1. PART ONE - GENERAL

1.1 DESCRIPTION

A. The purpose of this document is to describe the minimum requirements and establish the design guidelines for All Communications Cabling. The communications cabling will support data, video and voice signals throughout the network. Station cabling will run from designated Main Distribution Frame (MDF) or Intermediate Distribution Frame (IDF) to various locations indicated on the contract drawings and described herein. Backbone cabling will run from designated Main Distribution Frame (MDF) to Intermediate Distribution Frame (IDF). All non-accessible cabling must be in conduit from end to end.

B. All substitutions to any pre-approved Parts or Hardware listed below, are required to be submitted in writing to the Director of PVUSD technology so that he may determine if they are equivalent and are approved for use in any project. The Director of PVUSD Technology will ultimately decide if any proposed substitutions are acceptable. Contractor is responsible to understand all information on this and all supporting documents, any discrepancies or questions must be submitted in writing for clarification.

C. Provide all labor, materials, tools and equipment required for the complete installation of a complete structured cabling system, including Category 6 or 6A UTP, single-mode optical fiber backbone system and work called for in the contract documents. This shall include but is not limited to all UTP copper cabling, racks, cabinets, patch panels, modular connectors, optical fiber cable, cable management, documentation and accessories for a complete system.

D. All copper cable terminations shall comply with and be tested to ANSI/TIA/EIA 568-B.2 Commercial Building Telecommunications Cabling Standard Part: 2 Balanced Twisted Pair Cabling Components. ANSI/TIA/EIA 568-B.2-1 Commercial Building Telecommunications Cabling Standard Part: 2 Balanced Twisted Pair Cabling Components – Addendum 1 – Transmission Performance for 4 Pair 100 ohm Category 6 Cabling. ANSI/TIA/EIA 568-B.2-6 Commercial Building Telecommunications Cabling Standard Part: 2 Balanced Twisted Pair Cabling Components – Addendum 6 – Category 6 Related Component Test Procedures.

E. The contractor is responsible for the provision and installation of all data raceways, including all boxes, raceway fittings, cable management and raceways. The low voltage cabling contractor shall provide and install all cabling and provide terminations per the PVUSD provided specifications.

F. The contractor is responsible for the care or any existing technical equipment and/or racks located in the direct vicinity of any construction. These cabinets and equipment must be properly protected/covered without obstructing airflow during any construction. The contractor i responsible for damage and repair to any Equiptment or work disrupted as a result of their work, including but not limited to painting, complete replacement or hardware, cabling and/or parts.

G. The low voltage cabling contractor is responsible to Perform all work in compliance with local, state and federal codes and regulations that may affect this described work.

H. Work provided by other trades or Sub-Contractors is required to be Inspected to meet PVUSD Requirements/Standards by the General contractor and PVUSD Technology Director or designee. Commencement of work described herein will serve as evidence that the contractor has accepted all prior and/or ongoing work performed by other trades for the structured cabling system. All necessary changes done without prior written authorization from the PVUSD Director or Technology or designee, shall be done at the contractor's own risk and expense.

I. It is the contractor's responsibility to verify the capacity of the structured cabling pathways/Conduit and that they are sufficient space for the designed structured cabling system. Any discrepancy between site conditions and the contract drawings must be submitted in writing to the Director of Technology or their designee. Commencement of work implies acceptance of the site conditions by the contractor.

J. It is the contractor's responsibility to field verify all pathways, routes and dimensions necessary for the structured cabling system and that all pathways and spaces are installed prior to cable installation. Commencement of work implies acceptance of the pathways by contractor.

K. The Contract documents do not necessarily describe all the required work to satisfy the intention. On the basis of work described herein and/or indicated in the drawings, the contractor shall furnish all items and provide all labor required to provide a complete, standards based, structured cabling system.

1.2 SUBMITTALS

A. Provide a contractor generated detailed bill of materials required for installation based on the contract documents. Clearly indicate manufacturer, part number and quantity to be provided to complete the scope of work.

B. The communications contractor shall be certain that all correct parts are ordered per products section of this document and installed in accordance with manufacturer's design and installation guidelines. Vendor shall submit complete parts and part numbers prior to installation of equipment. Failure to do so is done at the risk of the contractor.

C. It is the contractor's responsibility to verify all part numbers in this specification and to make the customer aware of any changes in writing, that the manufacturer may have made to part numbers or product.

D. The communications contractor shall guarantee at the time of the bid/Quote that all copper cabling, fiber optic cabling and components meet specifications (including installation) of ANSI/TIA/EIA-568-B.1, 568-B.2, 568-B.3 and 569 and other applicable standards.

E. Hardware manufacturer Warranty shall be a (15) year manufacturer supported extended warranty issued to the customer upon completion of the project. Workmanship Warranty shall be 1 Year. The warranty's shall be applications assurance warranty guaranteeing that the installed system shall support any application present and future that is designed to run on the installed infrastructure. The warranty shall cover 100% material and labor for the installed system.

F. Documentation from the manufacturer that the contractor has authority to provide the warranty on behalf of manufacturer must be provided to the PVUSD technology Director or designee.

G. Complete documentation regarding the manufacturer's warranty shall be submitted as part of the proposal. This shall include, but is not limited to; a sample of the warranty that would be provided to the customer when the installation is complete and documentation of the support procedure for warranty issues.

1.3 REFERENCES AND STANDARDS INCORPORATED

A. Published specifications, standards, tests, or recommended methods of trade, industry, or government organizations apply to work of this section.

ANSI	American National Standards Institute
EIA	Electrical Industries Association of America
ISO	International Standards Organization
ITU	International Telecommunications Union
IEEE	Institute of Electrical and Electronic Engineers
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories, Inc.
TIA	Telecommunications Industry Association

B. Nothing in drawings, details, or specifications shall be construed to permit work not conforming to applicable laws, ordinances, rules, regulations, or industry standards. It is contractor's responsibility to field verify all conditions, including footages between and within buildings and/or Pathways.

C. It is not the intent of the drawings, details, or specifications to repeat requirements of codes or standards except where necessary for completeness or clarity. It is the Low Voltage cabling contractor's responsibility to understand and follow these and any other state, local and federal standards and guidelines.

D. Contractor is expected to adhere to and follow the most recent standards, codes and publications.

E. ANSI/TIA/EIA 568-B.1 - Commercial Building Telecommunications Cabling Standard – Part 1: General requirements. Rev: Latest

F. ANSI/TIA/EIA 568-B.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components. Rev: Latest

G. ANSI/TIA/EIA 568-B.2-1 - Commercial Building Telecommunications Cabling Standard - Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling Rev: Latest

H. ANSI/TIA/EIA 568-B.2-2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components - Addendum 2, Rev: Latest

I. ANSI/TIA/EIA 568-B.2-3 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling - Addendum 3 - Additional Considerations for Insertion Loss and Return Loss Pass/Fail Determination Rev: Latest

J. ANSI/TIA/EIA 568-B.2-3 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling – Addendum 4 – Solderless Connection Reliability Requirements for Copper Connecting Hardware Rev: Latest

K. ANSI/TIA/EIA 568-B.2-3 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling – Addendum 5 – Corrections to TIA/EIA 568-B.2 Rev: Latest

L. ANSI/TIA/EIA 568-B.2-3 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling – Addendum 6 – Category 6 Related Component Test Procedures Rev: Latest

M. ANSI/TIA/EIA 568-3 - Optical Fiber Cabling Components Standard Rev: Latest

N. Compliance to industry standards and codes is mandatory. Do not proceed with work that is in conflict with codes and/or standards without written direction from the PVUSD Director of technology or designee. Proceeding with work that is not compliant with codes and standards is done so at the contractor's own risk and expense.

1.4 QUALITY ASSURANCE

A. Contractor requirements:
   1. The contractor, sub-contractor and employees assigned to PVUSD projects must have successfully completed a minimum of five (10) communication projects of the same size and scope within the last calendar year prior to work commencement.
   2. Contractor Project Manager
      a. The Contractor Project Manager shall have successfully completed a minimum of five (15) communications projects of the same size and scope.

b. The contractor shall make the Contractor project manager available to the Director of Technology or designee 2 weeks before the start of this project for an interview. This person must be deemed acceptable by the Director of Technology or designee before work can begin.
c. Contractor Project Manager will be required to be available for scheduled on site project meetings at no additional cost to the Director of Technology or designee.
d. Contractor Project Manager will be required to be available to meet on site with the Director of Technology or designee with a minimum of 24 hours' notice for non-emergency issues and a minimum of 4 hours for emergency issues, at no additional cost to the PVUSD Technology department or designee.
e. Contractor/sub-contractor and all employees must readily wear Company issues ID badges and Bright colored vest to indicate non-PVUSD association ANY time they are at ANY site within PVUSD.

B. Material requirements:
1. All material and equipment to be installed on this project will be new and free from defects.
2. New material shall meet the following requirements.
   a. Manufactured within one year of the installation date
   b. Undamaged
   c. Not previously installed or un-packaged
   d. Delivered to jobsite in original packaging
   e. No corrosion or other degradation of material
   f. In factory condition
   g. Unmodified
3. If used material or equipment has been installed on this project the contractor shall replace said materials and/or equipment with new products at no additional cost to PVUSD.
4. Equipment and accessories shall be in compliance with the applicable standards listed in this document and with applicable national, state and local codes.
5. ALL Items of a given type shall be the products of the same manufacturer.
6. Ship equipment in its original packages to prevent damaging or entrance of foreign matter.
7. Perform shipping and handling in accordance with manufacturer's recommendations. Provide protective covering during construction.
8. Replace at no expense to PVUSD, equipment or material damaged during storage, handling or is simply BOB (bad out of Box) as directed by the PVUSD Director of technology or designee.

C. Warranty requirements:
1. Contractor shall warranty all materials, equipment for (15) Years and workmanship for (1) Year minimum from installation date.
2. Warranty shall provide repair/replacement of all defective or improperly installed materials at no additional cost to PVUSD (including all costs to repair or replace the item(s)).
3. Contractor shall provide a competent service technician with at least 5 years of applicable experience and new materials to repair/replace defective items no later than 24 hours after notification.

D. All Equipment and accessories must be in compliance with the applicable standards listed and with applicable national, state and local codes.

1.5 DESIGN METHODOLOGY

A. Each NEW IDF is connected to the site MDF with one (1) 12-strand single mode optical fiber via a home run (not spliced). All strands shall be terminated and color coded to match industry standards. The fiber cables will be terminated with LC connectors and put into a rack mounted LIU (fiber optic interconnecting unit).

B. If the contractor is extending the existing fiber cabling from an existing IDF/MDF, the contractor will match the existing fiber type and strand count. The fiber cables will be terminated with SC for MM and LC connectors for SM, and housed in a rack mounted LIU (fiber optic interconnecting unit).

C. Category 6A cable shall be installed to each WAP (wireless Access Point) location. Each WAP's location shall be configured per the contract documents. Cables shall be installed from the corresponding MDF/IDF to each WAP location (NO Splicing). Contractor shall terminate WAP cables onto Category 6A RJ45 modular connectors listed below. At the MDF/IDF locations, WAP cables shall be terminated on rack mounted 24/48-port Category 6A RJ45 modular patch panel.

D. Category 6 cable shall be installed to each work area outlet (WAO) location. Each of the WAOs shall be configured per the contract documents. Cables shall be installed from the corresponding MDF/IDF to each WAO location (NO Splicing). Contractor shall terminate WAO cables onto Category 6 RJ45 modular connectors. WAO cables shall be terminated on rack mounted 24/48-port Category 6 RJ45 modular patch panel.

E. Category 6 cable shall be installed to each (IPPA) IP Paging Anouncement location. Each Location shall be configured per the contract documents. Cables shall be installed from the corresponding MDF/IDF to each location. Contractor shall terminate cables onto Category 6 RJ45 modular connectors. At the MDF/IDF locations, cables shall be terminated on rack mounted 24/48-port Category 6 RJ45 modular patch panel.

F. Category 6 cable shall be installed to each Camera location. Each Location shall be configured per the contract documents. Cables shall be installed from the corresponding MDF/IDF to each location. Contractor shall terminate cables onto Category 6 RJ45 modular connectors. At the MDF/IDF locations, cables shall be terminated on rack mounted 24/48-port Category 6A RJ45 modular patch panel.

G. Refer to contract documents for quantity and configuration of each location.

H. Cables must not be, attached to ceiling grid, lighting fixture wires, laying on floor of ceiling, Unprotected

I. Pair untwist at termination shall not exceed 3.18mm (0.125”).

J. Bend radius of cable in termination area shall be no less than 4 times the outside diameter of the cable.

K. All cable and connectors shall be installed and terminated to the manufacturer’s guidelines, recommendations and best industry practices.

L. Cable shall be installed in continuous lengths from point of origin to termination point, no splices allowed.

M. The contractor will be responsible to demo and remove any unused material specific to installation.

N. Communications contractor shall be responsible for providing and installing the appropriate sized J-hooks where cable tray is not used.

O. Cable bundles of up to QTY:50 for Category 6 or up to QTY:30 for Category 6A cables must be supported by 2” J-hooks. Cable bundles of up to QTY: 150 Category 6 or QTY:90 Category 6A cables must be supported using 4” J-hooks.

P. J-hooks are to be placed at 48 to 60 inch intervals. At no point shall the cables rest on the acoustical ceiling or floor of hard cap ceiling.8

PRE-INSTALLATION CONFERENCE

A. Contractor shall attend a pre installation meeting to be conducted by the PVUSD project manager. Attendance shall be at the direction of the Director of Technology and may include the contractor's construction manager, subcontractors, vendors and PVUSD representatives.

2. PART TWO – PRODUCTS

2.1 GENERAL

A. Quality of Products: Material and equipment specified herein have been selected as the basis of acceptable and desired quality of performance and have been coordinated to function as components of the specified system.

B. Provide Complete: Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the work of this section as if specified in full herein.

C. Provide New: All materials provided under the work of this section shall be of the manufacturer's latest design/model and shall be permanently labeled with the manufacturer's name, model number and serial number.

D. Continuous Use: All active circuitry shall be solid state and shall be rated for continuous use. All circuit components shall be operated in full compliance with the manufacturer's recommendations and shall contain sufficient permanent identification to facilitate replacement.

2.2 DATA CABLING

A. Contractor shall provide, install and test a CAT-6A cable link from each WAP Outlet, CAT-6 cable link from each Data/VOIP/IPPA/Camera outlet directly to the IDF utilizing the hardware listed below, in full compliance with all applicable standards, local and national codes, manufacturer’s recommendations and otherwise noted within these specifications.

B. Routing shall be via Continuous conduit for any cabling ran through unserviceable areas, such as hard cap ceilings with no access. All work is to be performed in accordance with low-voltage plans approved by PVUSD Technology. The contractor is responsible for determination of actual segment lengths with a minimum of 4’service loop at the MDF/IDF End.

C. Specifications:
   1. Four twisted, unshielded, 23 AWG, solid pairs (23 AWG UTP).
   2. Suppress cross-talk.
   3. Maintain 10GB/S performance.
   4. Meet or exceed Cat-6/Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
   5. SRL, Attenuation and NEXT results shall use Sweep Frequency test per TIA-568-C.
   6. Compatible with IEEE 802.3at POE+.
   7. GENSPEED UTP 10Gig 6A 7133819, Panduit CAT6A PUR6AD04BU-UG, Superior Essex CAT6A Outdoor Rated 04-001-A4.
   8. GENSPEED UTP 10Gig 6, Panduit CAT6, Superior Essex CAT6A Outdoor Rated 04-001-A4.
   9. Cables shall be rated for its intended use, (i.e. plenum, riser, wet location, etc.).

2.3 DROP CABLE WIRING CLOSET HARDWARE

A. All material shall be UL listed for its application.

B. All IDF, MDF, etc. shall be enclosed unless open racks are called out on the plans.

C. Top of IDFs shall be mounted 18” below ceiling.

D. All cabinets will be mounted in a location where it would not impede the natural flow or walkways of room or become a liability; usually these are place in corners of rooms. Any deviation from this is done at the contractors own risk and fixed at their own expense.

E. Provide all necessary mounting hardware. Including fire rated backboard.

2.5 COPPER PATCH PANELS

A. 48 Port, Modular patch panel: Panduit #NKPP48P – Leviton#49255-D48.

B. 24 Port, Modular patch panel: Panduit #NKPP24P – Leviton#49255-H24.

C. Data ports
1. RJ45 design.
2. Terminate 26AWG to 22 AWG, solid copper cabling without punch-down tool.
3. Suppress alien cross-talk.
4. Maintain 10GB/S performance in 48 port, 1RU patch panels.
5. T568B wiring scheme.
6. Meet or exceed Cat-6A requirements of TIA-568-C.2 and IEEE 802.3an.
7. Compatible with IEEE 802.3at POE+.
8. Snap in, snap out modular design.
9. Conductor retention and strain relief.
10. Gold plated contacts.
11. Manufacturer and models:
    a. Green CAT6A: Wireless Outlet = Panduit #NK6X88MGR -- Leviton #6110G-RV6
    b. Red CAT6: Work Area Outlet = Panduit #NK6X88MRD -- Leviton #61110-RC6
    c. White CAT6: Video Surveillance = Panduit #NK6X88MIW -- Leviton #61110-RW6
    d. Purple CAT6: IP PA Endpoint Speakers = Panduit #NK688MVL-- Leviton #61110-RP6
    e. Blue CAT6: Phone Wall mount = Panduit #NK688MBL-- Leviton #61110-RL6
12. Grouping of ports in patch panels shall be determined by PVUSD Technology Staff

D. Identification
1. Interior: Brother #TZEFX231 self-laminating, polyester label.

2.5 DROP CABLE (WOA) OUTLET HARDWARE

A. All data drop outlet/station outlet connecting hardware shall be EIA/TIA TSB-40 Category 6/6A compliant.

B. All drop outlet/station outlet hardware shall be modular jack outlets with Category 6/6A RJ45 modular jacks.

C. All modular jacks shall be eight (8) position jacks with pin/pair assignments utilizing EIA/TIA T568B.

D. All modular jacks will be placed into faceplates with any unused openings supplied with blank inserts.
   1. All ports shall be RJ45, Cat-6/6A.
      a. Terminate 26AWG to 22 AWG, stranded or solid, CAT-6A cables without punch-down tool
      b. Suppress cross-talk
      c. Maintain and test for 10GB/S performance in 48 port, 1RU patch panels
      d. T568B wiring scheme
      e. Meet or exceed Cat-6/6A requirements of TIA-568-C.2 and IEEE 802.3an
      f. Compatible with IEEE 802.3at POE+
      g. Snap in, snap out modular design
      h. Conductor retention and strain relief
      i. Gold plated contacts
      j. Manufacturer and models
         a. Green CAT6A: Wireless Outlet = Panduit #NK6X88MGR -- Leviton #6110G-RV6
         b. Red CAT6: Work Area Outlet = Panduit #NK6X88MRD--Leviton #61110-RC6
         c. White CAT6: Video Surveillance = Panduit #NK6X88MIW--Leviton #61110-RW6
         d. Purple CAT6: IP PA Endpoint Speakers = Panduit #NK688MVL--Leviton #61110-RP6
         e. Blue CAT6: Phone Wall mount = Panduit #NK688MBL--Leviton # 61110-RL6
      k. Identification
         1. Interior: Brother #TZEFX231 self-laminating, polyester label

2.6 COPPER PATCH CORDS - NO BOOTS!

A. RJ45 design.
B. Four twisted, unshielded, 23 AWG, solid pairs (23 AWG UTP)
C. Suppress alien cross-talk.
D. Maintain 10GB/S performance.
E. T568B wiring scheme.
F. Meet or exceed Cat-6/6A requirements of TIA-568-C.2 and IEEE 802.3an.
G. SRL, attenuation and NEXT results shall use sweep frequency test per TIA-568-C.
H. Compatible with IEEE 802.3at POE+.
I. Length shall be determined by distance from data port to data equipment.
J. Manufacturer and models. NO BOOTS!

1. Green CAT6A: Wireless = Panduit #UTP6AxxGR/N – Leviton #NOT Available
2. Red CAT6: Work Area = Panduit #UTP6AxxRD/N – Leviton #6D460-xR
3. White CAT6: Video Surveillance = Panduit #UTP6A8xxIW/N – Leviton #6D460-xW
4. Purple CAT6: IP PA Endpoint Speakers = Panduit #UTPSP10VLY – Leviton #Not Available
5. Blue CAT6: Phone Wall mount = Panduit # – Leviton #6D460-xL

3. PART THREE - DATA BACKBONE CABLING

3.1 GENERAL

A. The contractor shall provide, install, terminate, dress and test continuous fiber optic backbone cable from 'IDF' to 'MDF' utilizing the hardware listed in full compliance with all applicable standards, local and national codes, manufacturer's recommendations and otherwise noted within these specifications. Contractor shall determine cable "link" quantities as shown on the Contract Documents.

B. Routing shall be via conduit in accordance with contract drawings. The contractor is responsible for determination of actual segment lengths with a minimum of 6'service loop at both ends.

C. Provide all termination accessories, dressing accessories, enclosures and testing for a complete fiber optic distribution system. Refer to specification.

D. Cabling and Hardware must be Rated Operating temperature range: -40°F to 167°F

E. Cabling and Hardware must be Rated Maximum load
   1. Installation: 600 pounds
   2. Sustained: 180 pounds

F. Cable shall be rated for installation environment, (i.e. plenum, riser, outdoor, underground, etc.).

G. Cables, fibers and all other components shall meet the requirements of standards listed in this document.

H. Fibers shall be laser optimized glass.

I. Factory testing shall be in accordance with TIA 455 series of standards.

J. Cables shall be loose tube with water blocking system.

K. Multimode fibers (Fiber Extension Only)
   1. Multimode fibers shall be listed to OM4 (TIA-492-AAAD) standards.
   2. They shall be compatible with 1000Base-SX, 10GBase-SR, and 10GBase-LRM transceivers.

L. Single-mode fibers
   1. Single-mode fibers shall be listed to OS2 (TIA-492-CAAB) standards.
   2. They shall be compatible with 1000Base-LX10, 10GBase-LRM, and 10GBase-LR transceivers.

M. Backbone SM fiber cables shall be 12 strand OS2 cable, General Cable 12F 8.3/125 SM TB I/O OFNP # AP0121ANU.BK.

N. Identification
   1. 1 Interior: Brother #TZEFX231 self-laminating, polyester label.

3.2 FIBER OPTIC PATCH PANELS

A. The fiber patch panels for IDF locations shall be rack mountable and provide a slide out function with applicable number of port connector outlets for termination of fiber run from MDF and leave room for expansion.

B. The fiber patch panels for MDF location shall be rack mountable with applicable number of port connector outlets for termination of fiber runs from all IDFs.

C. The fiber patch panels for all locations shall be complete with all necessary interconnection sleeves/bulkheads to support all fiber optic cables at the given location.

