the Rm 107 Main Cross Connect.

  - (1) 48 port patch panel blank loaded with blue Cat 5e RJ-45 jacks, and ivory Cat 5e RJ-45 jacks for **warehouse connections** workstation applications.

  - (1) 24 port patch panel blank loaded with green Cat 6 RJ-45 jacks for **IP surveillance** workstation applications.

  - (3) 1RU horizontal cable managers

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

Open ports for termination of additional cables

There are **(4)** open ports for additional warehouse connections cables.

There are **(17)** open ports for additional IP surveillance cables.

There are **(18)** open ports for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

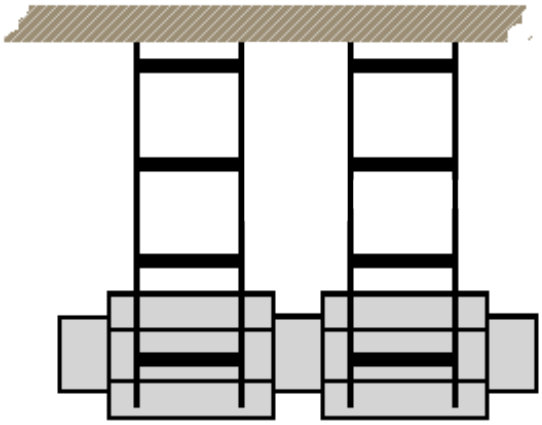
Configuration of the Lab IDF

The following support hardware will be installed in the Lab IDF:

- **(2)** black 19" x 7' equipment racks.
- **(1)** vertical cable managers installed between racks.
- **(2)** vertical cable managers installed on the ends of racks.
- **(1)** section of black 12" wide ladder runway.

The ladder runway will be installed on top of the floor standing racks.

The racks will be arranged as shown below.



The following wall mounted support hardware will be installed:

- **(1)** grounding bus bar.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

All racks and ladder runway will be grounded to the grounding bus bar with #6 CU ground wire.

Termination Panels on Floor Racks

The following termination panels will be installed on 19" x 7' equipment racks in the Lab IDF:

Rack 1 will have the following panels installed starting at the top.

- (1) 3 panel 1RU rack mount fiber enclosure for fiber backbone to the Rm 107 Main Cross Connect The enclosure will be loaded with **(1)** 12 strand LC OM3 MM fiber adapter panel and **(2)** blank panels

- (3) 1RU horizontal cable managers
Alternating with

- **(3)** 24 port patch panel blanks for lab cables with Cat 6A unshielded (10G) jacks to match the workstation jacks

Rack 2 will have the following panels installed starting at the top.

- **(1)** 1RU horizontal cable manager

- **(1)** 24 port patch panel blank for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(12)** yellow Cat 6A unshielded (10G) RJ-45 jacks

- **(1)** 1RU horizontal cable manager
- **(1)** 24 port Cat 5e patch panel for voice/data cables

Starting at the middle of **Rack 2** the following panels will be installed.

- **(1)** rack mount Cat 5e 200 pair 110 block with C-5s for mulitpair backbone to the Rm 107 Main Cross Connect

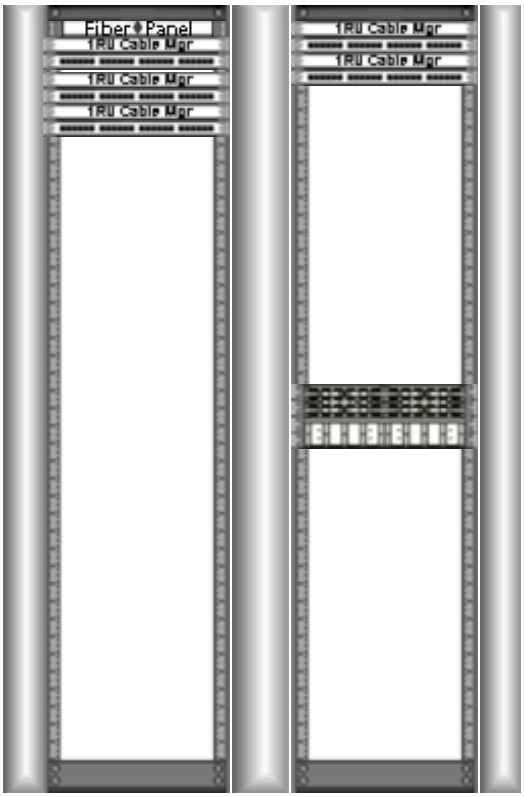
Open ports for termination of additional cables

There are **(12)** open ports for additional voice/data cables.