D. The fiber optic interconnection sleeves/bulkheads shall be LC for SM and SC for MM (only used for extending fiber).

E. All fiber strands shall be terminated in accordance with industry standards and color codes.

3.3 FIBER OPTIC PATCH PANELS

A. Patch panel: Panduit #CFAPPBL1 – Leviton# no applicable part available

B. Enclosure: Panduit # FMT1 – Leviton# no applicable part available

C. Fiber adapter panels (FAP)
   1. Multi-mode (Fiber Extension Only)
      a. OM3
      b. 6 Duplex SC adapters per FAP
      c. Zirconia ceramic, split sleeve ferrules
      d. Color: Blue
      e. Manufacturer: Panduit # FAP6WFDBDLCZ – Leviton# no applicable part available
   2. Single-mode
      a. OS2
      b. 6 Duplex LC adapters per FAP
      c. Zirconia ceramic, split sleeve ferrules
      d. Color: Green
      e. Manufacturer: Panduit # FAP6WCGRDLCZ– Leviton# no applicable part available

D. Install blank adapter panel in each unused space in the patch panel: Panduit #FAPB– Leviton# no applicable part available

E. Install dust covers on any unused bulkheads

F. Fiber optic patch cords
   1. Cords shall have duplex Appropriate connectors on one end (for patch panel) and SFP/LC connectors on other end.
   2. Length shall be 2 meter
   3. Multi-mode patch cords shall be OM4 (extensions only).
   4. Single-mode patch cords shall be OS2.
   5. Mode conditioning cables shall have MC on LC side and MC side should be on left.
   6. Cord and connector colors shall be
      a. SM 10 GB and up = Yellow
      b. MM 10 GB and up (OM3, OM4) = Aqua

c. MM 1 GB and up (OM1 62.5) = Orange
d. LRM Over MM 62.5M = One side, Orange with LC side Mode conditioning on Left

4. PART FOUR - ENCLOSURES AND RACKS

4.1 OPEN FRAME RACKS

A. Racks
1. Four posts floor mount: Front and rear pairs of 3” deep C-shaped equipment.
2. Mounting channels, 19” wide.
3. Refer to plans for minimum quantity of rack units.
4. 1000 pound static load capacity.
5. Provisions for anchoring to floor.
6. Zone 4 seismic rated.
7. Material: Aluminum or steel.
8. Racks shall be black.
9. Part numbers: DAMAC
   a. Floor mount 4-post open frame rack: R4S19084CND-3MU
   b. Floor mount 2-post open frame rack: RRA19084-3MU
   c. Concrete floor installation kit: ARRFCK-58
   d. #12-24 cage nuts: AHPFM6-30
   e. #12-24 screws: AHPF1224-30
   f. Grounding kit ARGGB019
   g. Ladder rack protective end caps: PLAEC-3
   h. DAMAC junction plate: PLB12RS-3
   i. DAMAC wall angle support: PLBA12-3

B. Mount a backboard on wall behind cabinet or rack
1. 48” wide by 96” high by 3/4” deep plywood.
2. Mounting: 3/8”x2” long wood or self-tapping screw every 12” along wall stud.
3. Backboard plywood shall be fire resistant or be painted with 3 coats of fire resistant paint.

C. Cable management
1. Provide and install vertical and Horizontal cable manager at each post.
2. Vertical cable managers shall be double sided.
3. Cable managers between racks shall be 6” wide Panduit Products. #WMPVE45.
4. Cable managers with rack on one side only shall be 3.6” wide Panduit Products. #WMPVE45.

4.2 ENCLOSED RACKS/CABINATES

A. Racks/Cabinets
1. Material: Steel.
2. 300 pound static load capacity.
3. 18” DIN rail.
4. 30’’ Deep
5. Cabinet shall be composed of three sections:

a. Rear panel mounted to wall.
b. Main section shall be hinged on rear panel and include lock to secure in closed position to rear panel.
c. Front door shall be hinged on main section and lockable in the closed position.

5. Hinges shall be reversible to allow swing open from the right or left. (cabinet must be mounted accordingly)
6. The front door shall have rounded edges and corners.
7. The front doors of cabinets mounted inside shall feature a smoked polymethyl-methacrylate window.
8. Mounting rails shall be placed no less then 4 and no more than 6" from front of cabinet.

B. Cooling for cabinets in air conditioned rooms
1. Ventilation Fan, minimum flow rate of 225 CFM DAMAC.#ATFK2
2. Ventilation openings in roof
3. Ventilation openings in sides
4. Ventilation opening on bottom

C. Cabinates (floor mount)
1. Four posts.
2. Refer to plans for minimum quantity of rack units.
3. 300 pound static load capacity.
4. Mounting rails shall be adjustable in depth so that they can be positioned at any point within the cabinet body.
5. Mounting rails shall be placed no less then 4 and no more than 6" from front of cabinet.
6. Racks shall be black.
7. Racks will be installed with a minimum 3' of clearance in back, and 4' in front.

D. Mount a backboard inside rear of cabinet (enclosed IDF) or on wall behind rack (open IDF).
1. 3/4" plywood.
2. Refer to plans for minimum quantity of rack units.
3. 300 pound static load capacity.
4. Mounting rails shall be adjustable in depth so that they can be positioned at any point within the cabinet body.
5. Racks shall be black.
6. Mounting: 3/8"x2" long wood or self-tapping screw every 12" along wall stud.
7. Backboard plywood shall be fire resistant and be painted leaving fire resistant stamp visible. Paint to match existing décor.

4.3 COATING

A. The completed rack or cabinet shall be degreased and cleaned.

B. After the cleaning process is finished, the rack or cabinet shall be phosphatized.

C. After the phosphatizing, the rack or cabinet shall receive an electrostatic deposition of polyester powder coating followed by baking to produce a hard durable finish.
1. The minimum thickness of the paint film shall be 2.0 mils.

2. For the exterior of transformer tank, interior and exterior of primary and secondary cable compartments the minimum total dry film thickness shall be 3.5 mils.
3. Paint film shall be uniform in color and free from blisters, sags, flaking and peeling.

D. Finish shall conform to UL 50 and UL 50E.

E. Color shall be black.

F. The contractor shall calculate space requirements prior to ordering equipment. If the specified enclosure or rack is not large enough, the contractor shall order the size required for the equipment to be installed.

G. Racks/posts shall have square holes for mounting inserts with ECA-310-D compliant hole pattern (MDF).

H. Each rack unit space shall be identified on the racks/posts.

I. All Rack Keys to be returned to Director of Technology or designee. Do not Leave onsite or on cabinet

J. All Keys will be CH751 Code and cut compatible

K. Manufacturers
   1. DAMAC.
      a. DAMAC 24"x22"x30" RIGHT HAND HINGE GLAND HD BLACK #WS24Z22336-3
      b. DAMAC 24"x22"x30" LEFT HAND HINGE GLAND HD BLACK #WS24Z22688-3
      c. DAMAC 36"x22"x30" RIGHT HAND HINGE GLAND HD BLACK #WS36Z22337-3
      d. DAMAC 36"x22"x30" LEFT HAND HINGE GLAND HD BLACK #WS36Z22678-3
      e. DAMAC 48"x22"x30" RIGHT HAND HINGE GLAND HD BLACK #WS48Z22338-3
      f. DAMAC 48"x22"x30" RIGHT HAND HINGE GLAND HD BLACK #WS48Z22677-3
      g. DAMAC AXIS PLUS ENCLOSURE 84”x24”x42” 45U CAGENUT #CC084EQB1SHSR (used in cases where cab is pressed up against wall)
      h. DAMAC AXIS PLUS ENCLOSURE 84”x24”x42” 45U CAGENUT #CCP84Z24083-3 (used when cab is stand alone or not pressed up against something.

5. PART FIVE - LABELING

5.1 CONTRACTOR SHALL FOLLOW PVUSD’S LABELING SCHEME

A. Label each cable at its beginning and end points no further than 6” behind termination on a section of cable that is easily accessible. Cable labels shall include the ID’s of both terminations and cable ID. Label all cable beginning and terminating points. Label Biscuit boxes and faceplates as well as patch panel. In the event cable is terminated above ceiling/ceiling tile, label ceiling /ceiling grid must with black tape/white letters no more than 1’ from termination.

B. All labels shall be machine printed or embossed. Handwritten labels are not acceptable.

C. All labeling information shall be recorded on the as-built drawings and all test documents.

D. Labels for cables shall Follow this standard:
   a. **Standard WAO Cabling (Red)**
      i. room#, plate#, jack#
      ii. Example: 22.1.1 room 22, plate location 1, port 1. The next port on the same plate would be 22.1.2.
   b. **Video surveillance Cabling (White)**
      i. CAM.RM#
      ii. Example: CAM.22
   c. **Wireless Access Point Cabling: (Green)**
      i. AP.room#.out (for outdoor WAPs).
      ii. Example: AP.22 (AP inside room 22)
      iii. Example: AP.22.OS (AP outside room 22)
      iv. Ceiling grid will be labeled to match each WAP port label.
   d. **IPPA Cabling: (Purple)**
      i. Interior Clock Speaker
         1. PA.RM#
         2. Example: PA.22 (room 22 Inside speaker)
      ii. Exterior Horn
         1. H.RM#.#of Horn outside room)
         2. Example: H.22.1 = Room 22 horn 1
   e. **Phone Cabling: (Blue)**
      i. PH.RM#
      ii. Example: PH.22 (phone in room 22)

6. PART SIX - TESTING

6.1 GENERAL

A. All cables (including each fiber) and termination hardware will be tested by contractor.

B. Testing must comply with TIA standards for testing (refer to section 1.3 of this document), plans, specifications and manufacturer recommendations.

C. Contractor shall notify the PVUSD Technology department or designee 72 hours before commencement of testing.

D. Upon receipt of the test documentation, the customer reserves the right to have the contractor perform a 20% witnessed “spot testing” of the cabling system at no additional cost, in order to validate test results provided in the test document. If a significant amount of cables are marginal and/or fail during the “spot test”, contractor will retest the entire cable plant at no additional cost.

E. Equipment
   1. All equipment must be properly calibrated and traceable to NIST.
   2. Equipment shall have been recalibrated within the previous 6 month prior to testing.

F. Data Copper Cables
   1. Each pair in each cable shall be tested in accordance with TIA-568-C series and TIA-TSB-67 for 10GB transmission:
      a. Opens
      b. Shorts
      c. Grounds
      d. Continuity
      e. Polarity
      f. DC resistance
      g. Impulse noise
      h. Signal attenuation
      i. NEXT
      j. PS-NEXT
      k. ELFEXT
      l. PS-ELFEXT
      m. Return loss
      n. Propagation delay
      o. Delay skew
   2. Each installed cable link shall be tested for installed length using a TDR type device. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
   3. Conductors and connectors shall be tested as a complete system.
   4. Testing of all cable, outlet ports, patch cords and riser cable pairs shall include end-to-end tests using a Fluke Network's DTX / VERSIV Cable Analyzer Series scanner.
   5. Test cables to check that they meet all IEEE and TIA Cat-6/6a and 10GB/S performance specifications.
   6. All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
   7. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA standards.
   8. The test equipment shall provide a printed document for each test that is also available in a downloadable file using an application from the test equipment manufacturer. The printed test results shall include a print out of all tests performed and the individual test results for each cable.

7. PART SEVEN - SYSTEM CLOSEOUT AND AS-BUILT DOCUMENTATION

7.1 COMPLETION

A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the PVUSD Technology department or designee for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.
   1. Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall

be submitted within 30 calendar days of the completion of each testing phase. At the request of the PVUSD Technology department or designee, the telecommunications contractor shall provide copies of the original test results.

B. PVUSD may request that a 10% random field retest be conducted on the cable system at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the engineer, including a 100% re-test. This re-test shall be at no additional cost to the PVUSD Technology department or designee.

C. Test result documentation shall be provided in two media's as listed above; one (1) hardcopy and one (1) Electronic copy in Full, within three weeks after completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name and the date of completion (month and year).

D. The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

E. Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.

F. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted and both the failed and passed test data shall be documented.

G. PVUSD will provide floor plans in electronic format, for which as-built Drawing information can be added for most existing devices. Contractor will need to verify accuracy of maps.

H. The as-built drawings are to include cable routes (conduit), outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons and drawing conventions used shall be consistent throughout all documentation provided. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the PVUSD Technology department or designee in electronic format in Visio and PDF.
    1. As built maps should include:
        a. Map of conduit routes (in Visio format)
        b. Map of cabling and labeling for all components (in Visio format)
        c. Map of WAPS with cable# and WAP name (if applicable). Maps should include distinction between old/new/cable only locations. (in Visio format)
        d. Map of Phone locations Phone with Cable# and Extension# (if applicable) (in Visio format)
        e. IDF/MDF build outs with accurate connections and all devices and models in IDF/MDF (in Visio format)

2. Cable test results
    a. Should be modified for ease of reading and turned in in PDF format
3. Wired Equipment and UPS Backbone SS
    a. Should include all of the following info at minimum: Device manufacturer, model, serial number, MAC address, IP address, Hostname, local admin password (encrypted on doc), purchasing channel (IE PO, SR, order etc.), date purchased and date installed.
4. Wireless backbone SS
    a. Should include all of the following info at minimum: AP Name/location, SN, MAC, Type of AP, Asset tag info, Erate sticker info, funding source (Erate 18, sales order etc.), date of install and date of test.
5. Warranty Information
    Should include Cabling hardware and workmanship warranty with accurate dates
    i. Should include hardware and workmanship warranty with accurate dates

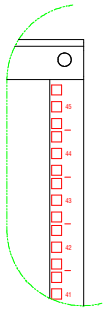
Addendum/s: Please see Addendum 1 for “beyond low voltage specs”

TANDEM RACK SERIES: 84.00"H x 20.25W" x 36.00"D
PART NO.: R4S19084CND-3MU

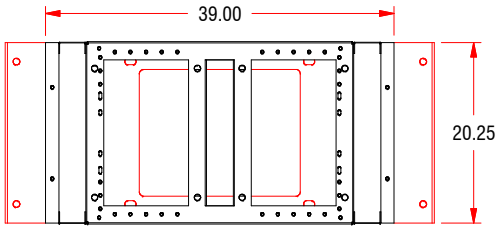
REVISIONS			
REV	ECO	DATE	DESCRIPTION
--	--	--	

MOUNTING RAILS: 45U

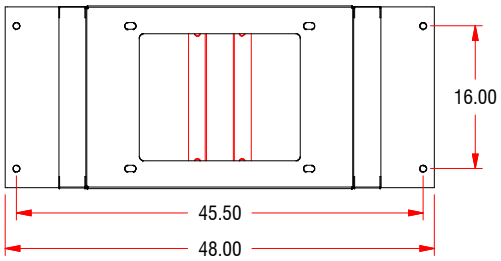
45RMU, C-CHANNEL UPRIGHTS
CAGE-NUT, M6
EIA SPACING, 5/8 x 5/8 x 1/2
19" RACKBLE
RMU MARKS BOTTOM TO TOP
30PC HARDWARE INCLUDED

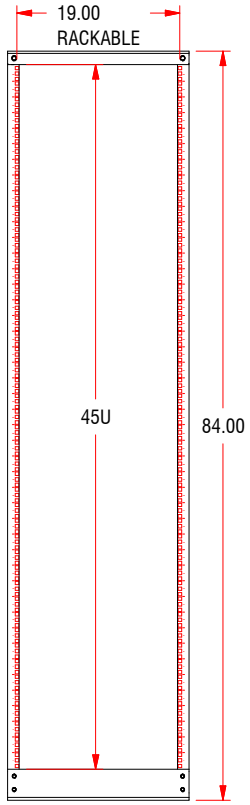


TOP VIEW

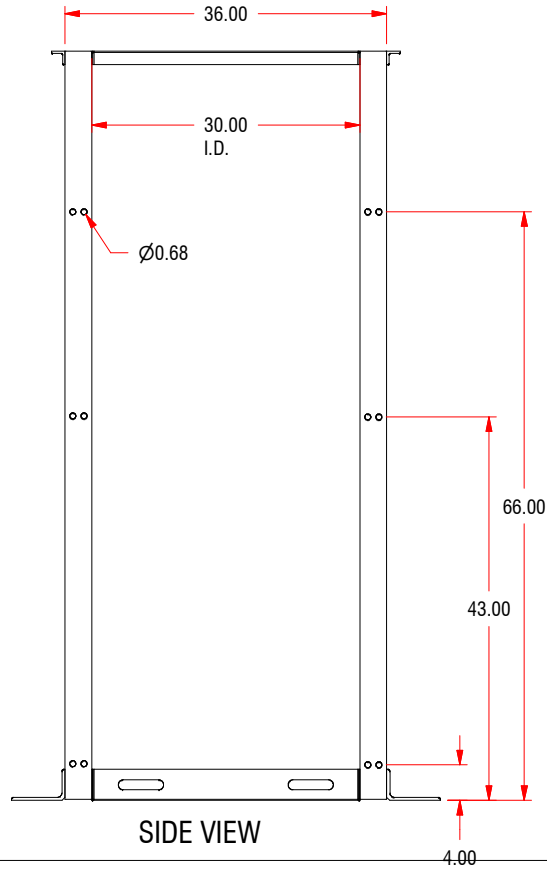


BOTTOM VIEW

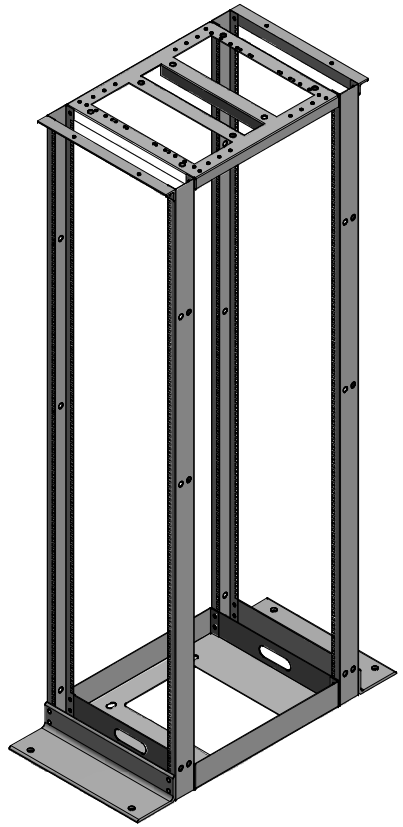




FRONT VIEW



SIDE VIEW



DIMENSIONS

R4A SERIES
STEEL UPRIGHTS
HEIGHT: 84.00"
WIDTH: 20.25"
DEPTH: 36.00"
FOOTPRINT: 48.00"

MOUNTING RAIL

45 RMU, C-CHANNEL UPRIGHTS
CAGE-NUT, M6
EIA SPACING, 5/8 x 5/8 x 1/2
19.00" RACKABLE

WT CAPACITY

2000 LBS.

CLASSIFICATION

UL LISTED
19" EIA-310-D COMPLIANT

TITLE: RACK, TANDEM SERIES 84.00"H x 20.25"W x 36.00"D W/CAGE-NUT RAILS

PART NO.	CHECKED BY:	SCALE:
R4S19084CND-3MU	CR	N/A
DRAWN BY:	DATE:	SHEET:
AP	11.30.2010	1 OF 1

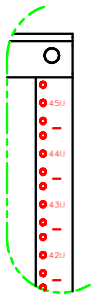
REV: --

MATERIAL: N/A
FINISH: EPOXY POWDER-COAT BLACK
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

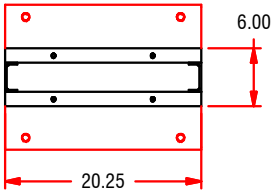
RELAY RACK SERIES: 84.00"H x 20.25"W x 15.00"D
PART NO.: RRA19084-3MU

MOUNTING RAILS: 45U

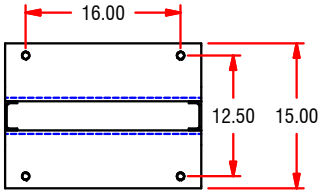
45RMU, C-CHANNEL UPRIGHTS
12-24 TAPPED HOLES
EIA SPACING, 5/8 x 5/8 x 1/2
19" RACKBLE
RMU MARKS BOTTOM TO TOP
20PC HARDWARE INCLUDED



TOP VIEW



BOTTOM VIEW



REVISIONS			
REV	ECO	DATE	DESCRIPTION
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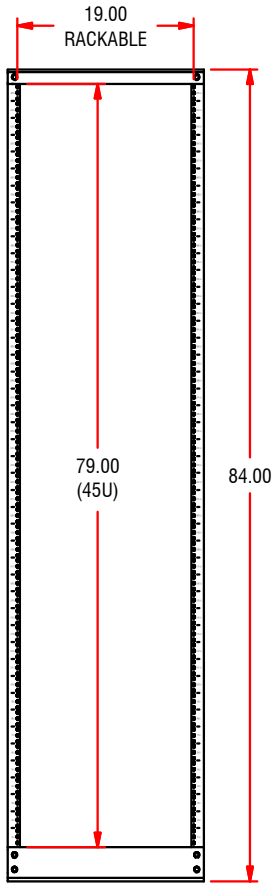
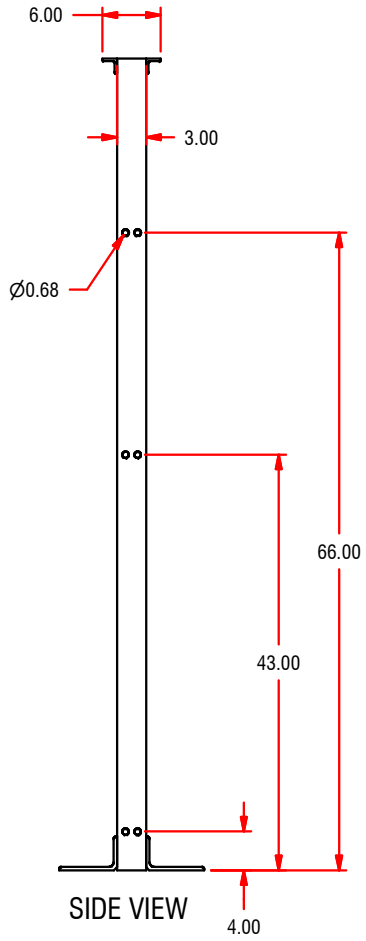
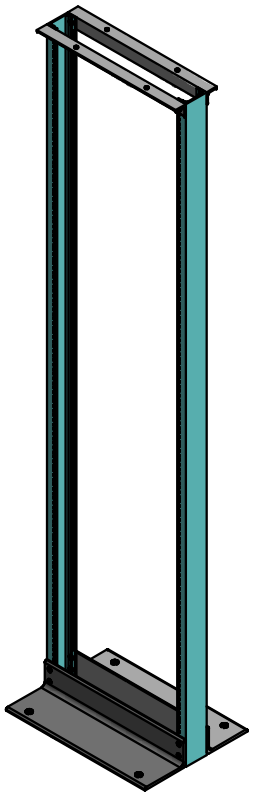


FRONT VIEW



SIDE VIEW



DIMENSIONS

RRA SERIES
ALUMINUM UPRIGHTS
HEIGHT: 84.00"
WIDTH: 20.25"
DEPTH: 3.00"
FOOTPRINT: 15.00"

MOUNTING RAIL

45 RMU, C-CHANNEL UPRIGHTS
12-24 TAPPED HOLES
EIA SPACING, 5/8 x 5/8 x 1/2
19.00" RACKABLE

WT CAPACITY

1000 LBS.

CLASSIFICATION

UL LISTED
19" EIA-310-D COMPLIANT

TITLE: RELAY RACK, 3"CHNL 84.00"H x 19" RACKABLE W/12-24 TAPPED HOLES

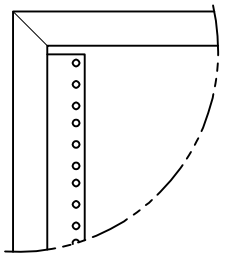
PART NO.	CHECKED BY:	SCALE:
RRA19084-3MU	--	N/A
DRAWN BY: AP	DATE: 11.29.2010	SHEET: 1 OF 1
		REV: --

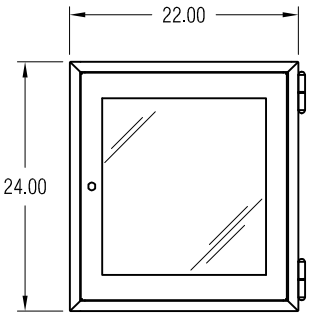
MATERIAL: N/A
FINISH: EPOXY POWDER-COAT
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

HD WALL MOUNT SERIES: 24.00 x 22.00 x 30.00 (O.D.)
PART NO.: WS24Z22336-3

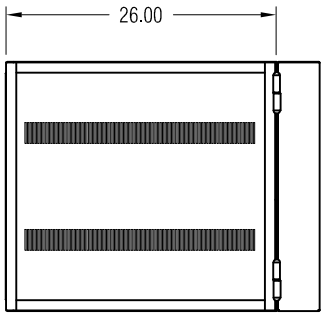
REVISIONS			
REV	ECO	DATE	DESCRIPTION
A	--	07.06.2009	CHANGE TOP SUB-PANEL TO HAVE CUSTOM CUT-OUT W/PLATE.

MOUNTING RAIL: 12U
10-32 TAPPED RAILS, 12U
(1) PAIR, 19" EIA-310-D COMPLIANT
20PC 10-32 HARDWARE INLCUDED
ADJUSTABLE FRONT-BACK
MAX. EQ. DEPTH: 24.00"

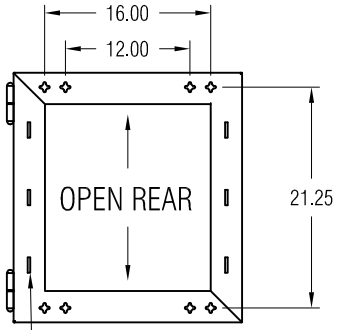




FRONT VIEW

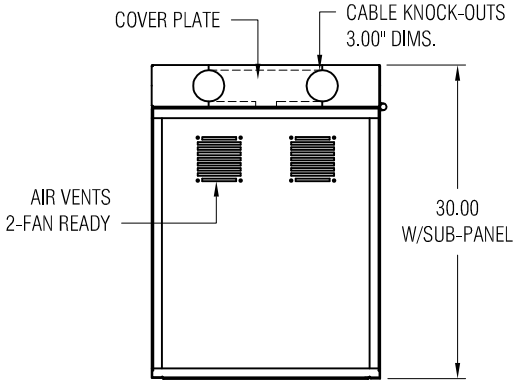


SIDE VIEW

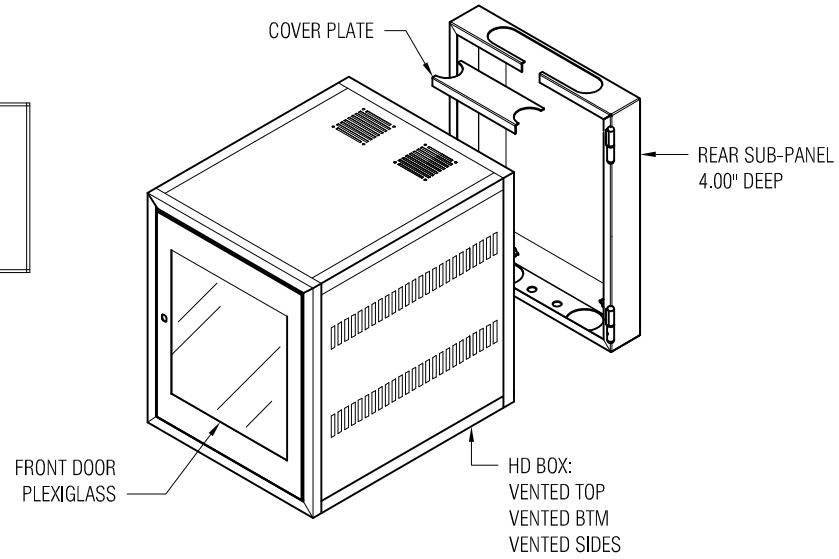


REAR VIEW

TOP/BTM VIEW
VENTED, 2-FAN READY
(1) CUSTOM CUT-OUT FOR CABLE
PASS THRU HOLES ON 4.00" SUB-PANEL
(1) COVER PLATE

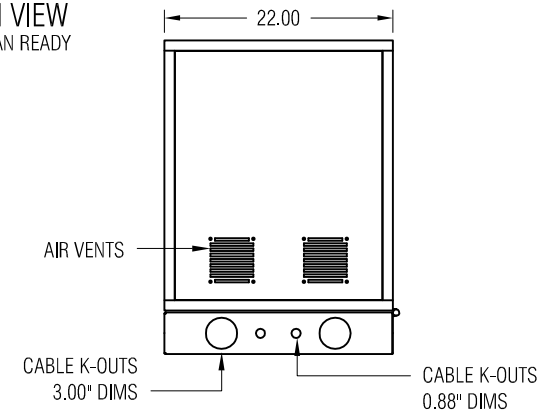


A) APPROVED AS DRAWN
_____ DATE _____
B) APPROVED WITH CHANGES
_____ DATE _____



ISOMETRIC VIEW

TOP/BTM VIEW
VENTED, 2-FAN READY
3.00" K-OUTS
1.00" K-OUTS



DIMENSIONS
HD TUBULAR FRAME
HEIGHT: 24.00"
WIDTH: 22.00"
DEPTH: 30.00"

MOUNTING RAIL
12 U, L-RACK ANGLES
10-32 TAPPED HOLES
EIA SPACING, 5/8 x 5/8 x 1/2
19.00" RACKABLE

FRONT DOOR
PLEXIGLASS, SMOKED
RECESSED, MOVABLE
REVERSIBLE, SWING 180° SWING
STANDARD LOCK, CH751
DIMS: 22.00H x 20.00W x 0.50D

ACCESSORIES
ALL ACCESSORIES SOLD
SEPARATE

WT. CAPACITY
300 LBS. STATIC CAP.

REAR SUB-PANEL
REMOVABLE, OPEN
FOUR SETS OF MOUNTING SLOTS
2 SETS @ 12.00" CENTERS
2 SETS @ 16.00" CENTERS

COLOR
BLACK TEXTURED
EPOXY POWDER-COAT

CLASSIFICATION
UL LISTED
19" EIA-310-D COMPLIANT

DAMAC PRODUCTS INC. LA MIRADA, CA 90638

TOLERANCE .XXX±.010 .XX±.030 .X±.060 °(DEG)±.5
ALL DIM. ARE IN INCHES UNLESS OTHERWISE SPECIFIED

TITLE: WALL MOUNT, SWING-OUT 24.00 x 22.00 x 30.00 HEAVY DUTY

PART NO.	CHECKED BY:	SCALE:
WS24Z22336-3	CR	N/A
DRAWN BY: AP	DATE: 07.01.2009	SHEET: 1 OF 1 / REV: A

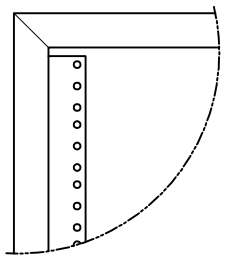
MATERIAL: N/A
FINISH: EPOXY POWDER-COAT
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

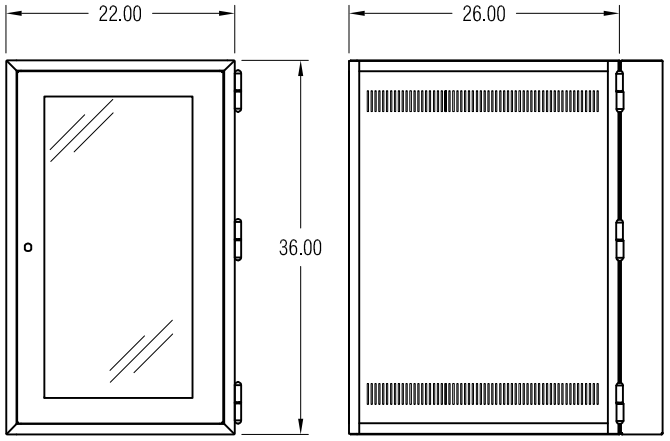
HD WALL MOUNT SERIES: 36.00 x 22.00 x 30.00 (O.D.)
PART NO.: WS36Z22337-3

REVISIONS			
REV	ECO	DATE	DESCRIPTION
A	--	07.06.2009	CHANGE SUB-PANEL TOP TO HAVE CUSTOM CUT-OUT W/PLATE.

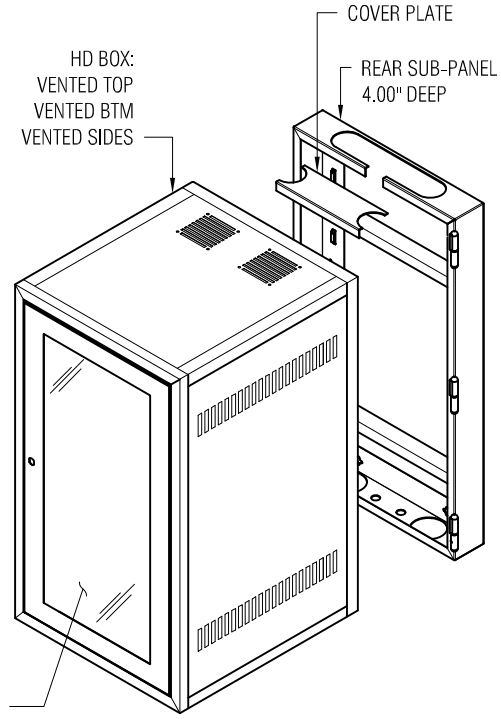
MOUNTING RAIL: 18U

10-32 TAPPED RAILS, 18U
(1) PAIR, 19" EIA-310-D COMPLIANT
20PC 10-32 HARDWARE INLCUDED
ADJUSTABLE FRONT-BACK
MAX. EQ. DEPTH: 24.00"





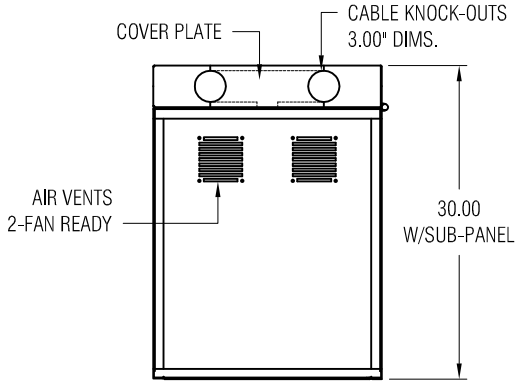
FRONT VIEW SIDE VIEW



ISOMETRIC VIEW

TOP VIEW

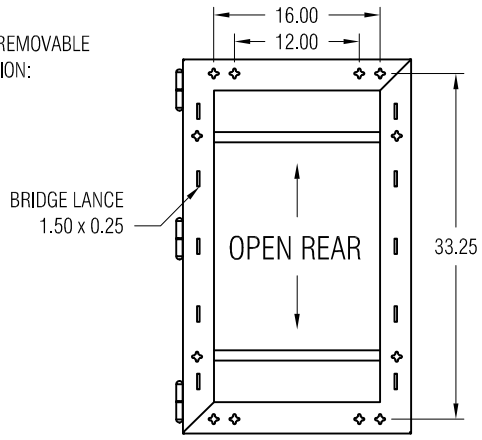
VENTED, 2-FAN READY
(1) CUSTOM CUT-OUT FOR CABLE
PASS THRU HOLES ON 4.00" SUB-PANEL
(1) COVER PLATE



A) APPROVED AS DRAWN
_____ DATE _____
B) APPROVED WITH CHANGES
_____ DATE _____

REAR VIEW

OPEN SUB-PANEL, REMOVABLE
MOUNTING DIMENSION:
33.25 x 12.00
33.25 x 16.00



DIMENSIONS

HD TUBULAR FRAME
HEIGHT: 36.00"
WIDTH: 22.00"
DEPTH: 30.00"

MOUNTING RAIL

18 U, L-RACK ANGLES
10-32 TAPPED HOLES
EIA SPACING, 5/8 x 5/8 x 1/2
19.00" RACKABLE

FRONT DOOR

PLEXIGLASS, SMOKED
RECESSED, MOVABLE
REVERSIBLE, SWING 180° SWING
STANDARD LOCK, CH751
DIMS: 34.00H x 20.00W x 0.50D

ACCESSORIES

ALL ACCESSORIES SOLD SEPARATE

WT. CAPACITY

300 LBS. STATIC CAP.

REAR SUB-PANEL

REMOVABLE, OPEN
FOUR SETS OF MOUNTING SLOTS
2 SETS @ 12.00" CENTERS
2 SETS @ 16.00" CENTERS

COLOR

BLACK TEXTURED
EPOXY POWDER-COAT

CLASSIFICATION

UL LISTED
19" EIA-310-D COMPLIANT

DAMAC PRODUCTS INC. LA MIRADA, CA 90638

TOLERANCE .XXX±.010 .XX±.030 .X±.060 °(DEG)±.5
ALL DIM. ARE IN INCHES UNLESS OTHERWISE SPECIFIED

TITLE: WALL MOUNT, SWING OUT 36.00 x 22.00 x 30.00 HEAVY DUTY

PART NO.	CHECKED BY:	SCALE:
WS36Z22337-3	CR	N/A
DRAWN BY: AP	DATE: 07.01.2009	SHEET: 1 OF 1
		REV: A

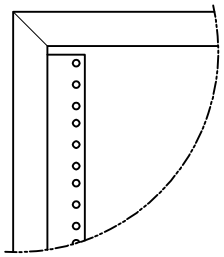
MATERIAL: N/A
FINISH: EPOXY POWDER-COAT
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

HD WALL MOUNT SERIES: 48.00 x 22.00 x 30.00 (O.D.)
PART NO.: WS48Z22338-3

REVISIONS			
REV	ECO	DATE	DESCRIPTION
A	--	07.06.2009	CHANGE SUB-PANEL TOP TO CUSTOM CUT-OUT W/PLATE

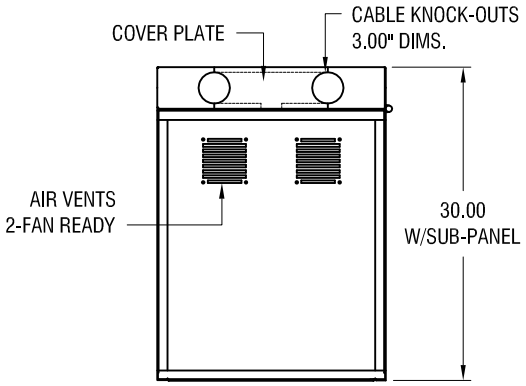
MOUNTING RAIL: 26U

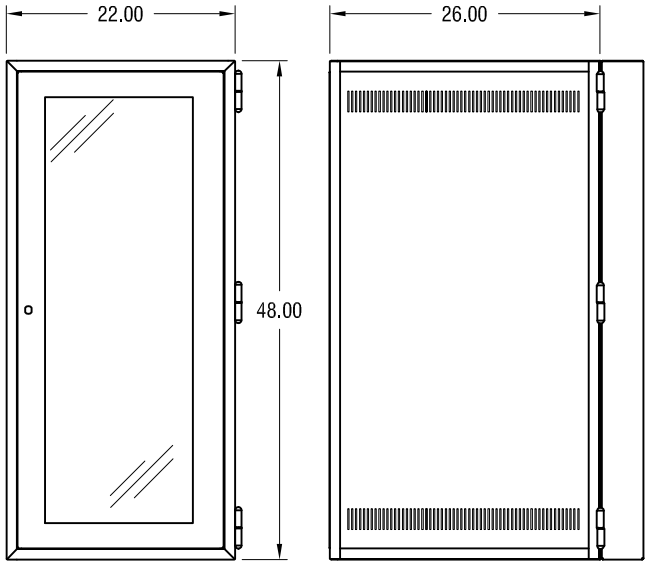
10-32 TAPPED RAILS, 26U
(1) PAIR, 19" EIA-310-D
COMPLIANT
20PC 10-32 HARDWARE INLCUDED
ADJUSTABLE FRONT-BACK
MAX. EQ. DEPTH: 24.00"



TOP VIEW

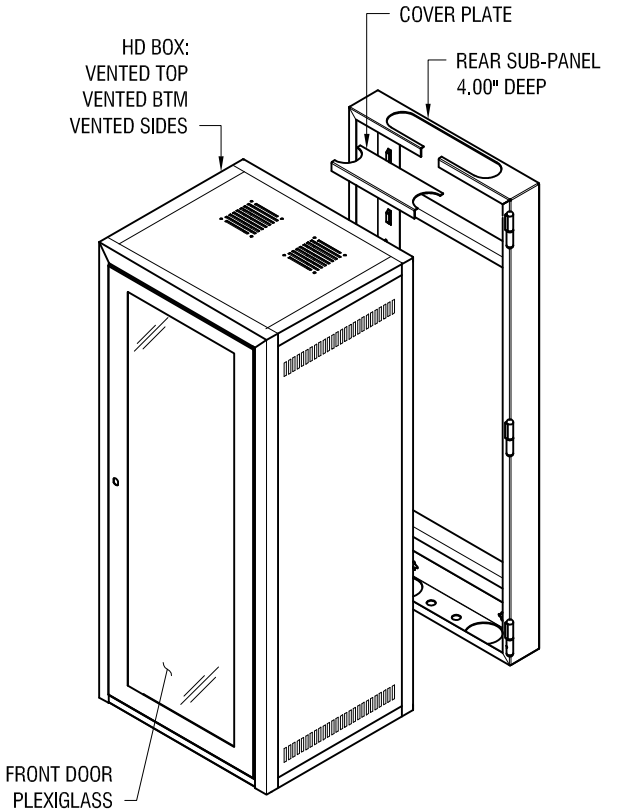
VENTED, 2-FAN READY
(1) CUSTOM CUT-OUT FOR CABLE
PASS THRU HOLES ON 4.00" SUB-PANEL
(1) COVER PLATE





FRONT VIEW SIDE VIEW

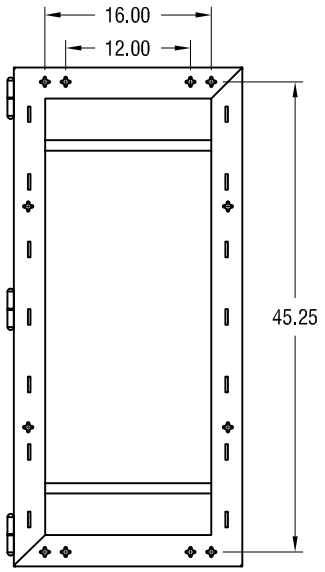
A) APPROVED AS DRAWN
_____ DATE _____
B) APPROVED WITH CHANGES
_____ DATE _____



ISOMETRIC VIEW

REAR VIEW

OPEN SUB-PANEL, REMOVABLE
MOUNTING DIMENSION:
45.25 x 12.00
45.25 x 16.00



DIMENSIONS

HD TUBULAR FRAME
HEIGHT: 48.00"
WIDTH: 22.00"
DEPTH: 30.00"

MOUNTING RAIL

26 U, L-RACK ANGLES
10-32 TAPPED HOLES
EIA SPACING, 5/8 x 5/8 x 1/2
19.00" RACKABLE

FRONT DOOR

PLEXIGLASS, SMOKED
RECESSED, MOVABLE
REVERSIBLE, SWING 180° SWING
STANDARD LOCK, CH751
DIMS: 46.00H x 20.00W x 0.50D

ACCESSORIES

ALL ACCESSORIES SOLD
SEPARATE

WT. CAPACITY

300 LBS. STATIC CAP.

REAR SUB-PANEL

REMOVABLE, OPEN
FOUR SETS OF MOUNTING SLOTS
2 SETS @ 12.00" CENTERS
2 SETS @ 16.00" CENTERS

COLOR

BLACK TEXTURED
EPOXY POWDER-COAT

CLASSIFICATION

UL LISTED
19" EIA-310-D COMPLIANT

DAMAC PRODUCTS INC. LA MIRADA, CA 90638

TOLERANCE .XXX±.010 .XX±.030 .X±.060 °(DEG)±.5
ALL DIM. ARE IN INCHES UNLESS OTHERWISE SPECIFIED

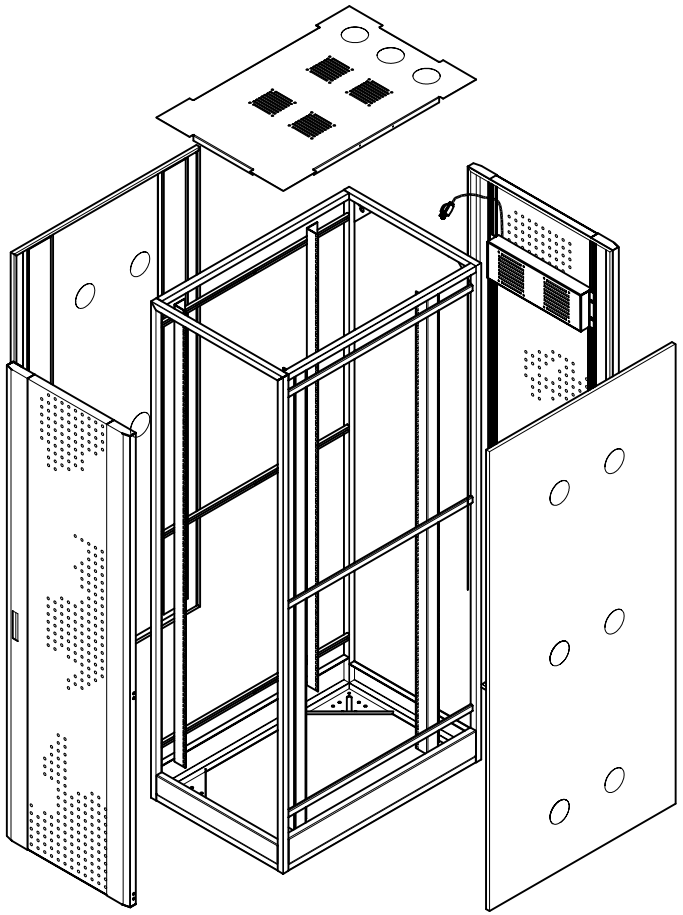
TITLE: WALL MOUNT, SWING-OUT
48.00 x 22.00 x 30.00
HEAVY DUTY

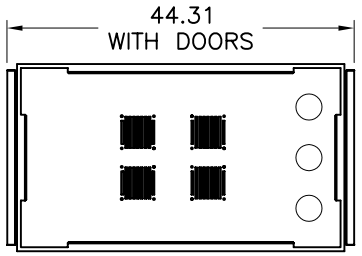
PART NO.	CHECKED BY:	SCALE:
WS48Z22338-3	CR	N/A
DRAWN BY:	DATE:	SHEET:	REV:
AP	07.01.2009	1 OF 1	A

MATERIAL: N/A
FINISH: EPOXY POWDER-COAT
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

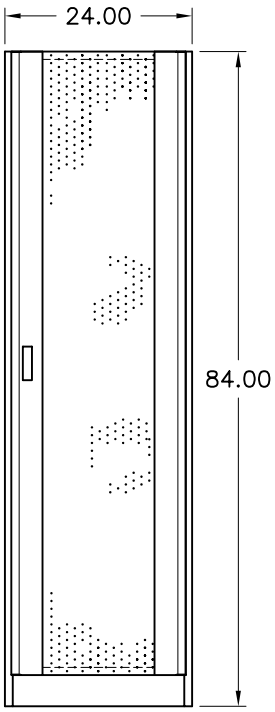
AXIS SERIES CABINET
CC084EQB1SHSR

REVISIONS			
REV	ECO	DATE	DESCRIPTION
--	--	--	RELEASED TO PRODUCTION

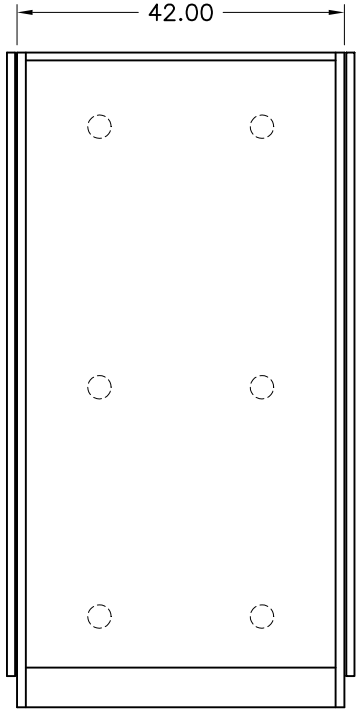




TOP VIEW



FRONT VIEW



SIDE VIEW

DIMENSIONS

FRAME AXIS
1x1 TUBING (16GA)
HEIGHT 84.00"
WIDTH 24.00"
DEPTH 42.00"

RAIL TYPE

L-TYPE RAILS
CAGE-NUT
19" RACKABLE

DOORS

FRONT DOOR
MESH, BEVELED
HEIGHT 80.00"
WIDTH 22.38"
DEPTH 1.15"

REAR DOOR
MESH, BEVELED
FLOW TRACK
HEIGHT 80.00"
WIDTH 22.38"
DEPTH 1.15"

SIDES

SOLID, RECESSED
HEIGHT 77.85"
WIDTH 39.85"
DEPTH 0.50"

TOP

4-FAN, FLUSH
W/CABLE ACCESS
ON REAR

DAMAC PRODUCTS INC.
LA MIRADA, CA 90638

TOLERANCE .XXX±.010 .XX±.030 .X±.060 °(DEG)±.5
ALL DIM. ARE IN INCHES UNLESS OTHERWISE SPECIFIED

TITLE: CABINET, AXIS
84.00 x 24.00 x 42.00

PART NO.	CHECKED BY:	SCALE:
CC084EQB1SHSR	CR	N/A
DRAWN BY: AP / DATE: 05.02.2006	SHEET: 1 OF 1	REV: --

MATERIAL: N/A
FINISH: POWDER-COATED
MAX BEND R=.030, RELIEF=.060 A/R.
UNLESS OTHERWISE SPECIFIED

NET SERIES COMMUNICATION AND SERVER CABINET

INDUSTRY STANDARDS

UL 1863 Listed (perforated, split perforated and louvered door models only)

EIA 310-D
IEC 60529, IP20
Perforated door material meets equipment manufacturer ventilation requirements

APPLICATION

Net Series Cabinets are an economical solution for contractors, small computer rooms, schools or smaller networks that require a general-purpose cabinet to house servers and communication equipment. Multiple sizes, adjustable rack angles and accessories give Net Series Cabinets wide application flexibility.