There are **(8)** open ports for additional lab cables.

There are **(12)** open ports for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

RACK ELEVATION - Lab IDF



RACK 1 RACK 2

Cable managers provided may look different than those shown. Refer to the bill of materials for managers that will be provided.

Hardware and Termination Equipment for the demarc

Exact room layout is not included in this scope.

The following wall mounted support hardware will be installed in the demarc:

- (1) ivory 6 port surface mount box for 4 pair backbone to the Rm 107 Main Cross Connect with cables terminating on **(5)** red Cat 5e RJ-45 jacks.

The location of wall mounted support hardware will be determined based upon site conditions and discussion with the customer's representative.

Open ports for termination of additional cables

There are **(1)** open port for additional 4 pair backbone cables to the Rm 107 Main Cross Connect.

Patch Cords and Fiber Jumpers

The following copper patch cords will be provided.

- **(15)** 1 ft gray Cat 5e patch cords
- **(15)** 3 ft gray Cat 5e patch cords
- **(252)** 7 ft white Cat 5e patch cords
- **(92)** 3 ft white Cat 5e patch cords
- **(50)** 5 ft white Cat 5e patch cords
- **(10)** 10 ft white Cat 5e patch cords
- **(139)** 7 ft yellow Cat 6A unshielded (10G) patch cords
- **(36)** 5 ft yellow Cat 6A unshielded (10G) patch cords

The following fiber jumpers will be provided.

- **(6)** 2 meter duplex SC-LC 50/125 OM3 fiber jumpers
- **(6)** 1 meter duplex SC-LC 50/125 OM3 fiber jumpers

Assumptions

Plywood backboards will be provided by others.

Poke throughs, core holes, and sleeves through brick or masonry will be provided by others. Sleeves required through gypsum board walls will be considered part of the cabling scope of work.

Firestopping of holes or sleeves used for communications cabling on this project will be considered part of the cabling scope of work.

Grounding and bonding not described in the scope of work will be done by others. It is recommended that connection of the grounding system to the building ground be done by an electrician.

Purpose	Description	Manufacturer	Part Number	Rm 107 Main Cross Connect QTY	Rm 135 Main Equip Room QTY	Rm 213 IDF QTY	Rm 325 IDF QTY	Loading Dock IDF QTY	Lab IDF QTY	demarc QTY	Project Total
voice/data station cables	white plenum Cat-5E cable	TE-AMP & TrueNet	TE520P-WTII	19775	390	30975	37625	0	1620	0	**91000**
warehouse connections station cables	gray nonplenum Cat-5E cable	TE-AMP & TrueNet	TE520R-GYII	1050	0	0	0	9460	0	0	**11000**
lab station cables	blue plenum Cat 6A unshielded (10G) cable	TE-AMP & TrueNet	TE640P-BL02	0	0	0	0	0	8192	0	**9000**
IP surveillance station cables	green plenum Cat 6 cable	TE-AMP & TrueNet	TE610P-GNII	1720	0	0	0	1386	0	0	**4000**
data jack	blue Cat 5e RJ-45 jack	TE-AMP & TrueNet	1375191-6	58	3	91	108	0	7	0	**267**
voice jack	ivory Cat 5e RJ-45 jack	TE-AMP & TrueNet	1-13751911-1	55	3	86	105	0	5	0	**254**
warehouse data jack	blue Cat 5e RJ-45 jack	TE-AMP & TrueNet	1375191-6	3	0	0	0	11	0	0	**14**
warehouse voice jack	ivory Cat 5e RJ-45 jack	TE-AMP & TrueNet	1-13751911-1	3	0	0	0	33	0	0	**36**