FEATURES

- Includes two sets of adjustable L-shaped rack angles for convenient equipment mounting
- Rack angles on communication cabinets have tapped 10-32 holes per EIA standards. Order 10-32 fasteners separately.
- Rack angles on server cabinets have square holes per EIA standards. Order fasteners and cage nuts separately.
- Rack angle settings on all 700- and 800-mm wide cabinets can accommodate either 19- or 23-in. rack spacing
- In 600-mm wide cabinets, equipment mounted on 19-in. rack angles is centered
- In 700- and 800-mm wide cabinets, 19-in. rack angles can be set to center equipment or to mount equipment next to the left or the right side for improved cable management
- Rack angles infinitely positionable within the cabinet for easy adjustment to desired position
- All doors are field removable and reversible with left or right hinging for installation flexibility
- Communication cabinet has fully perforated or window front and louvered rear doors for equipment ventilation
- Server cabinet has fully perforated front and split rear perforated doors for easy access to servers
- Doors have key-locking handles that provide security with convenient access for authorized personnel
- Removable side panels with quarter-turn key-locking latch are inset for flush appearance
- Two cable entry ports with caps and grommets on cabinet top for wiring ease
- Fan-ready top with integral finger guard. Order up to two 6-in. fans separately.
- Caster- and leveler-ready open base design. Order casters and levelers separately.

SPECIFICATIONS

- Some models available with or without sides
- Welded multi-formed steel frame. The top and columns are 16 gauge; base is 14 gauge.
- Multi-formed rigid doors are 14 gauge steel
- Window made of 1/8-in. smoke-tinted acrylic
- Formed solid sides are 14 gauge steel
- Rack angles are 12 gauge steel
- Ground studs provided on doors and covers

FINISH

Pretreated steel coated with RAL 9005 black textured low-gloss polyester powder paint. Other finishes available—contact Hoffman Customer Service.

LOAD RATING

1000 lb. (454 kg) per UL 1863 with load evenly distributed in enclosure
NOTE: UL 1863 requires that the cabinet be tested with a load four times the rating. The cabinet was tested to 4000 lb. (1814 kg) without failure to meet the 1000 lb. (454 kg) rating. Contact Hoffman if other loading specifications are required.

ACCESSORIES

Net Series Rack Angles
Net Series Caster Kit
Net Series Leveler Kit
Net Series Joining Kit
Net Series Tool-less (Snap-in) Blanking Panels for 19-in. Racks
Net Series Vertical Tie-Down Cable Manager
Net Series Tool-less Shelf

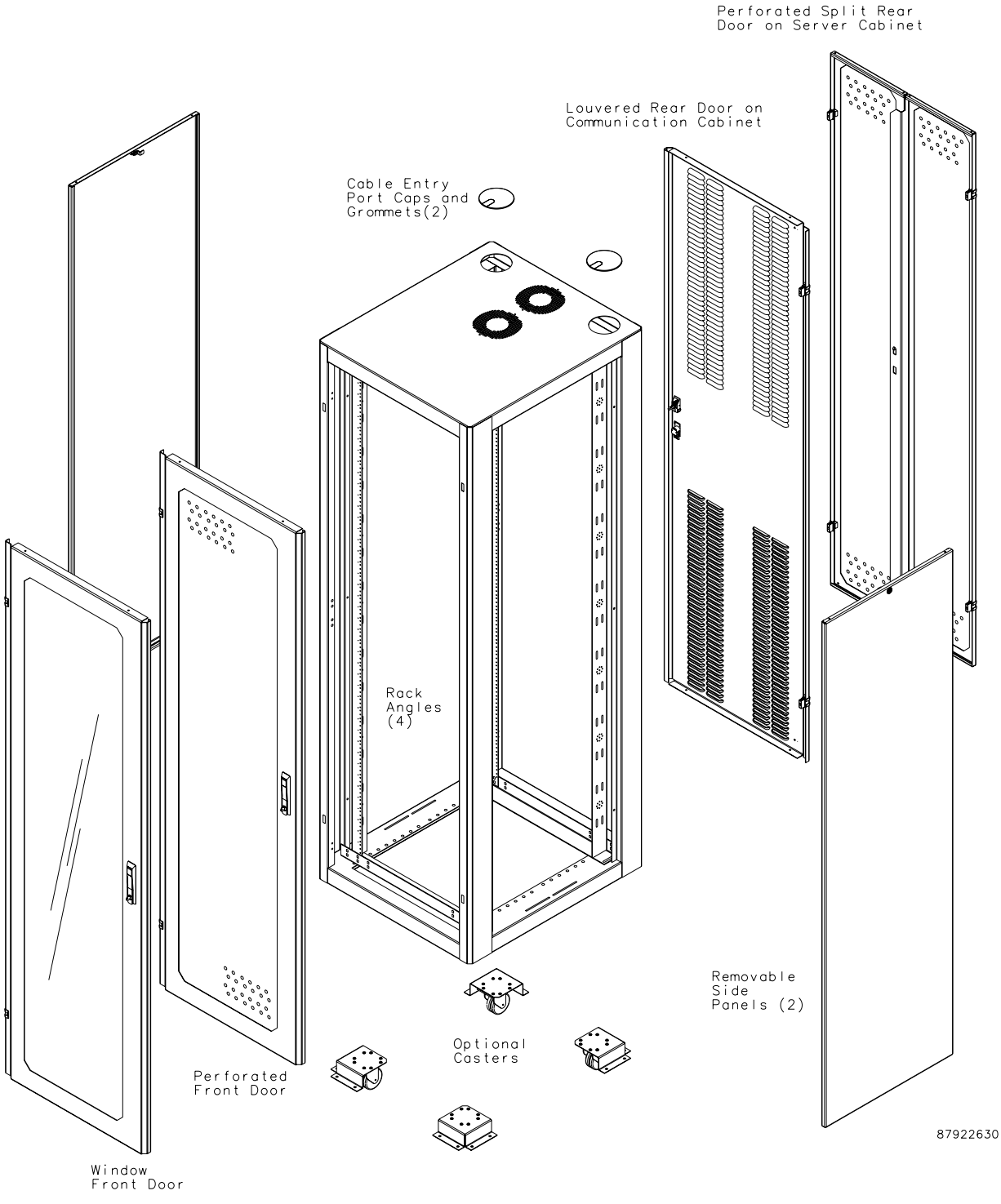
BULLETIN: DC

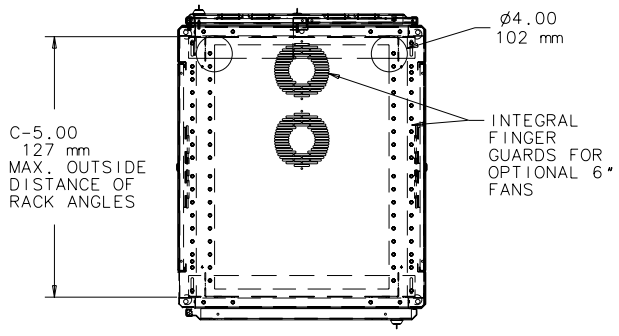
Standard Product

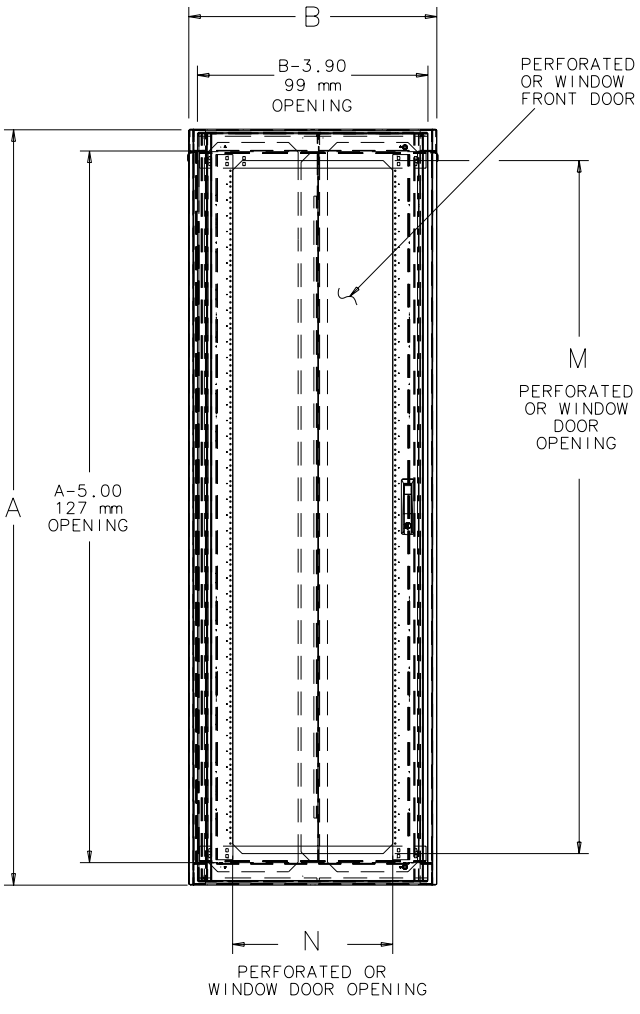
Catalog Number	AxBxC in./mm	Description	Rack Units	M in./mm	N in./mm	Rack Angle Holes	Additional Rack Angles
NC1268	49.00 x 23.62 x 33.99 1245 x 600 x 863	Communication Cabinet	23	42.00 1067	14.71 374	Tapped 10-32	NRAT126
NC2178	84.00 x 27.56 x 33.99 2134 x 700 x 863	Communication Cabinet	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NC2178NS	84.00 x 27.56 x 33.98 2134 x 700 x 863	Communication Cabinet No Sides	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NC2179	84.00 x 27.56 x 37.93 2134 x 700 x 963	Communication Cabinet	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NC21710	84.00 x 27.56 x 41.86 2134 x 700 x 1063	Communication Cabinet	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NC2188	84.00 x 31.50 x 33.99 2134 x 800 x 863	Communication Cabinet	43	77.00 1956	22.58 574	Tapped 10-32	NRAT218
NC2189	84.00 x 31.50 x 37.93 2134 x 800 x 963	Communication Cabinet	43	77.00 1956	22.58 574	Tapped 10-32	NRAT218
NC21810	84.00 x 31.50 x 41.86 2134 x 800 x 1063	Communication Cabinet	43	77.00 1956	22.58 574	Tapped 10-32	NRAT218
NCW2168	84.00 x 23.62 x 33.99 2134 x 600 x 863	Communication Cabinet, Window Door	43	77.00 1956	14.71 374	Tapped 10-32	NRAT216
NCW2168NS	84.00 x 23.62 x 33.98 2134 x 600 x 863	Communication Cabinet, Window Door No Sides	43	77.00 1956	14.71 374	Tapped 10-32	NRAT216
NCW2178	84.00 x 27.56 x 33.99 2134 x 700 x 863	Communication Cabinet, Window Door	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NCW2178NS	84.00 x 27.56 x 33.98 2134 x 700 x 863	Communication Cabinet, Window Door No Sides	43	77.00 1956	18.65 474	Tapped 10-32	NRAT217
NCW2188	84.00 x 31.50 x 33.99 2134 x 800 x 863	Communication Cabinet, Window Door	43	77.00 1956	22.58 574	Tapped 10-32	NRAT218
NS12610	49.00 x 23.62 x 41.86 1245 x 600 x 1063	Server Cabinet	23	42.00 1067	14.71 374	Square	NRAS126
NS2169	84.00 x 23.62 x 37.93 2134 x 600 x 963	Server Cabinet	43	77.00 1956	14.71 374	Square	NRAS216
NS2169NS	84.00 x 23.62 x 37.91 2134 x 600 x 963	Server Cabinet No Sides	43	77.00 1956	14.71 374	Square	NRAS216
NS21610	84.00 x 23.62 x 41.86 2134 x 600 x 1063	Server Cabinet	43	77.00 1956	14.71 374	Square	NRAS216
NS21610NS	84.00 x 23.62 x 41.85 2134 x 600 x 1063	Server Cabinet No Sides	43	77.00 1956	14.71 374	Square	NRAS216
NS21611	84.00 x 23.62 x 45.80 2134 x 600 x 1163	Server Cabinet	43	77.00 1956	14.71 374	Square	NRAS216
NS21612	84.00 x 23.62 x 49.74 2134 x 600 x 1263	Server Cabinet	43	77.00 1956	14.71 374	Square	NRAS216
NS21711	84.00 x 27.56 x 45.80 2134 x 700 x 1163	Server Cabinet	43	77.00 1956	18.65 474	Square	NRAS217
NS21811	84.00 x 31.50 x 45.80 2134 x 800 x 1163	Server Cabinet	43	77.00 1956	22.58 574	Square	NRAS218

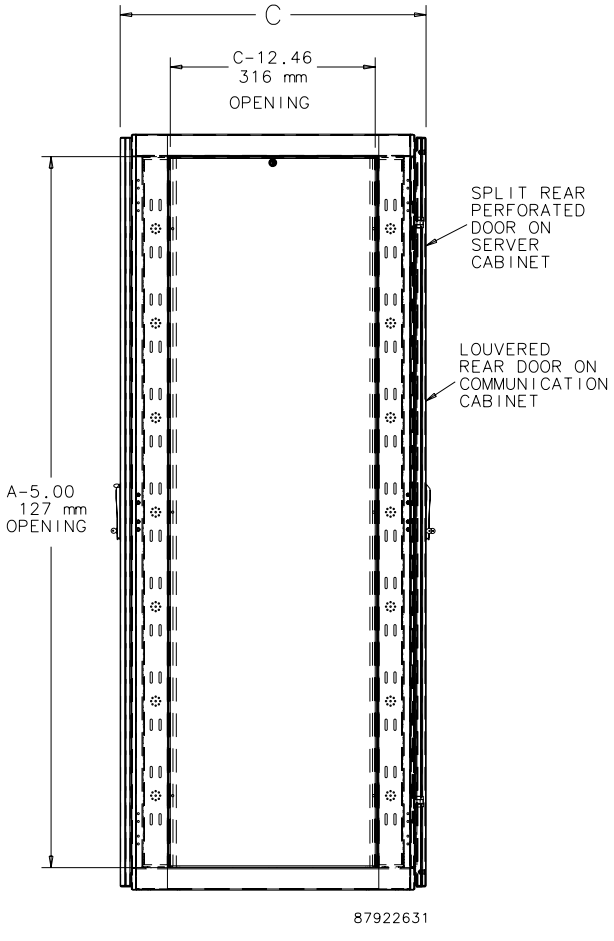
Tapped and square hole rack angles of the same size can be used interchangeably in communication and server cabinets. See rack angle table for available rack angles.

Catalog numbers with "NS" at the end have no sides.

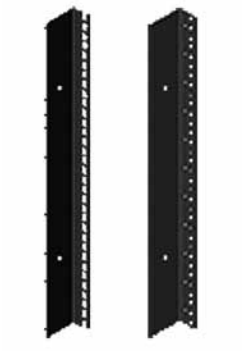

Perforated Split Rear Door on Server Cabinet
Louvered Rear Door on Communication Cabinet
Cable Entry Port Caps and Grommets(2)
Rack Angles (4)
Removable Side Panels (2)
Optional Casters
Perforated Front Door
Window Front Door
87922630


ø4.00
102 mm
INTEGRAL
FINGER
GUARDS FOR
OPTIONAL 6"
FANS
C-5.00
127 mm
MAX. OUTSIDE
DISTANCE OF
RACK ANGLES


B
B-3.90
99 mm
OPENING
PERFORATED
OR WINDOW
FRONT DOOR
M
PERFORATED
OR WINDOW
DOOR
OPENING
A
A-5.00
127 mm
OPENING
N
PERFORATED OR
WINDOW DOOR OPENING


C
C-12.46
316 mm
OPENING
SPLIT REAR
PERFORATED
DOOR ON
SERVER
CABINET
LOUVERED
REAR DOOR ON
COMMUNICATION
CABINET
A-5.00
127 mm
OPENING
87922631

NET SERIES RACK ANGLES



Rack angles are available with either 10-32 tapped or square mounting holes. Communication and server cabinets can use either tapped-hole or square-hole rack angles. Finish is RAL 9005 black, low-gloss smooth polyester powder paint. Shipped in sets of two with two mounting brackets and mounting hardware.

BULLETIN: DCY

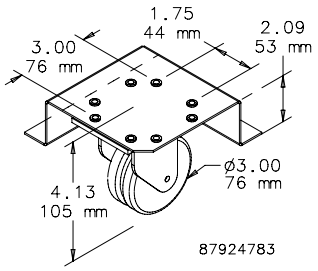
Catalog Number	Length in./mm	Hole Type	Use with Net Series Cabinet H x W
NRAT126	40.37 1025	Tapped	1245 x 600
NRAT216	78.87 2003	Tapped	2134 x 600
NRAT217	78.87 2003	Tapped	2134 x 700
NRAT218	78.87 2003	Tapped	2134 x 800
NRAS126	40.37 1025	Square	1245 x 600
NRAS216	78.87 2003	Square	2134 x 600
NRAS217	78.87 2003	Square	2134 x 700
NRAS218	78.87 2003	Square	2134 x 800

NET SERIES CASTER KIT

These recessed ball-bearing casters allow Net Series Cabinet repositioning with a minimal effort. Casters add 2 in. to height of cabinet. Kit includes four casters, recessed brackets and mounting hardware.

BULLETIN: DCY

Catalog Number	Description
NCK	Set of four casters, recessed brackets and mounting hardware



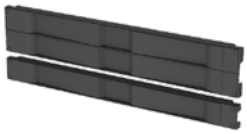
NET SERIES LEVELER KIT

Leveler Kits allow adjustment of Net Series Cabinets for uneven floors. Can be used with casters to stabilize final installation.

BULLETIN: DCY

Catalog Number	Description
NLK	Set of four levelers

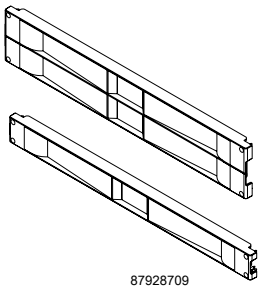
TOOL-LESS (SNAP-IN) BLANKING PANELS FOR 19-IN. RACKS



These Tool-less 19-in. Blanking Panels provide easy tool-less installation and ensure proper airflow to equipment. Made of black composite material and can be used with tapped or square EIA universal spaced rack mounting angles.

BULLETIN: DACCY

Catalog Number	Description	Rack Units	Fits	Pkg. Qty.
D19BPT1RU	Blanking Panel, 19 in.	1	19 in., universal rack spacing, tapped or square holes	10
D19BPT2RU	Blanking Panel, 19 in.	2	19 in., universal rack spacing, tapped or square holes	10



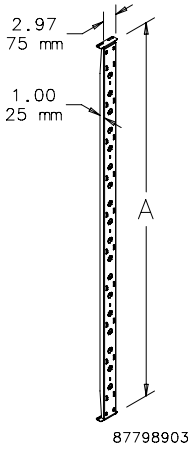
NET SERIES VERTICAL TIE-DOWN CABLE MANAGER

Hold larger cable bundles securely. VELCRO™ Cable Wraps provide convenient cable fastening and easy access to individual cables. One piece design. Holes provided for addition of cable transitions, spools, or D-Rings (order separately). Made of steel coated with RAL 9005 black polyester powder paint. Includes mounting hardware.

VELCRO is a trademark of Velcro Industries B.V.

BULLETIN: DCY

Catalog Number	A in./mm	Fits Cabinet Height
NVCMTD12	40.37 1025	1245
NVCMTD21	78.87 2003	2134



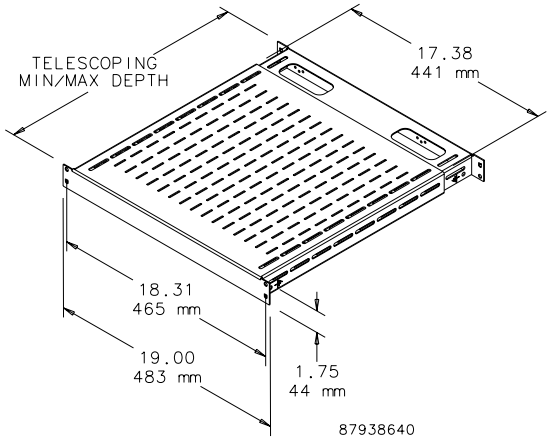
TOOL-LESS SHELF

An easy-to-install tool-less vented 19-in. shelf. Mounts onto rack angles that have EIA-spaced square holes (.375 in.). Shelf slides open and provides a variable-sized, continuous surface for equipment. Back of shelf has oval cutouts for power and data cables. Accessory hole patterns at back of shelf fit small and large D-rings to help manage cable. Made of steel with a 150 lb. (68 kg) static load rating. Available with RAL 9005 black or RAL 7035 gray polyester powder coat finish.