lab jack	yellow Cat 6A unshielded (10G) RJ-45 jack	TE-AMP & TrueNet	1933476-8	0	0	0	0	0	64	0	**64**
camera jack	green Cat 6 RJ-45 jack	TE-AMP & TrueNet	1375055-9	8	0	0	0	7	0	0	**15**
wallphone faceplate	wall phone faceplate	TE-AMP & TrueNet	1FM-ØE-AMP-PHONE	2	1	5	5	7	6	0	**26**
1 port wall outlets	stainless steel 1 port faceplate	TE-AMP & TrueNet	1FM-ØE-AMP-LAB	0	0	0	0	30	0	0	**30**
2 port wall outlets	ivory 2 port faceplate	TE-AMP & TrueNet	1-2111009-1	43	3	6	11	0	0	0	**63**
2 port wall outlets	stainless steel 2 port faceplate	TE-AMP & TrueNet	1FM-ØØE-AMP-LAB	0	0	0	0	6	3	0	**9**
4 port wall outlets	ivory 4 port faceplate	TE-AMP & TrueNet	1-2111203-1	3	0	0	0	0	0	0	**3**
4 port wall outlets	stainless steel 4 port faceplate	TE-AMP & TrueNet	1FM-(4)ØE-AMP-LAB	0	0	0	0	0	8	0	**8**
6 port wall outlets	stainless steel 6 port faceplate	TE-AMP & TrueNet	1FM-(6)ØE-AMP-LAB	0	0	0	0	0	5	0	**5**
blank inserts for wall outlets	ivory blank insert	TE-AMP & TrueNet	1-11164121-1	5	0	0	0	0	0	0	**5**
4 port modular furniture outlets	black 4 port snap in furniture faceplate	TE-AMP & TrueNet	1933134-1	15	0	78	91	0	2	0	**186**

blank inserts for modular furniture outlets	black blank insert	TE-AMP & TrueNet	1116412-2	30	0	153	179	0	0	0	**362**
2 port floor mounted outlets	black 2 port 106 mounting frame	TE-AMP & TrueNet	1116618-2	0	0	2	3	0	0	0	**5**
1 port ceiling mounted outlets				2	0	2	0	9	0	0	**13**
large (up to 300 cables) supports for horizonal cable	large support assemblies (up to 300 cables)	TBD	TBD	7	0	10	12	0	4	0	**33**
medium (up to 50 cables) supports for horizonal cable	medium support assemblies (up to 50 cables)	TBD	TBD	65	4	91	111	21	20	0	**312**
small (up to 16 cables) supports for horizonal cable	small support assemblies (up to 16 cables)	TBD	TBD	89	6	94	117	27	29	0	**362**

RJ-45 to RJ-45 copper TOTAL ONLY	1 ft gray Cat 5e patch cords	TE-AMP & TrueNet	TCPC-5ERUVA-GY01F	0	0	0	0	0	0	0	**15**
RJ-45 to RJ-45 copper TOTAL ONLY	3 ft gray Cat 5e patch cords	TE-AMP & TrueNet	TCPC-5ERUVA-GY03F	0	0	0	0	0	0	0	**15**
RJ-45 to RJ-45 copper TOTAL ONLY	7 ft white Cat 5e patch cords	TE-AMP & TrueNet	TCPC-5ERUVA-WT07F	0	0	0	0	0	0	0	**252**
RJ-45 to RJ-45 copper TOTAL ONLY	3 ft white Cat 5e patch cords	TE-AMP & TrueNet	TCPC-6RUVA-WT03F	0	0	0	0	0	0	0	**92**
RJ-45 to RJ-45 copper TOTAL ONLY	5 ft white Cat 5e patch cords	TE-AMP & TrueNet	TCPC-6RUVA-WT05F	0	0	0	0	0	0	0	**50**
RJ-45 to RJ-45 copper TOTAL ONLY	10 ft white Cat 5e patch cords	tbd	tbd	0	0	0	0	0	0	0	**10**
RJ-45 to RJ-45 copper TOTAL ONLY	7 ft yellow Cat 6A unshielded (10G) patch cords	TE-AMP & TrueNet	TCPC-6ARUVB-3307	0	0	0	0	0	0	0	**139**

RJ-45 to RJ-45 copper TOTAL ONLY	5 ft yellow Cat 6A unshielded (10G) patch cords	TE-AMP & TrueNet	TCPC-6ARUVB-3305	0	0	0	0	0	0	0	**36**