BULLETIN: DACCY

Catalog Number	Description	Finish	Minimum Depth mm/in.	Maximum Depth mm/in.
D19FVT69B	Shelf, vented, 19 in. tool-less	Black	495 19.50	851 33.50
D19FVT69G	Shelf, vented, 19 in. tool-less	Gray	495 19.50	851 33.50
D19FVT912B	Shelf, vented, 19 in. tool-less	Black	792 31.20	1151 45.30
D19FVT912G	Shelf, vented, 19 in. tool-less	Gray	792 31.20	1151 45.30

Minimum and maximum depth measured from rack angle to rack angle.



NET SERIES JOINING KIT

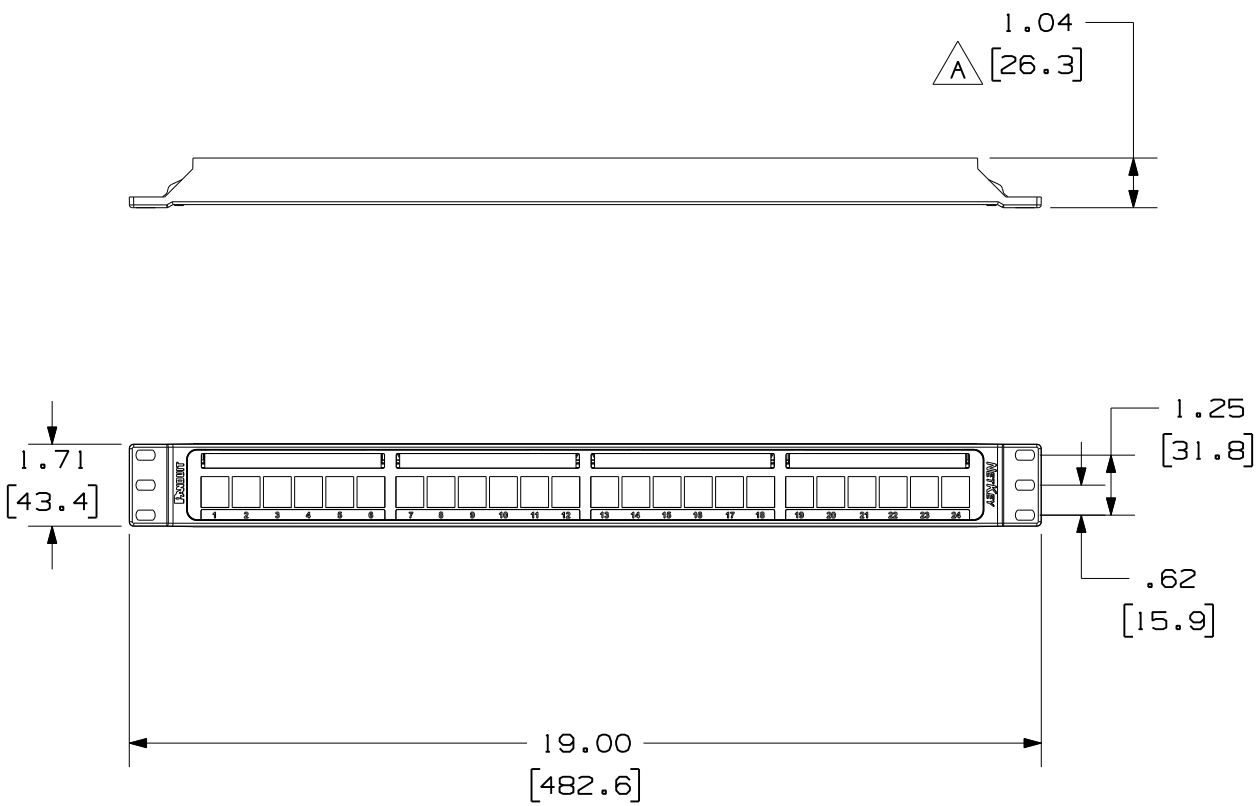
The joining kit enables joining Net Series Cabinets without sides to form a single bank of cabinets. Each kit joins two cabinets.

BULLETIN: DCY

Catalog Number	Description
NJK	Net Series Joining Kit

Notes

PANDUIT P/N	WEIGHT
NKPP24P	.49 LB/10 PCS (220.9 g/EACH PC)



NOTES:
1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
3. DIMENSIONS IN PARENTHESES ARE IN METRIC.
4. THE PATCH PANEL IS DESIGNED FOR MOUNTING TO 19" UNIVERSAL RACKS.
5. PART INCLUDES:
   - 1- PANEL ASSEMBLY
   - 4- LABEL COVERS
   - 4- LABELS
   - 1- SCREW KIT (INCLUDES FOUR #12-24 SCREWS)
   - 1- SCREW KIT (INCLUDES FOUR M6 SCREWS)
6. LABELS ARE PRE-NUMBERED (1-24) WITH BLANK SIDE FOR CUSTOM LABELING.

MODEL FILENAME: 10M163AB/00

DRAWING FILENAME: 10M163AB_DC02/00B

SIZE: A

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
1	1-21-11	BJN	JSP	A. ADDED DIMENSION TO TOP VIEW	10M163AB-02	MMR		
R	12-28-10	BJN	JSP	RELEASED TO PRODUCTION	10M163AB-02	MMR		

NETKEY 24 PORT ALL MOLDED MODULAR PATCH PANEL CUSTOMER DRAWING

PANDUIT®
TINLEY PARK, IL 60487

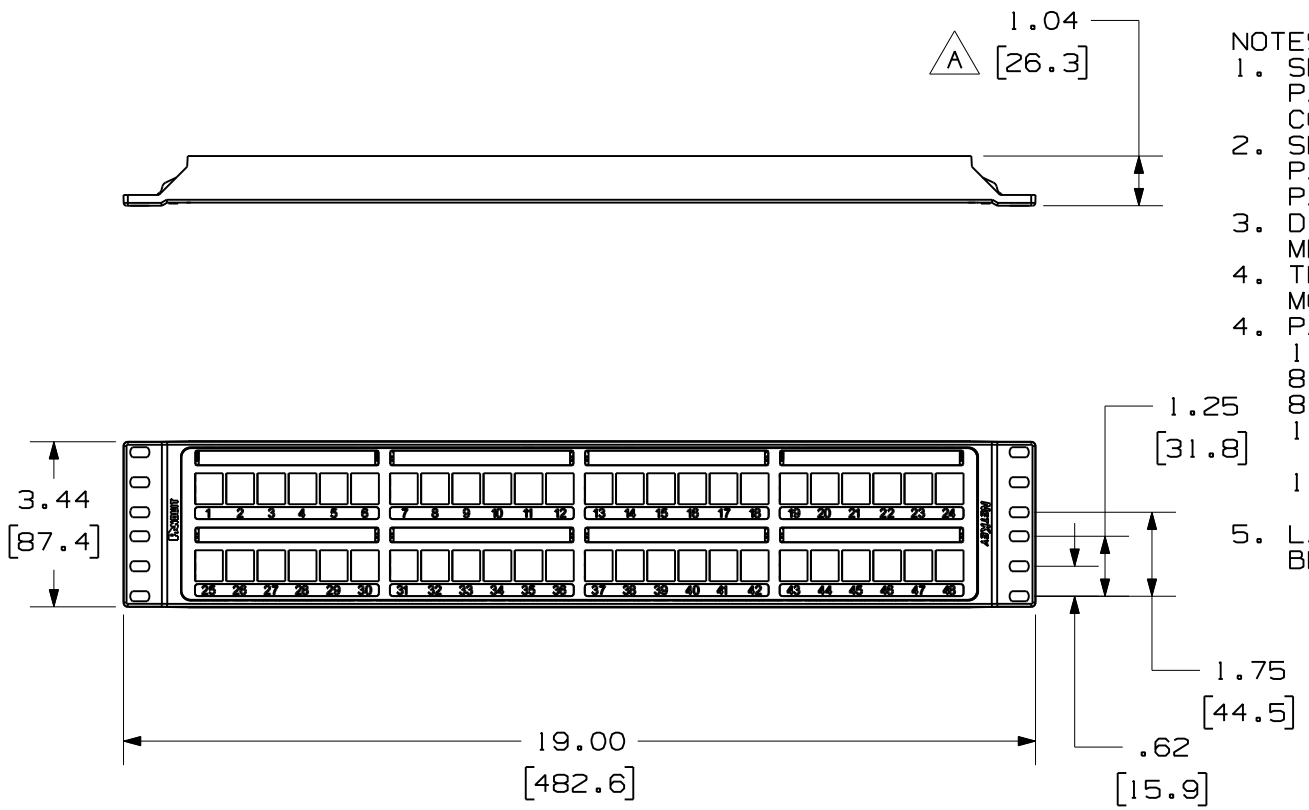
THIRD ANGLE PROJECTION

ALL DIMENSIONS ARE GIVEN IN INCHES, UNLESS OTHERWISE SPECIFIED.
DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ±.010(.3)
(.XX) ±.03(.8) ANGLES ±

DRAWN BY: BJN
DATE: 12-28-10
CHK'D: JSP
REVIEW DRAWING NUMBERS:
MAT'L: BASE- REINFORCED PBT
COVER- ABS

I.I. NUMBER: N/A
PRODUCT SPEC/ PKG SPEC: N/A
ASSY METHOD/ TEST METHOD: N/A
SCALE: NONE
PART NO.: NKPP24P
DRAWING NO.: 10M163AB-02

PANDUIT P/N	WEIGHT
NKPP48P	.90 LB/10 PCS (408.5 g/EACH PC)



NOTES:
1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
3. DIMENSIONS IN PARENTHESES ARE IN METRIC.
4. THE PATCH PANEL IS DESIGNED FOR MOUNTING TO 19" UNIVERSAL RACKS.
4. PART INCLUDES:
   1- PANEL ASSEMBLY
   8- LABEL COVERS
   8- LABELS
   1- SCREW KIT (INCLUDES FOUR #12-24 SCREWS)
   1- SCREW KIT (INCLUDES FOUR M6 SCREWS)
5. LABELS ARE PRE-NUMBERED (1-48) WITH BLANK SIDE FOR CUSTOM LABELING.

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
1	1-21-11	BJN	JsP	A. ADDED DIMENSION TO TOP VIEW	10M163AA-02			
R	12-28-10	JsP	JsP	RELEASED TO PRODUCTION	10M163AA-02	MMR		

MODEL FILENAME: 10M163AA/00
DRAWING FILENAME: 10M163AA_DC02/00B
SIZE: A

NETKEY 48 PORT ALL MOLDED MODULAR PATCH PANEL CUSTOMER DRAWING

PANDUIT®
TINLEY PARK, IL 60487

THIRD ANGLE PROJECTION

ALL DIMENSIONS ARE GIVEN IN INCHES, UNLESS OTHERWISE SPECIFIED.
DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ± .010(.3)
(.XX) ±.03(.8) ANGLES ±

DRAWN BY: JsP
DATE: 12-28-10
CHK'D: JsP
REVIEW DRAWING NUMBERS:
MAT'L: BASE- REINFORCED PBT
COVER- ABS

I.I. NUMBER: N/A
PRODUCT SPEC/ PKG SPEC: N/A
ASSY METHOD/ TEST METHOD: N/A
SCALE: NONE
PART NO.: NKPP48P
DRAWING NO.: 10M163AA-02

NetKey® Category 6A Punchdown Jack Module

PANDUIT®

DATA SHEET

Category 6A/Class E_A, 8-position keystone jack module shall terminate unshielded twisted 4-pair, 22 – 26 AWG, 100 ohm cable. Punchdown tool properly terminates each conductor for optimum performance. Universal label is color-coded T568A and T568B wiring schemes.

technical information

Category 6A/Class E_A channel performance:	Meets all TIA/EIA-568-C.2 Category 6A and ISO 11801 2nd Edition Class E_A channel requirements at swept frequencies up to 500 MHz
FCC compliance:	Meets ANSI/TIA-968-A; contacts plated with 50 microinches of gold for superior performance
IEC compliance:	Meets IEC 60603-7
PoE compliance:	Meets requirements of IEEE 802.3af and IEEE 802.3at for PoE applications
UL rated:	UL 1863 approved
RoHS compliance:	Compliant

key features and benefits

100% performance tested	Confidence that each jack module delivers specified performance
110 style punchdown termination	Utilizes industry standard termination style and includes a wire retention cap
Modularity	Universal keystone jack modules snap in and out of all NetKey® Faceplates, Modular Patch Panels, and Surface Mount Boxes for fast moves, adds, and changes
Individually serialized	Marked with quality control number for future traceability
Convenience packaging (optional)	25 jacks packaged in one easy to open container, eliminating the time to open each individual package and reducing on-site waste; ideal for high volume installations

applications

NetKey® Category 6A Punchdown Jack Modules provide a cost effective medium for ensuring that network bandwidth needs are easily met today and tomorrow. The NetKey® Solution helps organizations efficiently and reliably meet data transmission needs.

With certified performance to ISO 11801 Class E_A Edition 2.0, IEEE 802.3an-2006 and TIA/EIA-568-C.2 Category 6A standards, this system will support high bandwidth applications such as finance, banking, education and healthcare.

www.panduit.com

NetKey® Category 6A Jack Module

Module:	NK6X88M*
Bulk pack of 24 jack modules:	NK6X88M*-Q

NetKey® Modular Patch Panels

24-port, 1 RU:	NKPP24P
48-port, 2 RU:	NKPP48P

Termination and Cable Prep Tools

Punchdown tool:	PDT110‡
Punchdown base:	NKSPB
JackRapid+ Termination Tool:	JR-PAN-2‡‡
Cable snipping tool:	CWST
Cable stripping tool:	CJAST

*To designate a color, add suffix IW (Off White), EI (Electric Ivory), IG (Int'l Gray), WH (White), BL (Black), OR (Orange), RD (Red), BU (Blue), GR (Green) or YL (Yellow).

‡Terminates the NetKey® Keystone Punchdown Jack Module and NetKey® Patch Panel.

‡‡Terminates the NetKey® Keystone Punchdown Jack Module. Fluke JackRapid+ Termination Tool available through distribution. To locate the local office, visit www.flukenetworks.com/contact.
+JackRapid is a trademark of Fluke Networks.

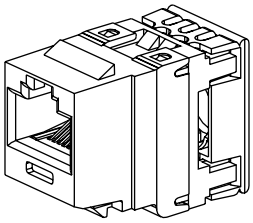
NetKey® Category 6A Punchdown Jack Module

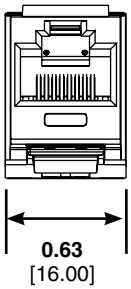
Test Results

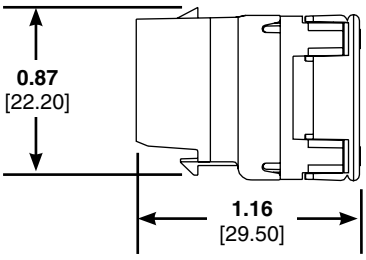
Mechanical Test	Test Method	Measurement	Typical Test Results
Normal Force	—	Load (grams)	>100
Vibration	IEC 512-6d	Circuit Resistance (mOhms)	<40
Shock	IEC 512-6c	Contact Disturbance (microseconds)	<5
Durability	IEC 512-9a	Circuit Resistance (mOhms)	<40
Mating/Un-Mating	IEC 512-13b	Mating Force (N)	<20
		Un-Mating Force (N)	<20
Termination Cycles	IEC 352	Number of Cycles	<20

Electrical Test	Test Method	Measurement	Typical Test Results
Low Level Circuit Resistance	IEC 512-2a	Resistance (mOhms)	<20
Dielectric Withstand Voltage	IEC 512-4a	1000 V, 1 minute	Passed
Insulation Resistance	IEC 512-3a	Resistance (mOhms)	>500

Environmental Test	Test Method	Measurement	Typical Test Results
Temperature Life	IEC 512-9b	Circuit Resistance (mOhms)	<40
Humidity	IEC 512-11c	Circuit Resistance (mOhms)	<40
Thermal Shock	IEC 512-11d	Circuit Resistance (mOhms)	<40
Climatic Sequence	IEC 512-11a	Circuit Resistance (mOhms)	<40
Flowing Mixed Gas Corrosion	IEC 512-11g	Circuit Resistance (mOhms)	<40







Dimensions are in inches [Dimensions in brackets are metric]

WORLDWIDE SUBSIDIARIES AND SALES OFFICES

PANDUIT CANADA
Markham, Ontario
cs-cdn@panduit.com
Phone: 800.777.3300

PANDUIT EUROPE LTD.
London, UK
cs-emea@panduit.com
Phone: 44.20.8601.7200

PANDUIT SINGAPORE PTE. LTD.
Republic of Singapore
cs-ap@panduit.com
Phone: 65.6305.7575

PANDUIT JAPAN
Tokyo, Japan
cs-japan@panduit.com
Phone: 81.3.6863.6000

PANDUIT LATIN AMERICA
Guadalajara, Mexico
cs-la@panduit.com
Phone: 52.33.3777.6000

PANDUIT AUSTRALIA PTY. LTD.
Victoria, Australia
cs-aus@panduit.com
Phone: 61.3.9794.9020

For a copy of Panduit product warranties, log on to www.panduit.com/warranty

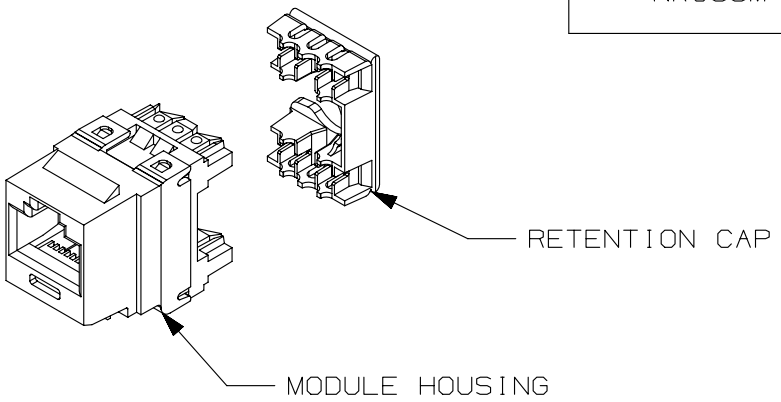
For more information

Visit us at www.panduit.com

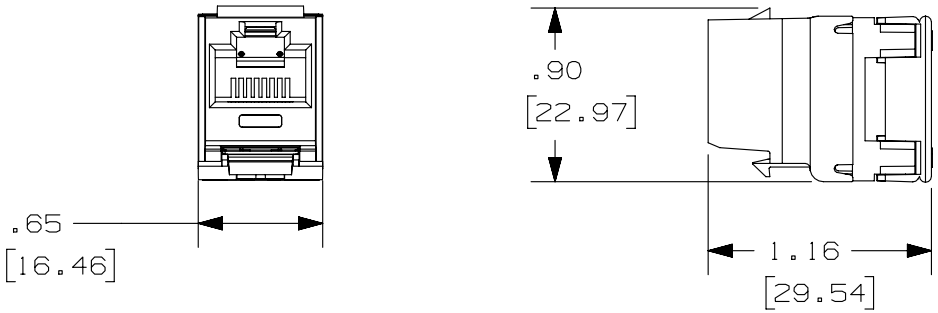
Contact Customer Service by email: cs@panduit.com
or by phone: 800.777.3300

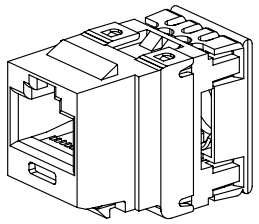
NKDS52--WW-ENG
7/2014

PANDUIT PART#	DESCRIPTION	WEIGHT
NK688M**	8 POSITION, 8 WIRE UNIVERSAL MODULE. MODULE IS COLOR CODED FOR T568A AND T568B WIRING SCHEMES.	1.495 LB/100 PCS (678g/100 PCS)



NOTES:
1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. MATERIAL:
   MODULE - ABS/PC
   RETENTION CAP - ABS
3. ALL CATEGORY 6, 8 POSITION, 8 WIRE CONNECTOR MODULES ARE UNIVERSAL IN DESIGN. THEY ACCEPT SIX AND EIGHT POSITION MODULAR PLUGS WITHOUT DAMAGE.
4. DIMENSIONS IN PARENTHESES ARE IN METRIC.





ACTUAL SIZE

REV	DATE	BY	CHK	APR	DESCRIPTION	ECN
03	5-13-14	MDJR	REFR	JCK	ALL PREVIOUS REVISIONS HAVE BEEN OMITTED FOR CLARITY. A. UPDATED TITLE BLOCK.	02341-07

PART NUMBER: NK688M**

TITLE: NETKEY CATEGORY 6 PUNCHDOWN JACK MODULE

CUSTOMER DRAWING

ITEM REVISION NAME: M02341CA/06

DATASET FILE NAME: M02341CA_DC07/06B

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: IN [mm]
.X ± .XXX ± .010 [.3]
.XX ± .03[.8] ANGLES ±
THIRD ANGLE PROJECTION

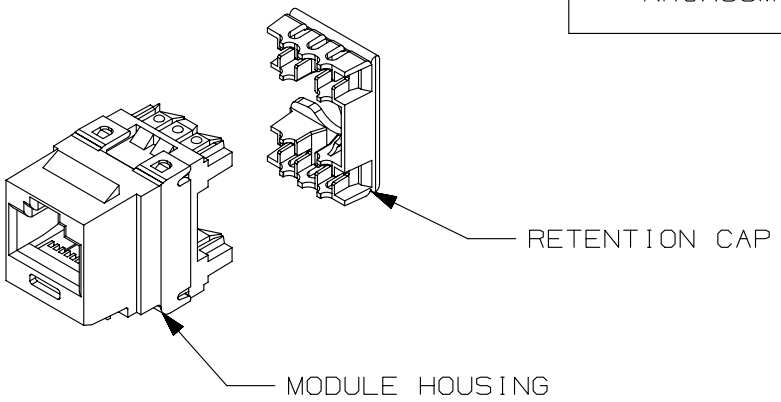
MATERIAL: SEE NOTE 2

DRAWING NUMBER: 02341-07

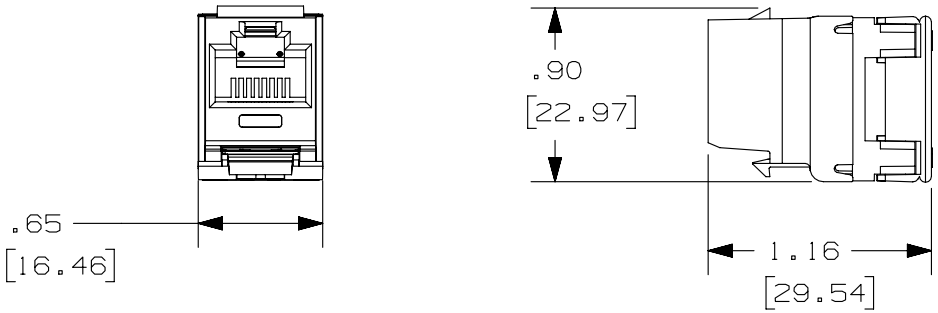
DRAWN BY	DATE	CHK	SCALE	SHT 1 OF 1	SIZE
MDJR	8-25-05	PBC	NONE		A

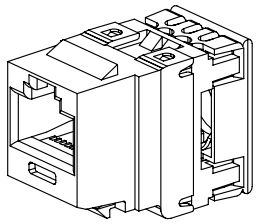
D10100DA/14

PANDUIT PART#	DESCRIPTION	WEIGHT
NK6X88M**	8 POSITION, 8 WIRE UNIVERSAL MODULE. MODULE IS COLOR CODED FOR T568A AND T568B WIRING SCHEMES.	1.495 LB/100 PCS (678g/100 PCS)



NOTES:
1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. MATERIAL:
   MODULE - ABS/PC
   RETENTION CAP - ABS
3. ALL CATEGORY 6A, 8 POSITION, 8 WIRE CONNECTOR MODULES ARE UNIVERSAL IN DESIGN. THEY ACCEPT SIX AND EIGHT POSITION MODULAR PLUGS WITHOUT DAMAGE.
4. DIMENSIONS IN PARENTHESES ARE IN METRIC.