Purpose	Description	Manufacturer	Part Number	Rm 107 Main Cross Connect QTY	Rm 135 Main Equip Room QTY	Rm 213 IDF QTY	Rm 325 IDF QTY	Loading Dock IDF QTY	Lab IDF QTY	demarc QTY	Project Total
1st Fiber Backbone	12 strand 50/125 OM3 plenum fiber cable	TE-AMP & TrueNet	3-1553312-9	0	125	68	97	0	167	0	**457**
1st Fiber Innerduct	1 inch plenum innerduct	Carlon	PLM100T	0	125	68	97	0	167	0	**457**
Connectors for fiber 1	LC simplex OM3 MM connector	TE-AMP & TrueNet	6754483-4	36	12	6	6	0	12	0	**72**
4 pair backbone cable	blue plenum Cat 6A unshielded (10G) cable	TE-AMP & TrueNet	TE640P-BL02	0	1500	408	582	1290	2004	0	**6000**
4 pair backbone cable	white plenum Cat-5E cable	tbd	tbd	0	0	0	0	0	0	1225	**1225**
25 pair backbone cable	25 pair plenum Cat 3 cable	Superior Essex	18-499-36	0	0	0	0	430	167	0	**597**

100 pair backbone cable	100 pair plenum Cat 3 cable	Superior Essex	18-799-36	0	375	0	194	0	0	0	**569**
#1/0 CU cable for grounding backbone TOTAL ONLY	#1/0 CU ground wire	TBD	TBD	0	0	0	0	0	0	0	**235**
grounding lugs for #1/0 CU grounding backbone TOTAL ONLY	#1/0 grounding lug	TBD	TBD	0	0	0	0	0	0	0	**8**
taps for #1/0 CU grounding backbone TOTAL ONLY	#1/0 grounding tap	TBD	TBD	0	0	0	0	0	0	0	**3**
large (up to 300 cables) supports for backbone cable	large support assemblies (up to 300 cables)	TBD	TBD	0	21	0	0	0	0	0	**21**
medium (up to 50 cables) supports	medium support assemblies	TBD	TBD	0	21	27	45	39	87	0	**219**

for backbone cable	(up to 50 cables)										
small (up to 16 cables) supports for backbone cable	small support assemblies (up to 16 cables)	TBD	TBD	0	21	9	15	39	29	45	**158**
fiber jumper TOTAL ONLY	2 meter duplex SC-LC 50/125 OM3 fiber jumper	TE-AMP & TrueNet	PAT-LCSC-P30C002M	0	0	0	0	0	0	0	**6**
fiber jumper TOTAL ONLY	1 meter duplex SC-LC 50/125 OM3 fiber jumper	TE-AMP & TrueNet	PAT-LCSC-P30C002M	0	0	0	0	0	0	0	**6**

Purpose	Description	Manufacturer	Part Number	Rm 107 Main Cross Connect QTY	Rm 135 Main Equip Room QTY	Rm 213 IDF QTY	Rm 325 IDF QTY	Loading Dock IDF QTY	Lab IDF QTY	demarc QTY	Project Total
voice/data termination panels	48 port Cat 5e patch panel	TE-AMP & TrueNet	1479155-2	3	0	4	5	0	0	0	**12**
voice/data termination panels	24 port Cat 5e patch panel	TE-AMP & TrueNet	1479154-2	0	1	0	0	0	1	0	**2**
warehouse connections termination panels	24 port patch panel blank	TE-AMP & TrueNet	1375291-1	1	0	0	0	0	0	0	**1**
warehouse connections termination panels	48 port patch panel blank	TE-AMP & TrueNet	1375292-1	0	0	0	0	1	0	0	**1**
Modular jacks for warehouse connections patch panels	blue Cat 5e RJ-45 jack	TE-AMP & TrueNet	1375191-6	3	0	0	0	11	0	0	**14**
Modular jacks for warehouse connections patch panels	ivory Cat 5e RJ-45 jack	TE-AMP & TrueNet	1-13751911-1	3	0	0	0	33	0	0	**36**
lab termination panels	24 port patch panel blank	TE-AMP & TrueNet	1375291-1	0	0	0	0	0	3	0	**3**
Modular jacks for lab patch panels	yellow Cat 6A unshielded (10G) RJ-45 jack	TE-AMP & TrueNet	1933476-8	0	0	0	0	0	64	0	**64**
IP surveillance termination panels	24 port patch panel blank	TE-AMP & TrueNet	1375291-1	1	0	0	0	1	0	0	**2**