ACTUAL SIZE

REV	DATE	BY	CHK	APR	DESCRIPTION	ECN
R	7-25-14	BJN	LPH	LPH	RELEASED TO PRODUCTION	02341-07

PART NUMBER: NK6X88M**

TITLE: NETKEY CATEGORY 6A PUNCHDOWN JACK MODULE

CUSTOMER DRAWING

ITEM REVISION NAME: M02341CD/00

DATASET FILE NAME: M02341CD_DC11/00A

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: IN [mm]
.X ± .XXX ± .010 [.3]
.XX ± .03[.8] ANGLES ±
THIRD ANGLE PROJECTION

MATERIAL: SEE NOTE 2

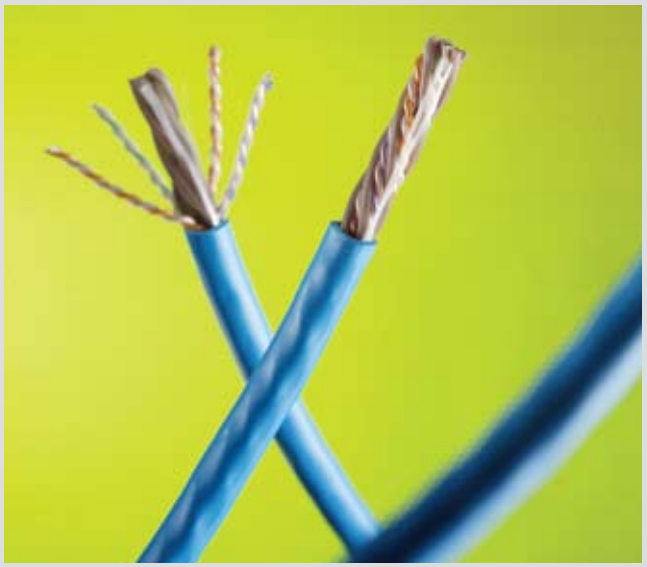
DRAWING NUMBER: 02341-11

DRAWN BY	DATE	CHK	SCALE	SHT 1 OF 1	SIZE
BJN	7-25-14	LPH	NONE		A

D10100DA/14

GenSPEED® 10,000

Standard-Compliant 6a



GenSPEED® 10,000 Category 6a cable is a cost-effective, standard-compliant UTP 10 Gig option designed to meet ANSI/TIA 568 C.2. Perfect for component upgrades, this cable is fully backward-compatible to legacy infrastructures, and it prepares your system for future 10 Gigabit applications. GenSPEED 10,000 solves the One Gigabit limitation of Category 5e and Category 6 and is an ideal solution for bandwidth-intensive applications.

FEATURES & BENEFITS

- Aerated jacket emcompasses the inner core to reduce the capacitance effect of the outer sheath and permits improved electrical performance and smaller overall size
- Innovative T-Top cross-web provides superior internal electrical characteristics by locking the pairs into a systematic orientation within the cable
- Superior flame and smoke characteristics achieved through innovative design and careful selection of materials with certified suppliers
- TRU-Mark® print legend contains footage markings from 1000' to 0'

APPLICATIONS

- IEEE 802.3 10G Base-T, 100 Base-T
- 100 Base-TX, 10 Base-T, 1000 Base-TX
- 155 Mb/s ATM
- ANSI X3.263 100Mb/s
- IEEE 802.3af for PoE
- IEEE 802.3at for PoE Plus

COMPLIANCES

- ANSI/TIA 568 C.2
- RoHs

CONSTRUCTION

Conductors
- 23 AWG solid bare annealed copper

Insulation
- Non-Plenum: Polyolefin
- Plenum: Fluoropolymer

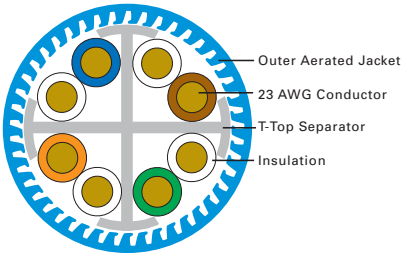
Pairing
- 4 Pair

Color Code
- Blue/White
- Orange/White
- Green/White
- Brown/White

Separator
- T-Top cross-web

Jacket
- Non-Plenum: Flame-retardant PVC
- Plenum: Low-smoke, flame-retardant PVC

Typical GenSPEED® 10,000 Category 6a Cross-Section



General Cable

GenSPEED® 10,000 Category 6a Cable

ELECTRICAL CHARACTERISTICS

DC Resistance (max) Ohms/100m (328ft) @ 20˚C	9.38 ohms/100m
DC Resistance Unbalanced (max) Individual Pair %	4%
Delay Skew (max) ns/100m	35 ns/100m
Nom. Velocity of Propagation % Speed of Light	70%
Characteristic Impedance Frequency (f): 1-500MHz	100 ohms ± 15 ohms

PART NUMBERS

Standard packaging: 1000' Reel

Jacket Color	Reel CMR (Riser)	Reel CMP (Plenum)
Blue	7133819	7131819
White	7133820	7131820
Gray	7133821	7131821
Yellow	7133822	7131822
Green	7133823	7131823
Red	7133824	7131824
Purple	7133825	7131825
Orange	7133826	7131826
Pink	7133827	7131827
Black	7133828	7131828

PHYSICAL DATA

	CMR (Non-Plenum)	CMP (Plenum)
Nominal Cable Diameter (in)	.335	.325
Nominal Cable Weight (lbs/1000 ft)	42	45
Minimum Bend Radius (in)	1.5	1.5
Maximum Pulling Force (lbs)	40	40
Temperature Rating (˚C)		
Installation:	0 to +60	0 to +60
Operation:	-20 to +75	-20 to +75

ELECTRICAL PERFORMANCE

Frequency MHz	PSACR Min.	ACR Min.	Attenuation Max.	PSNEXT Min.	NEXT Min.	PSACRF Min.	ACRF Min.	Return Loss Min.	TCL Min.	PSANEXT Min.	PSAACRF Min.
1	70.2	72.2	2.1	72.3	74.3	64.8	67.8	20.0	40.0	67.0	67.0
4	59.5	61.5	3.8	63.3	65.3	52.8	55.8	23.0	40.0	67.0	66.2
8	53.5	55.5	5.3	58.8	60.8	46.7	49.7	24.5	40.0	67.0	60.1
10	51.4	53.4	5.9	57.3	59.3	44.8	47.8	25.0	40.0	67.0	58.2
16	46.7	48.7	7.5	54.2	56.2	40.7	43.7	25.0	38.0	67.0	54.1
20	44.4	46.4	8.4	52.8	54.8	38.8	41.8	25.0	37.0	67.0	52.2
25	41.9	43.9	9.4	51.3	53.3	36.8	39.8	24.3	36.0	67.0	50.2
31.25	39.4	41.4	10.5	49.9	51.9	34.9	37.9	23.6	35.1	67.0	48.3
62.50	30.4	32.4	15.0	45.4	47.4	28.9	31.9	21.5	32.0	65.6	42.3
100	23.2	25.2	19.1	42.3	44.3	24.8	27.8	20.1	30.0	62.5	38.2
200	10.2	12.2	27.6	37.8	39.8	18.8	21.8	18.0	27.0	58.0	32.2
250	5.2	7.2	31.1	36.3	38.3	16.8	19.8	17.3	26.0	56.5	30.2
300	0.8	2.8	34.3	35.1	37.1	15.3	18.3	16.8	25.2	55.3	28.7
400	—	—	40.1	33.3	35.3	12.8	15.8	15.9	24.0	53.5	26.2
500	—	—	45.3	31.8	33.8	10.8	13.8	15.2	23.0	52.0	24.2

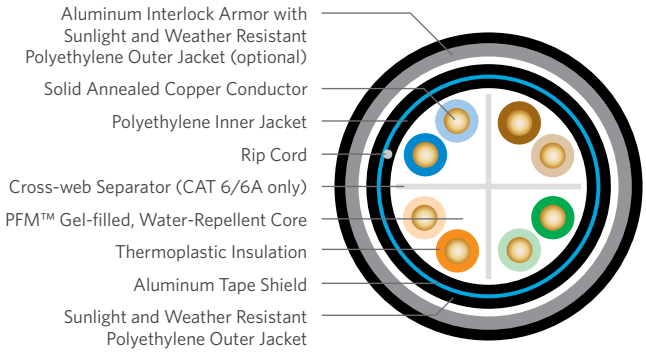
General Cable

4 Tesseneer Drive
Highland Heights, Kentucky 41076-9753
Telephone: (800) 424-5666
(859) 572-8000
Email: info@generalcable.com
www.generalcable.com

590 Barmac Drive
North York, Ontario M9L 2X8
Telephone: (800) 561-0649
Fax: (800) 565-2529

Form No. DAT-0119-R0310
37746

OSP Broadband BBDN



PRODUCT DESCRIPTION

BBDN is an Outside Plant (OSP) Broadband category cable. It is designed to provide an extension of the LAN beyond the premises or in situations where the NEC code requires an OSP-rated cable when it is in contact with earth, whether in a conduit or not. The cable consists of four (4) balanced twisted pairs surrounded by Superior Essex PFM™ gel that does not drip or flow, even in cell tower applications at elevated temperatures. The jacketed core is covered with dry block and an 8 mil aluminum tape shield providing exceptional Alien Crosstalk (AXT) performance. The outer jacket is OSP-grade black, polyethylene for superior sunlight and abrasion resistance. This shielded design is suitable for the following deployments: duct, underground conduit, tower, lashed aerial or open trench.

The BBDN is available in a variety of performances including CAT 5e, CAT 6 and CAT 6A. An optional Aluminum Interlock Armor with overjacket is also available (not suitable for tower deployment).

APPLICATIONS

- CAT 6A: 10BASE-T through 10GBASE-T Ethernet; CAT 6/5e: 10BASE-T through 1000BASE-T Ethernet
- Power over Ethernet (PoE) – IEEE 802.3af
- PoE+ – IEEE 802.3at Type 1 and 2
- ATM and token ring

FEATURES	BENEFITS
• Transmission performance characterized to 500 MHz for CAT 6A/6 and 350 MHz for CAT 5e	• Assures ample overhead for reliable transmission in an OSP-rated cable allowing extension of the premises LAN
• 8 mil aluminum tape shield	• Rugged shield provides protection against EMI/RFI
• Dry block between shield and inner jacket	• Prevents water ingress between shield and inner cable preventing damage to equipment
• PFM gel-filled core construction	• Prevents intrusion of moisture and easily wipes clean during installation
• OSP-grade black polyethylene jacket	• Outside plant rated cable for years of reliable performance
• ColorTip® circuit identification system	• Easily identifiable conductor mates even in low-light environments
• Aluminum interlock armored construction	• Protects against mechanical stresses • Installs faster and easier than EMT conduit and conventional wire

TECHNICAL GUIDELINE

Special connectivity is required for these cable designs. Refer to the "Resources" section on our site for the Technical Guideline, "OSP Broadband Installation Guidelines," for more information.

SPECIFICATIONS

Pair Count	4
Conductor	Solid annealed copper
Insulation	Polyolefin
Separator	CAT 6A/6: Polyolefin cross-web CAT 5e: none
Inner Shield	Electrically continuous 0.008 in (0.20 mm) polymer coated smooth aluminum tape shield, applied with an overlap
Dry Water Block	SAP powder
Jacket	Black, sunlight and weather resistant polyethylene
Optional Outer Armor	Interlocked aluminum armor covered with black, sunlight and weather resistant polyethylene jacket
Characteristic Impedance Ohms	100 ± 15
Nominal Velocity of Propagation %	CAT 6A/6: 68 CAT 5e: 65
Performance Compliance	ANSI/TIA-568-C.2 ANSI/ICEA S-107-704-2006 RoHS-compliant REACH-compliant

ENVIRONMENTAL SPECIFICATIONS AND TESTS

Operation	-40°F to +167°F (-40°C to +75°C)
Installation	-40°F to +140°F (-40°C to +60°C)
ANSI/ICEA S-100-685-2009 ***Tested down to -67°F (-55°C)***	Section 7.1: -4°F (-20°C) cold bend test Section 7.2: +14°F (-10°C) cold impact test Section 7.3: -40°F (-40°C) anvil test

PART NUMBERS AND PHYSICAL CHARACTERISTICS

Category	Part Number	Product Code	AWG (mm)	Nominal Diameter in (mm)	Approx. Weight lbs/kft (kg/km)	Package
CAT 6A	04-001-A4	BBDN6A	23 (0.57)	0.39 (9.8)	59 (88)	1,000' Plywood reel
CAT 6	04-001-64	BBDN6	23 (0.57)	0.39 (9.8)	59 (88)	1,000' Plywood reel
CAT 5e	04-001-54	BBDNe	24 (0.51)	0.36 (9.1)	49 (73)	1,000' Plywood reel

Additional part numbers, constructions and packaging available upon request.

SUPERIOR ESSEX
800.551.8948 | 770.657.6000
SuperiorEssex.com

RoHS
Rev 9/14 Ed 12.1

GenSPEED® 6 Category 6 Cable (23 AWG)

Standards-Compliant Extended Frequency

Features and Benefits

- Unique separator design engineered for consistent electrical performance
- Performance guaranteed to 350 MHz
- Improved cable temperature rating (90°C Plenum, 75°C Riser) for greater protection against increased operating temperatures
- TRU-Mark® print legend contains footage markings from 1000' to 0'
- Third-party verified for guaranteed performance
- Made in U.S.A.

Applications

- IEEE 802.3: 1000 BASE-T, 100 BASE-TX, 10 BASE-T, PoE, PoE+
- ANSI/TIA 854: 1000 BASE-TX
- CDDI, Token Ring, ATM
- Digital Video
- Broadband and Baseband Analog Video

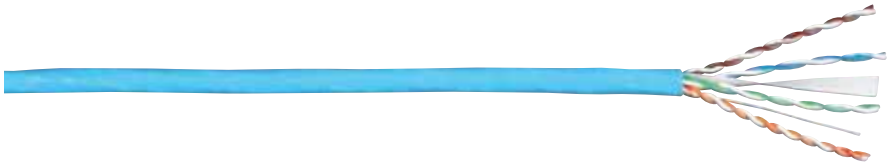
Standard Compliances

- ANSI/TIA 568-C.2
- NEC/CEC Type CMR (UL 1666) for Non-Plenum
- NEC/CEC Type CMP (NFPA 262) for Plenum
- UL Listed CMP-LP (0.5A) for Plenum*
- UL 444
- RoHS Compliant Directive 2011/65/EU
- ANSI/TIA 862 (Building Automation)
- ICEA S-116-732
- ICEA S-102-700
- ISO/IEC 11801 Ed. 2.0 (Class E)

LISTED VERIFIED TIA 568-C.2 RoHS Compliant Directive 2011/65/EU Made in U.S.A.

*0.5A is the ampacity rating of the cable, which equates to 100 watts using 50 volts over four pairs.

Data subject to change without notice.



CONSTRUCTION

Conductors
- 23 AWG solid bare annealed copper

Insulation
- Non-Plenum: Polyolefin
- Plenum: Fluoropolymer

Color Code
- Pair 1: Blue-White/Blue
- Pair 2: Orange-White/Orange
- Pair 3: Green-White/Green
- Pair 4: Brown-White/Brown

Separator
- Divider

Rip Cord
- Applied longitudinally under jacket

Jacket
- Non-Plenum: Flame-Retardant PVC
- Plenum: Low-Smoke, Flame-Retardant PVC

PHYSICAL DATA

	CMR (Non-Plenum)	CMP (Plenum)
Nominal Cable Diameter (in)	0.220	0.205
Nominal Cable Weight (lbs/1000 ft)	24	25
Minimum Bend Radius (in)	1.0	1.0
Maximum Pulling Force (lbs)	32	32
Temperature Rating (˚C)		
Installation:	0 to +60	0 to +60
Operation:	-20 to +75	-20 to +90

PART NUMBERS

Standard packaging: 1000' Pull-Pac® II

	Pull-Pac® II		Spool-Pac®		Spool	
Jacket Color	CMR (Non-Plenum)	CMP (Plenum)	CMR (Non-Plenum)	CMP (Plenum)	CMR (Non-Plenum)	CMP (Plenum)
Blue	7133800	7131800	7133840	7131840	7133860	7131860
White	7133801	7131801	7133841	7131841	7133861	7131861
Yellow	7133802	7131802	7133842	7131842	7133862	7131862
Gray	7133803	7131803	7133843	7131843	7133863	7131863
Red	7133804	7131804	7133844	7131844	7133864	7131864
Orange	7133805	7131805	7133845	7131845	7133865	7131865
Green	7133806	7131806	7133846	7131846	7133866	7131866
Black	7133807	7131807	7133847	7131847	7133867	7131867
Pink	7133808	7131808	7133848	7131848	7133868	7131868
Purple	7133809	7131809	7133859	7131859	7133869	7131869

Note: Bulk reels are available as a special request with a maximum allowable length of 3000 feet per reel. Minimum run and lead time may apply.

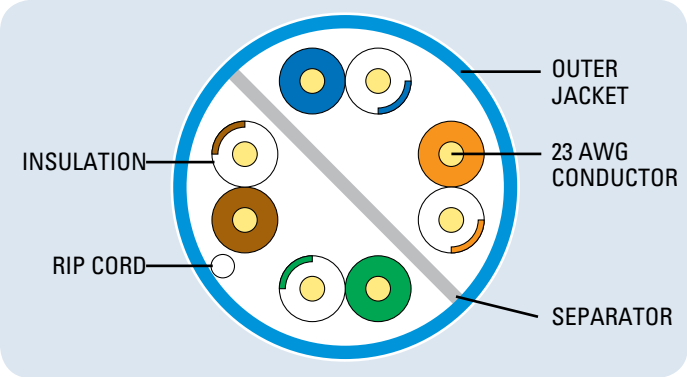
Non-stock items may be subject to minimum order quantities.

ELECTRICAL PERFORMANCE

Frequency MHz	PSACR* (min)	ACR* (min)	Insertion Loss (max)	PSNEXT (min)	NEXT (min)	PSACRF (min)	ACRF (min)	Return Loss (min)	TCL (min)	ELTCTL (min)
1	70.3	72.3	2.0	72.3	74.3	64.8	67.8	20.0	40.0	35.0
4	59.3	61.5	3.8	63.3	65.3	52.8	55.7	23.0	40.0	23.0
10	51.3	53.3	6.0	57.3	59.3	44.8	47.8	25.0	40.0	15.0
16	46.7	48.7	7.6	54.2	56.2	40.7	43.7	25.0	38.0	10.9
20	44.3	46.3	8.5	52.8	54.8	38.8	41.7	25.0	37.0	9.0
31.25	39.2	41.2	10.7	49.9	51.9	34.9	37.9	23.6	35.1	—
62.5	29.9	32.0	15.4	45.4	47.4	28.9	31.8	21.5	32.0	—
100	22.5	24.5	19.8	42.3	44.3	24.8	27.8	20.1	30.0	—
150	14.9	16.9	24.7	39.7	41.7	21.3	24.3	18.9	28.2	—
200	8.8	10.8	29.0	37.8	39.8	18.8	21.8	18.0	27.0	—
250	3.5	5.5	32.8	36.3	38.3	16.8	19.8	17.3	26.0	—
350	—	—	39.8	34.1	36.1	13.9	16.9	16.3	—	—
400	—	—	43.0	33.3	35.3	12.8	15.8	15.9	—	—
500	—	—	48.9	31.8	33.8	10.8	13.8	15.2	—	—

Note: Values are expressed in dB per 100 m (328 ft.) length @ 20°C. Results beyond 350 MHz are for reference only.
*PSACR & ACR not specified in ANSI/TIA 568-C.2

GenSPEED® 6 CATEGORY 6 (23 AWG) CROSS-SECTION



ELECTRICAL CHARACTERISTICS

	Max.	Nom.
DC Resistance Ohms/100 m (328 ft) @ 20˚C	9.38	7.50
DC Resistance Unbalance Individual Pair %	4.00	< 1
Delay Skew ns/100 m	45	CMP: 30 CMR: 35
Nom. Velocity of Propagation % Speed of Light	CMP: 70 CMR: 68	
Characteristic Impedance Frequency (f): 1-350 MHz	Ohms 100 ± 15	

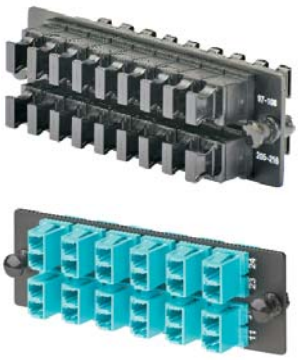
Opticom® Fiber Adapter Panels (FAPs)

PANDUIT®

SPECIFICATION SHEET

specifications

Fiber adapter panels contain TIA/EIA-604 FOCIS compliant or compatible simplex or duplex fiber optic adapters and meet or exceed TIA/EIA-568-C.3 requirements. Fiber adapter panels include horizontal and vertical MPO adapters, LC, keyed LC, SC, ST, FC, MT-RJ or E-2000 fiber optic adapters. Fiber optic adapters include phosphor bronze or zirconia ceramic split sleeves to fit specific network requirements. LC and SC adapter housing colors follow the TIA/EIA-568-C.3 suggested color identification scheme. Multimedia modular panels allow customization of installation for applications requiring integration of fiber optic and copper cables. Blank fiber adapter panels reserve fiber adapter panel space for future use. All fiber adapter panels snap quickly into the front of fiber optic patch panels and enclosures for easy network deployment or moves, adds, and changes.



technical information

Standards requirements:	All adapters meet or exceed TIA/EIA-568-C.3 requirements MPO: TIA/EIA-604 FOCIS-5 compliant LC: TIA/EIA-604 FOCIS-10 compatible SC: TIA/EIA-604 FOCIS-3 compliant ST: TIA/EIA-604 FOCIS-2 compatible FC: TIA/EIA-604 FOCIS-4 compliant MT-RJ: TIA/EIA-604 FOCIS-12 compliant E-2000: TIA/EIA-604 FOCIS-16 compatible
Split sleeve material:	Zirconia ceramic: 10Gig™ OM3/OM4 multimode adapters OS1/OS2 singlemode adapters Phosphor bronze: OM1 and OM2 multimode adapters
Insertion loss:	Supports the performance of connectors/patch cords
Return loss:	Supports singlemode (SPC and UPC) and multimode (PC) connector polish performance

key features and benefits

Snap quickly into Opticom® Fiber Adapter Patch Panels and Enclosures	Assures flexibility and ease of network deployment and moves, adds, and changes
Adapters available separately, and in Mini-Com® Patch Panels and Modules, and Opticom® MPO Fiber Optic Cassettes	Provides a complete system solution for connectivity, such as horizontal and vertical MPO adapters, LC, Keyed LC, SC, ST, FC, MT-RJ, E-2000 and Mini-Com® Fiber Optic Adapter Modules, copper jack modules and audio/video modules
LC and SC adapter housing colors follow TIA/EIA-568-C.3 suggested identification color scheme	Easy identification of fiber type via adapter colors; visually compatible with patch cords and connectivity that also follows the color identification scheme
Available with adapters in multiple colors	Type A polarity incorporates a black MPO adapter housing with a key-up to key-down configuration. Type B polarity incorporates a charcoal gray MPO adapter housing with a key-up to key-up configuration.

applications

Opticom® Fiber Optic Adapter Panels (FAPs) are used with Opticom® Rack and Wall Mount Enclosures, Fiber Adapter Patch Panels, and Opticom® Zero RU Fiber Adapter Panel Brackets to deploy medium to high-density fiber optic network applications as specified in the data center cabling standard TIA 942 for cross connects in main distribution, horizontal distribution, and equipment distribution areas. Opticom® Fiber Adapter Panels snap quickly into the patch panels and enclosures for easy network deployment or moves, adds, and changes. Opticom® Zero RU Fiber Adapter Panel Brackets mount directly to the rack to provide location, connection, and quick deployment of fiber adapter panels without taking any RU space. Multimedia modular panels also allow customization for installation requiring integration of fiber optic and copper cables. Blank fiber adapter panels reserve panel space for future use.