Modular jacks for IP surveillance patch panels	green Cat 6 RJ-45 jack	TE-AMP & TrueNet	1375055-9	8	0	0	0	7	0	0	**15**
Termination enclosures for fiber 1 backbone	6 panel 2RU rack mount fiber enclosure	TE-AMP & TrueNet	RMG-2000-000B	1	0	0	0	0	0	0	**1**
Termination enclosures for fiber 1 backbone	3 panel 1RU rack mount fiber enclosure	TE-AMP & TrueNet	RMG-1000-000B	0	1	1	1	0	1	0	**4**
Adapter panels for fiber 1	12 strand LC OM3 MM fiber adapter panel	TE-AMP & TrueNet	RMG-12ADPQ2	4	1	1	1	0	1	0	**8**
Blank panels for fiber 1	blank fiber adapter panel	TE-AMP & TrueNet	559523-1	2	2	2	2	0	2	0	**10**
Termination panels for multipair backbone	wall mount Cat 5e 300 pair 110 block with C-5s	TE-AMP & TrueNet	569446-1	2	1	0	1	0	0	0	**4**
Termination panels for multipair backbone	wall mount Cat 5e 100 pair 110 block with C-5s	TE-AMP & TrueNet	569440-1	2	0	0	0	0	0	0	**2**
Termination panels for multipair backbone	rack mount Cat 5e 200 pair 110 block with C-5s	TE-AMP & TrueNet	558637-1	0	0	0	0	1	1	0	**2**
4 pair backbone termination panels	48 port patch panel blank	TE-AMP & TrueNet	1375292-1	1	0	0	0	0	0	0	**1**
4 pair backbone termination panels	24 port patch panel blank	TE-AMP & TrueNet	1375291-1	1	1	1	1	1	1	0	**6**
4 pair backbone termination panels	ivory 6 port surface mount box	TE-AMP & TrueNet	1-1933674-1	0	0	0	0	0	0	1	**1**
Modular jacks for 4 pair backbone	yellow Cat 6A unshielded (10G) RJ-45 jack	TE-AMP & TrueNet	1933476-8	42	12	6	6	6	12	0	**84**

Modular jacks for 4 pair backbone	red Cat 5e RJ-45 jack	TE-AMP & TrueNet	1375191-7	5	0	0	0	0	0	5	**10**
2 post racks	19 inch x 7 foot black relay rack	Cooper B-Line	SB556084XUFB	2	2	2	2	0	2	0	**10**
vertical cable managers between racks	vertical cable manager	Chatsworth	30096-703	1	1	1	1	0	1	0	**5**
vertical cable managers at end of racks	vertical cable manager	Chatsworth	30095-703	2	2	2	2	0	2	0	**10**
1RU horizontal cable managers on floor rack	1RU horizontal cable manager	Chatsworth	30139-719	4	2	3	3	0	5	0	**17**
2RU horizontal cable managers on floor rack	2RU horizontal cable manager	Chatsworth	30130-719	3	0	4	5	0	0	0	**12**
wall mounted cabinet	wall mounted cabinet 38Hx19Wx18D	Chatsworth	12324-722	0	0	0	0	1	0	0	**1**
1RU horizontal cable managers in wall cabinet	1RU horizontal cable manager	Chatsworth	30139-719	0	0	0	0	3	0	0	**3**
ladder runway	12 inch black ladder runway	Cooper B-Line	SB17U12BFB	1	1	1	1	0	1	0	**5**
wall angle bracket	12 inch black wall angle support bracket	Cooper B-Line	SB211312FB	1	1	1	1	0	2	0	**6**
rack to runway connecting plate	12 inch black runway to rack mounting plate	Cooper B-Line	SB213312FB	2	2	2	2	0	2	0	**10**
runway junction splice	junction splice kit	Cooper B-Line	SB2101ABZ	1	0	1	1	0	0	0	**3**

runway end cap	protective runway end caps	Cooper B-Line	SB21B	2	1	2	2	0	2	0	**9**
vertical runway wall bracket	vertical wall bracket	Cooper B-Line	SB-2109	2	2	2	2	0	4	0	**12**
telecommunications grounding bus bar	telecommunications grounding busbar	Cooper B-Line	SB-476	1	1	1	1	0	1	0	**5**
2 hole #6 ground lug	No.6 insulated ground lug	TBD	TBD	10	8	10	10	0	12	0	**50**
#6 insulated ground wire	No.6 insulated ground wire	TBD	TBD	28	24	28	28	0	27	0	**135**