Opticom® Fiber Adapter Panels

Refer to next page for complete product listing.

Opticom® Rack Mount Fiber Cassette Enclosures

1 RU, holds 4 FAPs:	FCE1U
1 RU, open access, holds 4 FAPs:	FCE1UA
2 RU, holds 8 FAPs:	FCE2U
4 RU, holds 12 FAPs:	FCE4U

Opticom® Rack Mount Enclosures

1 RU, holds 3 FAPs:	FRME1U
2 RU, holds 6 FAPs:	FRME2U
3 RU, holds 9 FAPs:	FRME3
4 RU, holds 12 FAPs:	FRME4

Opticom® Standard Rack Mount Trays and Fiber Adapter Patch Panels

1 RU, holds 4 FAPs with 1 RU std. panel:	FMT1 with CFAPPBL1
2 RU, holds 8 FAPs with 2 RU std. panel:	FMT2 with CFAPPBL2

Opticom® Angled Rack Mount Trays and Fiber Adapter Patch Panels

1 RU, holds 4 FAPs with 1 RU angled panel:	FMT1A with CFAPPBL1A
2 RU, holds 8 FAPs with 2 RU angled panel:	FMT2A with CFAPPBL2A

Opticom® Zero RU Fiber Adapter Panel Brackets

Angled, 90°, adhesive and magnetic mount:	FEABRUA
Std., screw mount:	FEABRU

Opticom® Fiber Adapter Panels (FAPs)

ordering information

Opticom® MPO Fiber Optic Adapter Panels (FAPs)					
Fiber Type	**Adapter Color**	**FAP Orientation**	**4 Adapters**	**6 Adapters**	**8 Adapters**
OM3/OM4, OM2, OM1 and OS1/OS2	Black	Horizontal	FAPH0412BLMPO	FAPH0612BLMPO	FAPH0812BLMPO
			12 Adapters	**16 Adapters**	**18 Adapters**
			FAPH1212BLMPO	FAPH1612BLMPO	FAPH1812BLMPO
		FAP Orientation	**4 Adapters**	**6 Adapters**	**8 Adapters**
		Vertical	FAPV0412BLMPO	FAPV0612BLMPO	FAPV0812BLMPO

LC Opticom® Fiber Adapter Panels (Duplex Adapters)					
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**6 Adapters**	**8 Adapters**	**12 Adapters**
OM3/OM4	Aqua	Zirconia Ceramic	FAP6WAQDLCZ	FAP8WAQDLCZ	FAP12WAQDLCZ
		Phosphor Bronze	FAP6WAQDLC	FAP8WAQDLC	FAP12WAQDLC
OM2	Black	Phosphor Bronze	FAP6WBLDLC	FAP8WBLDLC	FAP12WBLDLC
OM1	Electric Ivory	Phosphor Bronze	FAP6WEIDLC	FAP8WEIDLC	FAP12WEIDLC
OS1/OS2	Blue	Zirconia Ceramic	FAP6WBUDLCZ	FAP8WBUDLCZ	FAP12WBUDLCZ

LC Opticom® Fiber Adapter Panels (Simplex Adapters)			
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**12 Adapters**
OM3/OM4	Aqua	Zirconia Ceramic	FAP12WAQLCZ
OS1/OS2	Blue	Zirconia Ceramic	FAP12WBULCZ

Keyed LC Opticom® Fiber Adapter Panels (Duplex Adapters)					
Fiber Type	**Key and Color**	**Split Sleeve(s)**	**6 Adapters**	**8 Adapters**	**12 Adapters**
All Fiber Types (OM3/OM4, OM2, OM1 and OS1/OS2)	A – Black	Zirconia Ceramic	FAP6WABLDLCZ	FAP8WABLDLCZ	FAP12WABLDLCZ
	B – Red		FAP6WBRDDLCZ	FAP8WBRDDLCZ	FAP12WBRDDLCZ
	C – Green		FAP6WCGRDLCZ	FAP8WCGRDLCZ	FAP12WCGRDLCZ
	D – Yellow		FAP6WDYLDLCZ	FAP8WDYLDLCZ	FAP12WDYLDLCZ
	E – Orange		FAP6WEORDLCZ	FAP8WEORDLCZ	FAP12WEORDLCZ
	F – Dark Blue		FAP6WFDBDLCZ	FAP8WFDBDLCZ	FAP12WFDBDLCZ
	G - Violet		FAP6WGVLDLCZ	FAP8WGVLDLCZ	FAP12WGVLDLCZ
	H - Aqua		FAP6WHAQDLCZ	FAP8WHAQDLCZ	FAP12WHAQDLCZ
	J - Rose		FAP6WJRODLCZ	FAP8WJRODLCZ	FAP12WJRODLCZ
	K - Slate		FAP6WKIGDLCZ	FAP8WKIGDLCZ	FAP12WKIGDLCZ
	L - Brown		FAP6WLLBDLCZ	FAP8WLLBDLCZ	FAP12WLLBDLCZ
	P - White		FAP6WPWTDLCZ	FAP8WPWTDLCZ	FAP12WPWTDLCZ
	Q - Charcoal		FAP6WQCGDLCZ	FAP8WQCGDLCZ	FAP12WQCGDLCZ
	R - Lavender		FAP6WRLVDLCZ	FAP8WRLVDLCZ	FAP12WRLVDLCZ
	S - Peach		FAP6WSPEDLCZ	FAP8WSPEDLCZ	FAP12WSPEDLCZ
	T - Steel Blue		FAP6WTSBDLCZ	FAP8WTSBDLCZ	FAP12WTSBDLCZ
	V - Maroon		FAP6WVMADLCZ	FAP8WVMADLCZ	FAP12WVMADLCZ
	W - Mint		FAP6WWMIDLCZ	FAP8WWMIDLCZ	FAP12WWMIDLCZ

Opticom® Fiber Adapter Panels (FAPs)

ordering information

SC Opticom® Fiber Adapter Panels (Duplex Adapters)						
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**2 Adapters**	**3 Adapters**	**4 Adapters**	**6 Adapters**
OM3/OM4	Aqua	Zirconia Ceramic	FAP2WAQDSCZ	FAP3WAQDSCZ	FAP4WAQDSCZ	FAP6WAQDSCZ
		Phosphor Bronze	FAP2WAQDSC	FAP3WAQDSC	FAP4WAQDSC	FAP6WAQDSC
OM2	Black	Phosphor Bronze	FAP2WBLDSC	FAP3WBLDSC	FAP4WBLDSC	FAP6WBLDSC
OM1	Electric Ivory	Phosphor Bronze	FAP2WEIDSC	FAP3WEIDSC	FAP4WEIDSC	FAP6WEIDSC
OS1/OS2	Blue	Zirconia Ceramic	FAP2WBUDSCZ	FAP3WBUDSCZ	FAP4WBUDSCZ	FAP6WBUDSCZ
APC, OS1/OS2	APC Green	Zirconia Ceramic	FAP2WAGDSCZ	FAP3WAGDSCZ	FAP4WAGDSCZ	FAP6WAGDSCZ

SC Opticom® Fiber Adapter Panels (Simplex Adapters)				
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**6 Adapters**	**12 Adapters**
OM3/OM4	Aqua	Phosphor Bronze	FAP6WAQSC	–
OM3/OM4	Aqua	Zirconia Ceramic	FAP6WAQSCZ	–
OS1/OS2	Blue		FAP6WBUSCZ	FAP12WBUSCZ
APC, OS1/OS2	APC Green		FAP6WAGSCZ	FAP12WAGSCZ

ST Opticom® Fiber Adapter Panels (Simplex Adapters)				
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**6 Adapters**	**12 Adapters**
OM3/OM4, OS1/OS2	Plated	Zirconia Ceramic	FAP6WSTZ	FAP8WSTZ
OM1, OM2		Phosphor Bronze	FAP6WST	FAP8WST

FC Opticom® Fiber Adapter Panels (Simplex Adapters)			
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**6 Adapters**
OM3/OM4, OS1/OS2	Plated	Zirconia Ceramic	FAP6WFCZ
OM1, OM2		Phosphor Bronze	FAP6WFC

MT-RJ Opticom® Fiber Adapter Panels (Duplex Adapters)			
Fiber Type	**Adapter Color**	**Split Sleeve(s)**	**6 Adapters**
OM3/OM4, OM2, OM1	Electric Ivory	N/A	FMP6WMTRJ
	Black		FMP6WMTRJBL

Multimedia Modular Panel	Blank Panel
FMP6	FAPB

related products

Opticom® Rack Mount Fiber Trays

Opticom® Rack Mount Fiber Enclosures

Opticom® Fiber Adapter Patch Panels

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PANDUIT®

WW-FBSP42
8/2011

Opticom® Rack Mount Fiber Trays

- Mount to standard EIA 19" rack rails
- Standard front or angled front options
- Use with Opticom® Fiber Adapter Patch Panels (below) to protect fibers and terminations
- Can be used as a back box for select Mini-Com® Patch Panels
- Removable top cover provides access to connections, fibers, and slack storage in rear of tray
- Multiple trunk cable entry locations provided on rear and sides of enclosure
- Include fiber optic cable routing kit (grommets, cable ties, spools, strain relief bracket and ID/caution labels) for various cable management solutions
- For fiber optic splicing solutions see page C.67, SA-NCCB51

FMT1

FMT2

FMT1A

FMT2A

Part Number	Part Description	No. of Rack Spaces^	Std. Pkg. Qty.
Standard Fiber Mount Trays			
FMT1	Mount with CFAPPBL1 fiber adapter patch panel to hold up to four QuickNet™ Cassettes, FAP, and FMP adapter panels. Dimensions: 1.75"H x 17.16"W X 11.16"D (44.4mm x 433.3mm x 283.5mm)	1	1
FMT2	Mount with CFAPPBL2 fiber adapter patch panel to hold up to eight QuickNet™ Cassettes, FAP, or FMP adapter panels. Dimensions: 3.48"H x 17.16"W x 11.16"D (88.3mm x 433.3mm x 283.5mm)	2	1
Angled Fiber Mount Trays			
FMT1A	Mount with CFAPPBL1A angled fiber adapter patch panel to hold up to four FAP or FMP adapter panels. Dimensions: 1.75"H x 17.16"W X 11.16"D (44.4mm x 433.3mm x 283.5mm)	1	1
FMT2A	Mount with CFAPPBL2A angled fiber adapter patch panel to hold up to eight FAP or FMP adapter panels. Dimensions: 3.48"H x 17.16"W x 11.16"D (88.3mm x 433.3mm x 283.5mm)	2	1

^One rack space = 1.75" (44.45mm).
All product color is black.

Opticom® Fiber Adapter Patch Panels

- Mount to standard EIA 19" rack rails
- Standard version holds both QuickNet™ Fiber Optic Cassettes and Opticom® Fiber Adapter Panels
- Angled version holds Opticom® Fiber Adapter Panels and matches Mini-Com® Angled Patch Panel profile
- Use with Opticom® Rack Mount Fiber Trays (above) to protect fibers and terminations

CFAPPBL1

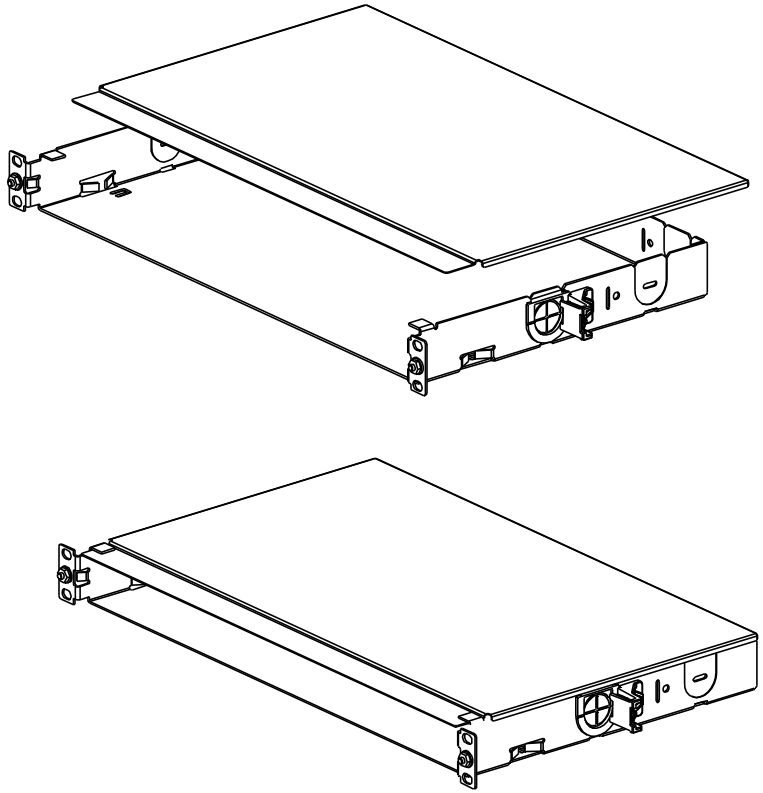
CFAPPBL2

CFAPPBL1A

CFAPPBL2

Part Number	Part Description	No. of Rack Spaces^	Std. Pkg. Qty.
Standard Fiber Adapter Patch Panels			
CFAPPBL1	Flat fiber patch panel. Holds up to four FAP or FMP adapter panels.	1	1
CFAPPBL2	Flat fiber patch panel. Holds up to eight FAP or FMP adapter panels.	2	1
Angled Fiber Adapter Patch Panels			
CFAPPBL1A	Angled fiber patch panel. Holds up to four FAP or FMP adapter panels.	1	1
CFAPPBL2A	Angled fiber patch panel. Holds up to eight FAP or FMP adapter panels.	2	1

^One rack space = 1.75" (44.45mm).
All product color is black.



NOTES:

1. SEE CURRENT CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
2. TRAY PROVIDES A MEANS TO MANAGE AND ORGANIZE FIBER OPTIC CABLE WHEN USING PANDUIT MODULAR PATCH PANELS.
3. MATERIAL:
   FIBER TRAY 16 GAGE(.060)(1.5) GALVANNEAL
   COVER 20 GAGE(.040)(1.0) GALVANNEAL.
4. FIBER OPTIC TRAY MOUNTS BEHIND MODULAR PATCH PANELS WHICH ARE OPTIONAL.
5. FIBER OPTIC TRAY MOUNTS ONTO EIA STANDARD 19" RACKS AND OCCUPIES ONE RACK SPACE.
6. THIS PART INCLUDES A CABLE ROUTING ACCESSORY KIT.
7. DIMENSIONS IN PARENTHESES ARE IN METRIC.

PANDUIT PART NO.	WEIGHT
FMT1	6.58 LB/EA 2991 g/EA

MODEL FILENAME: V10050AB_FMT1_02.prt

CAD FILENAME/LAYERS: V10050AB_DC_00D.prt (1)

PANDUIT CORP. TINLEY PARK, ILLINOIS

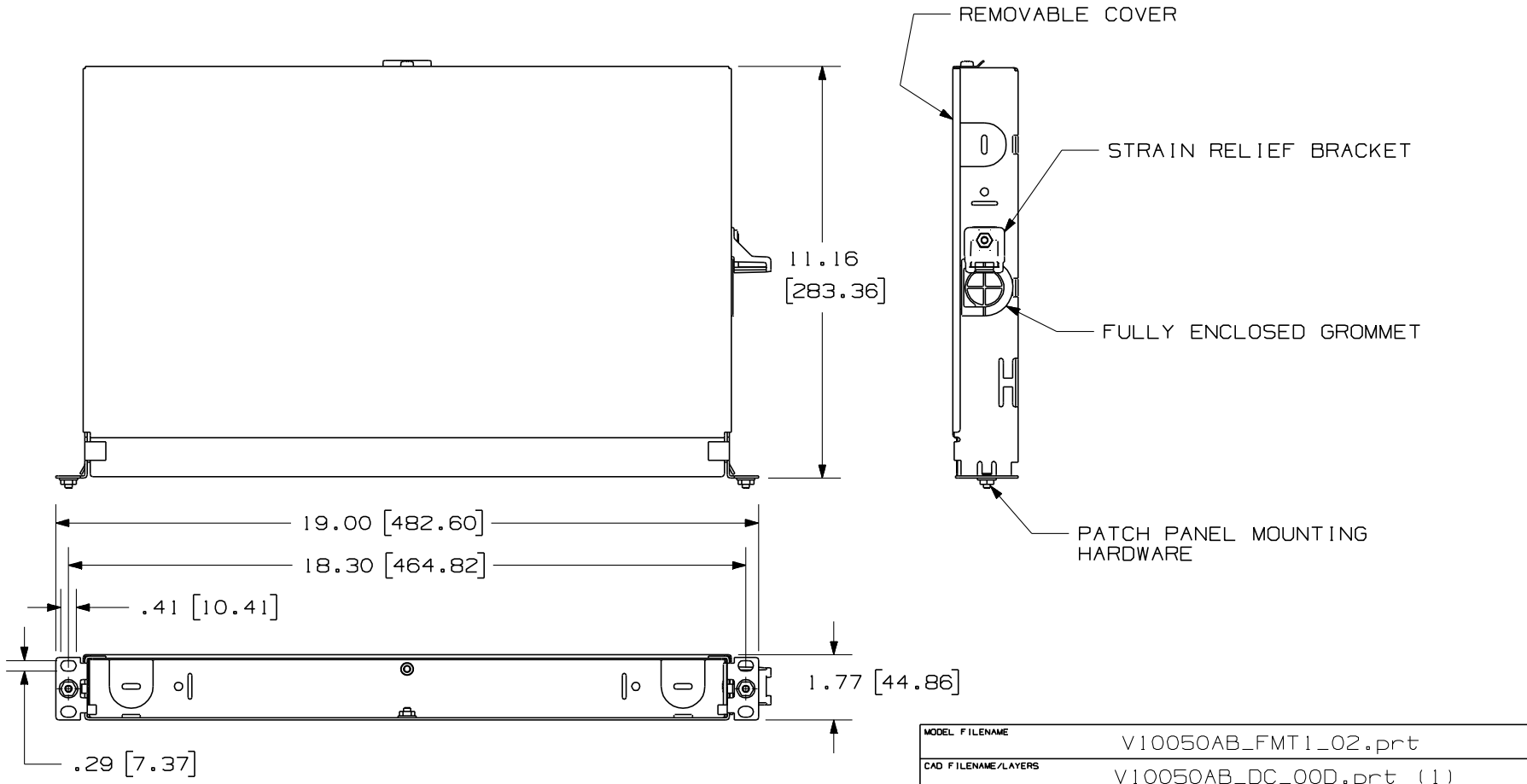
FIBER MOUNT TRAY (fixed tray), 1RU
(FMT1)
CUSTOMER DRAWING

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
3	05/10/07	DSI		C. REVISED PART NAME	10050-25			
2	4/15/02	RYB	RDC	B. REVISED EXPLODED VIEW	10050-25	JWI		
1	3/11/02	JDWE	RDC	A. CHANGED SHEET NUMBERS	10050-25	RDC		
R	2/26/02	RYB	RDC	RELEASED TO PRODUCTION	10050-25			

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ±
(.XX) ±.03 (.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.

DRAWN BY: REY B
DATE: 2/26/02
CHK'D: RDC
MAT'L: SEE NOTES
SCALE: NONE
DRAWING NO.: 10050-25 A
SHEET 1 OF 2
DWG SIZE: A



MODEL FILENAME	V10050AB_FMT1_02.prt
CAD FILENAME/LAYERS	V10050AB_DC_00D.prt (1)

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
3	5/10/07	DSI		SEE SHEET 1 OF 2 FOR REVISIONS	10050-25			
2	4/15/02	RYB	RDC	SEE SHEET 1 OF 2 FOR REVISIONS	10050-25	JWI		
1	3/11/02	JDWE	RDC	SEE SHEET 1 OF 2 FOR REVISIONS	10050-25	RDC		
R	2/26/02	RYB	RDC	SEE SHEET 1 OF 2 FOR REVISIONS	10050-25			

PANDUIT CORP. TINLEY PARK, ILLINOIS

FIBER MOUNT TRAY (fixed tray), 1RU
(FMT1)
CUSTOMER DRAWING

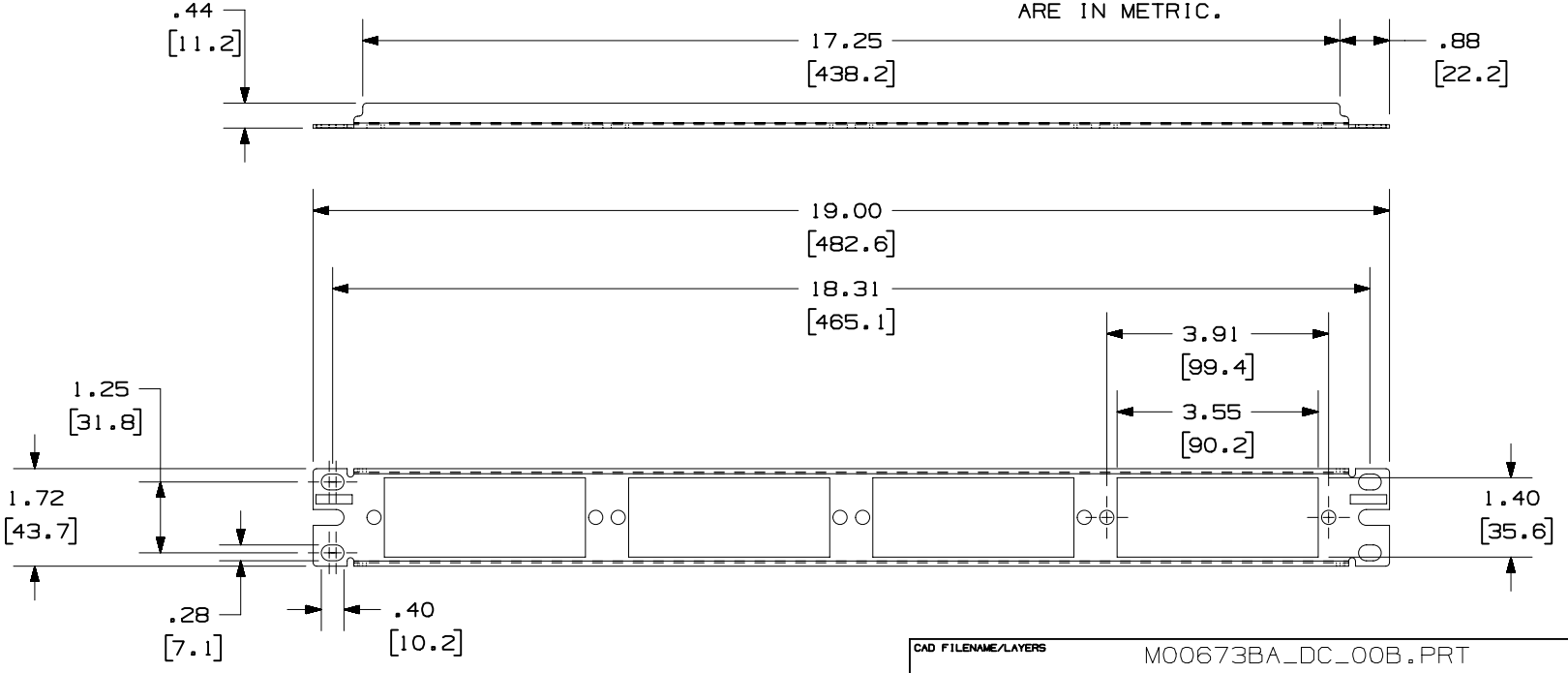
UNLESS OTHERWISE SPECIFIED,
DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ±
(.XX) ± .03 (.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED,
ALL DIMENSIONS ARE GIVEN
IN INCHES, THIRD ANGLE PROJECTION.

DRAWN BY	REY B
DATE	2/26/02
CHK'D	RDC
MAT'L:	SEE NOTES
SCALE	NONE
DRAWING NO.	10050-25 A
SHEET	2 OF 2
DWG SIZE	A

PANDUIT PART NO.*	DESCRIPTION	WEIGHT
CFAPPBL1	1 RACK UNIT - FIBER ADAPTER PATCH PANEL	1.5 LB (680.4 g)

NOTES:
1. SEE CURRENT CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
2. THE PATCH PANEL IS DESIGNED FOR MOUNTING TO FMTDW24 TRAY OR 19" UNIVERSAL RACKS.
3. (A) PARTS INCLUDED:
   1- PATCH PANEL
   4- 12-24 SCREWS
   4- M6 METRIC SCREWS
4. DIMENSIONS IN PARENTHESES ARE IN METRIC.



CAD FILENAME/LAYERS: M00673BA_DC_00B.PRT

PANDUIT CORP. TINLEY PARK, ILLINOIS

1 RACK UNIT - FIBER ADAPTER PATCH PANEL (CFAPPBL1) CUSTOMER DRAWING

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE:
(.X) ±.13(3.3) (.XXX) ±
(.XX) ±.03(.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.

DRAWN BY: BAS
DATE: 6-30-00
CHK'D: AFW
MAT'L: 16 GA. C.R.S.
SCALE: NONE
DRAWING NO.: 00673-18
DWG SIZE: A

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP
1	5-1-02	JDWE		A. REVISED NOTE 3- ADDED METRIC SCREWS.	00673-18		
R	6-30-00	BAS	AFW	RELEASED TO PRODUCTION	00673-18	AFW	

Keyed LC Opticom® Fiber Adapter Panels (FAPs)

- Include color-specific keys with positive and negative keying features to visually and mechanically distinguish connections to prevent unauthorized mating with unlike keyed or non-keyed connectors and patch cords
- Part of a complete keyed LC system that includes Opti-Core® Patch Cords and Pigtails, OptiCam® Pre-Polished Cam Connectors, Opticom® Fiber Adapter Panels (FAPs), and Mini-Com® Adapter Modules
- Snap quickly into the front of all Opticom® components
- Provide a keyed senior adapter interface at each end for keyed LC connectivity
- Include zirconia ceramic split sleeves for superior performance and reliability
- Every adapter is laser marked with Q.C. number to assure 100% traceability
- Keyed LC adapters are also available in Keyed LC QuickNet™ Fiber Optic Cassettes on pages C.49 – C.53, or Keyed LC Mini-Com® Modules on page C.34 to provide a complete keyed LC system solution

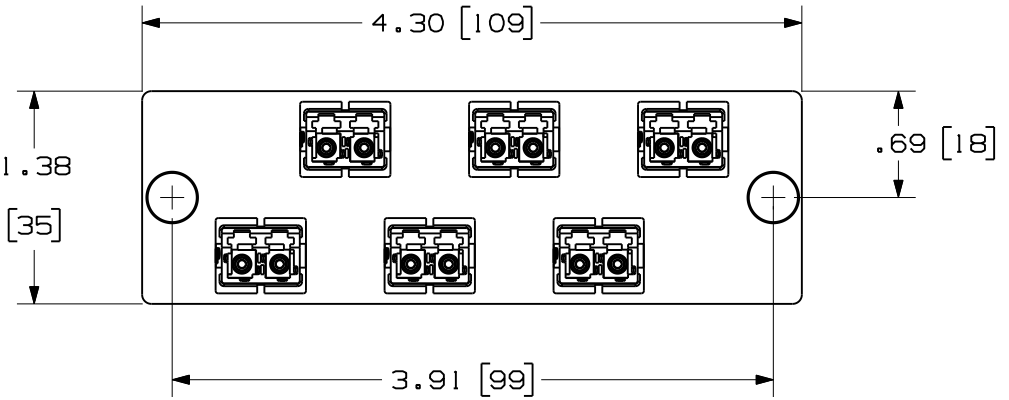
FAP6WBRDDLCZ

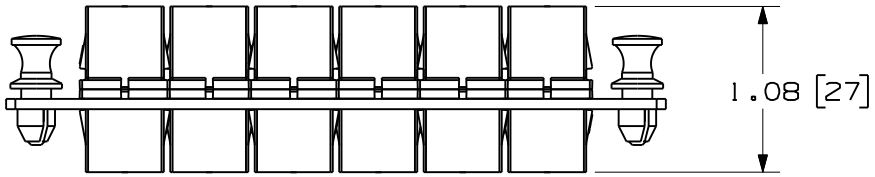
FAP8WEORDLCZ

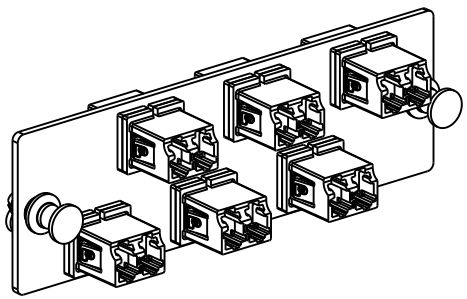
FAP12WDYLDLCZ

Part Number	Part Description	Key Type and Color	Std. Pkg. Qty.	Std. Ctn. Qty.
Keyed LC Fiber Adapter Panels – Six Adapters				
FAP6WABLDLCZ	Keyed LC FAP loaded with six LC (keyed A – black) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed A – Black	1	10
FAP6WBRDDLCZ	Keyed LC FAP loaded with six LC (keyed B – red) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed B – Red	1	10
FAP6WCGRDLCZ	Keyed LC FAP loaded with six LC (keyed C – green) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed C – Green	1	10
FAP6WDYLDLCZ	Keyed LC FAP loaded with six LC (keyed D – yellow) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed D – Yellow	1	10
FAP6WEORDLCZ	Keyed LC FAP loaded with six LC (keyed E – orange) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed E – Orange	1	10
FAP6WFDBDLCZ	Keyed LC FAP loaded with six LC (keyed F – dark blue) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed F – Dark Blue	1	10
Keyed LC Fiber Adapter Panels – Eight Adapters				
FAP8WABLDLCZ	Keyed LC FAP loaded with eight LC (keyed A – black) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed A – Black	1	10
FAP8WBRDDLCZ	Keyed LC FAP loaded with eight LC (keyed B – red) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed B – Red	1	10
FAP8WCGRDLCZ	Keyed LC FAP loaded with eight LC (keyed C – green) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed C – Green	1	10
FAP8WDYLDLCZ	Keyed LC FAP loaded with eight LC (keyed D – yellow) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed D – Yellow	1	10
FAP8WEORDLCZ	Keyed LC FAP loaded with eight LC (keyed E – orange) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed E – Orange	1	10
FAP8WFDBDLCZ	Keyed LC FAP loaded with eight LC (keyed F – dark blue) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed F – Dark Blue	1	10
Keyed LC Fiber Adapter Panels – Twelve Adapters				
FAP12WABLDLCZ	Keyed LC FAP loaded with twelve LC (keyed A – black) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed A – Black	1	10
FAP12WBRDDLCZ	Keyed LC FAP loaded with twelve LC (keyed B – red) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed B – Red	1	10
FAP12WCGRDLCZ	Keyed LC FAP loaded with twelve LC (keyed C – green) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed C – Green	1	10
FAP12WDYLDLCZ	Keyed LC FAP loaded with twelve LC (keyed D – yellow) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed D – Yellow	1	10
FAP12WEORDLCZ	Keyed LC FAP loaded with twelve LC (keyed E – orange) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed E – Orange	1	10
FAP12WFDBDLCZ	Keyed LC FAP loaded with twelve LC (keyed F – dark blue) duplex fiber optic adapters with zirconia ceramic split sleeves.	Keyed F – Dark Blue	1	10

The Keyed LC Fiber Optic System is now offering 18 colors to ensure network physical layer security with color-specific keyed connectivity. For complete keyed solutions, please reference www.panduit.com.

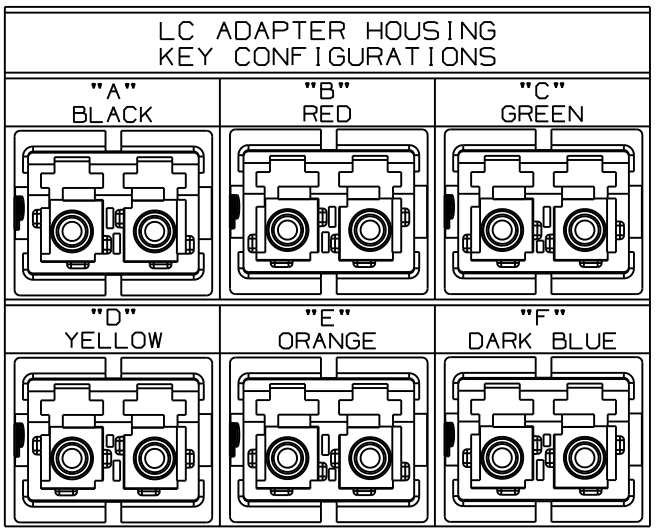






DUST CAPS REMOVED FOR CLARITY

NOTES:
1. SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PRODUCT AND PACKAGE QUANTITIES.
2. MATERIALS:
   a. PLATE: C.R.S. POWDER COATED
   b. ADAPTER: COMPOSITE
   c. SPLIT SLEEVE: ZIRCONIA
3. ALL MATERIALS AND COMPONENTS USED MEET THE MATERIAL RESTRICTIONS OF RoHS, (EUROPEAN DIRECTIVE 2002/95/EC ON THE RESTRICTION OF HAZARDOUS SUBSTANCES) AS PROPOSED BY THE RoHS TECHNICAL ADAPTATION COMMITTEE.
4. DIMENSIONS IN BRACKETS ARE METRIC.



REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
R	10-17-07		MC	RELEASED TO PRODUCTION	01945-93			

6 POSITION KEYED DUPLEX LC FIBER ADAPTER PANEL

CUSTOMER DRAWING

PANDUIT™ CORP.
TINLEY PARK, ILL 60477

THIRD ANGLE PROJECTION

ALL DIMENSIONS ARE GIVEN IN INCHES UNLESS OTHERWISE SPECIFIED.
DIMENSIONAL TOLERANCES ARE:
(.X) (.XXX)±.010 [0.3]
(.XX)±.03 [0.8] ANGLES

DRAWN BY: MC
DATE: 10-12-07
CHK'D:
REVIEW DRAWING NUMBERS

DRAWING FILENAME: M01945ZX_DC_00A.prt
SCALE: NONE
PART NO.: SEE TABLE, SHT. 2
DRAWING NO.: 01945-93 (SHT. 1 of 2)
SIZE: A

PANDUIT PART NUMBER	ADAPTER KEY CODE	ADAPTER COLOR	SPLIT SLEEVE TYPE	WEIGHT
FAP6WABLDLCZ	A	BLACK	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]
FAP6WBRDDLCZ	B	RED	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]
FAP6WCGRDLCZ	C	GREEN	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]
FAP6WDYLDLCZ	D	YELLOW	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]
FAP6WEORDLCZ	E	ORANGE	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]
FAP6WFDBDLCZ	F	DARK BLUE	ZIRCONIA	1.19 lb/10 pcs [507.7 g/10 pcs]

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP	OTH
R	10-17-07		MC	RELEASED TO PRODUCTION	01945-93			

6 POSITION KEYED DUPLEX LC FIBER ADAPTER PANEL

CUSTOMER DRAWING

PANDUIT™ CORP.
TINLEY PARK, ILL 60477

THIRD ANGLE PROJECTION

ALL DIMENSIONS ARE GIVEN IN INCHES UNLESS OTHERWISE SPECIFIED.
DIMENSIONAL TOLERANCES ARE:
(.X) (.XXX)±.010 [0.3]
(.XX)±.03 [0.8] ANGLES

DRAWN BY: MC
DATE: 10-12-07
CHK'D:
REVIEW DRAWING NUMBERS:

DRAWING FILENAME: M01945ZX_DC_00A.prt
SCALE: NONE
PART NO.: SEE TABLE
DRAWING NO.: 01945-93 (SHT. 2 of 2)
SIZE: A

General Cable

plus CORNING Optical Fiber

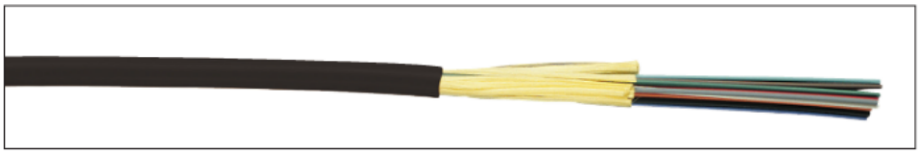
Optical Fiber Code Cross-Reference

Fiber Type	General Cable	Corning® Optical Fiber	Description
Standard Loose Tube SM	AQ	SMF-28e+™ Fiber	Full spectrum, low water peak singlemode, ITU-T G.652.D, ISO 11801 052, OS2*
Performance Loose Tube SM	AT	SMF-28e+™ Fiber	Full spectrum, high performance low water peak singlemode with 0.35/0.25 attenuation, ITU-T G.652.D, ISO 11801 052, OS2*
Tight Buffer SM	AP	SMF-28e+™ Fiber	Full spectrum, low water peak singlemode with 900 µm PVC buffer, ITU-T G.652.D, ISO 11801 052, OS2*
Long-Haul SM	AL	LEAF® Fiber	Large A_{eff}, low water peak, NZ-DSF singlemode, ITU-T G.655
Ultra-Bendable SM	AZ	ClearCurve® ZBL	Full spectrum with best macrobending performance, ITU-T G.652.D and ITU-T G.657.A
62.5 µm MM	CG	InfiniCor® 300 Fiber	1 Gb/s ≤ 300 m at 850 nm, OM1* 1 Gb/s ≤ 550 m at 1300 nm
62.5 µm MM	CL	InfiniCor® CL™ 1000 Fiber	1 Gb/s ≤ 500 m at 850 nm, OM1* 1 Gb/s ≤ 1000 m at 1300 nm
Ultra-bendable 50 µm MM	BI	ClearCurve® OM2 Fiber	10 Gb/s ≤ 150 m at 850 nm, OM2* 1 Gb/s ≤ 750 m at 850 nm
Ultra-bendable 50 µm MM	BE	ClearCurve® OM3 Fiber	10 Gb/s ≤ 300 m at 850 nm, OM3* 1 Gb/s ≤ 1000 m at 850 nm
Ultra-bendable 50 µm MM	BL	ClearCurve® OM4 Fiber	10 Gb/s ≤ 550 m at 850 nm, OM4* 1 Gb/s ≤ 1100 m at 850 nm
Ultra-bendable 50 µm MM	BM	ClearCurve® OM4 Fiber	10 Gb/s ≤ 600 m at 850 nm, OM4+* 1 Gb/s ≤ 1100 m at 850 nm

* Designation per ISO 11801 Fiber Standards

Tight Buffer Distribution Plenum Cable

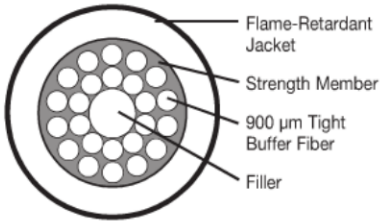
Indoor/Outdoor Dry Water Block, Type OFNP, CSA FT6



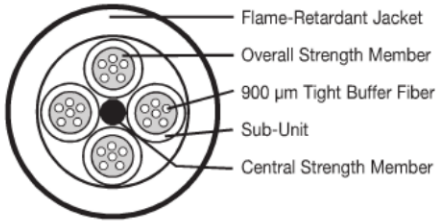
CATALOG NUMBER	FIBER COUNT	NO. OF SUB-UNITS	NOMINAL CABLE DIAMETER		NOMINAL CABLE WEIGHT		MAXIMUM TENSILE LOAD			
							INSTALLATION		IN-SERVICE	
			IN	mm	LBS/1000'	kg/km	LBS	N	LBS	N
XX0021ANU.BK	2	—	0.17	4	11.7	17.4	300	1334	90	400
XX0041ANU.BK	4	—	0.18	5	13.7	20.4	320	1423	96	427
XX0061ANU.BK	6	—	0.18	5	16.0	23.8	320	1423	96	427
XX0081ANU.BK	8	—	0.19	5	18.0	26.8	320	1423	96	427
XX0101ANU.BK	10	—	0.22	6	20.7	30.8	400	1780	120	534
XX0121ANU.BK	12	—	0.22	6	22.7	33.8	400	1780	120	534
XX0181ANU.BK	18	—	0.31	8	42.0	63	320	1423	112	500
XX0241ANU.BK	24	—	0.32	8	45.0	67	320	1423	112	500
XX0361A1D.BK	36	6	0.61	16	151	225	1300	5783	390	1735
XX0481A1D.BK	48	4	0.58	15	135	200	1300	5783	390	1735
XX0601A1D.BK	60	5	0.67	17	186	277	1500	6672	450	2002
XX0721A1D.BK	72	6	0.73	19	217	323	1900	8452	570	2535
XX0961A1D.BK	96	8	0.86	22	312	464	2000	8896	670	2980
XX1201A1D.BK	120	10	0.96	24	374	556	2000	8896	670	2535
XX1441A1D.BK	144	12	0.96	24	394	586	2000	8896	670	2980

XX denotes glass type.
A complete listing of NextGen® Brand glass types is specified on page 3 of this catalog.
* Double jacket design

Typical Cross-Sections



ANU.BK ≤ 24 Fiber



A1D.BK ≥ 36 Fiber

Hybrid designs (containing singlemode and multimode fiber) and composite designs (containing copper conductors) are also available.

Ordering Part Number Example

BE0241ANU.BK or BE0361A1D.BK

50 µm multimode, 24 or 36 fibers, tight buffer distribution plenum
Please see pages 4 and 5 for a complete guide on part number selection and ordering information.

Product Construction:

Fiber:

- 2–144 fibers
- 900 µm tight buffer
- Color-coding per TIA/IEIA 598 B

Central Strength Member:

- Epoxy/glass rod (above 12 fibers)

Overall Strength Member:

- Aramid fiber yarn

Jacket:

- UV-resistant black jacket
- Flame-retardant compound
- Sequential footage markings*

Features:

- Dry Water Block cable core for fiber protection
- Direct termination of connectors on tight buffer
- Sub-units are numbered for identification

Performance:

- Temperature:
  Storage -40°C (-40°F) to +70°C (+158°F)
  Installation 0°C (+32°F) to +50°C (+122°F)
  Operating -20°C (-4°F) to +70°C (+158°F)
- Minimum Bend Radius:
  20 X OD—Installation
  10 X OD—In-Service
- Maximum Crush Resistance:
  850 lbs/in (1485 N/cm)
- Maximum Vertical Rise—1,640 ft (500 m)

Applications:

- Intrabuilding and interbuilding voice or data communication backbones
- Outdoor use in ducts and underground conduits
- ETL Listed Type OFNP for installation in vertical riser and general horizontal applications when installed in accordance with NEC article 770.154 and 770.179

Compliances:

- ETL Listed Type OFNP
- CSA FT6
- TIA 568 C.3
- ICEA S-104-696
- GR-409
- RoHS Compliant Directive 2002/95/EC

*Sequential meter markings available upon request

NEXTGEN® BRAND

TIA 568 C.3

RoHS Compliant Directive 2002/95/EC

General Cable

Pan-Way® LD Surface Raceway System

PANDUIT®

SPECIFICATION SHEET

specifications

LD non-metallic series low voltage, one-piece hinged design, single channel surface raceway shall include adhesive backing and shall be made of impact resistant material with a smooth finish that shall not scratch, peel or corrode. The raceway shall include an assortment of bend radius and standard fittings that complement the offering to help route, protect and conceal low voltage data, voice and video cabling. LD raceway shall be available in three sizes and four standard colors that shall be optimized with the Panduit® Pan-Net® communication system.

technical information

Material:	Rigid PVC
Flammability:	UL94V-0; FT4
Capacity:	Single Channel
Voltage Rating:	50V or less
Operating and Storage Temperature:	0 to 50º C

key features and benefits

1" bend radius control fittings:	Cables in the raceway will satisfy the minimum 1" bend radius requirement, preventing the potential degradation of cable performance; meets TIA/EIA standards
One-piece hinged design:	Cables can be laid into the raceway, speeding installation and preventing damage to cables
Adhesive backing:	Full length adhesive strip allows easy tool free installation and works well for temporary mounting
Available in different sizes & lengths:	Accommodates varying cable types and capacities. Available sizes - LD3, LD5,LD10 ; Available lengths - 6',8',10' (2m length available in Europe only)
Non-metallic construction:	Lightweight, reducing installer fatigue and labor required to install the raceway; solid color throughout will not chip, peel, rust or corrode; easy to cut with standard saws and saw blades, eliminating the need for special cutting devices
Distinct colors:	Available in four standard colors- IW,EI,IG,WH. AW available in Europe only. Raceway is field paintable to match walls and surrounding décor
Full selection of fittings and surface mount boxes:	Wide variety of fittings and surface mount boxes available for various LD raceway applications

applications

Pan-Way® LD Surface Raceways are designed to provide easy and economical solutions for routing any low voltage cable along smooth and clean perimeter walls, baseboards or ceilings. This raceway is a perfect solution for schools, hospitals, offices, homes or anywhere a small, secure, low profile raceway is needed.

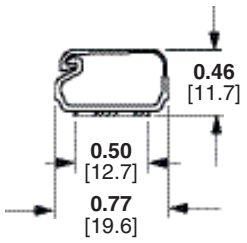
LD Raceway	
Raceway:	LD3IW**-A LD5IW**-A LD10IW**-A
LD Raceway Fittings	
Coupler:	CF*IW-E
Inside corner:	ICFC*IW-X
Outside corner:	OCFC*IW-X
Right angle:	RAFC*IW-X
End cap:	ECF*IW-X
Tee:	TFC*IW-X
Four-way cross:	CRFC5IW-X
Drop ceiling/ entrance end:	DCF*IW-X
Right angle/ entrance end:	RAEFXIW-X
LD5 to LD3 reducer:	RF5X3IW-E
LD10 to LD5 reducer:	RF10X5IW-X
LD10 to LD3 reducer:	RF10X3IW-X
LD5 fire box adapter:	FBA5IW-X
LD10 fire box adapter:	FBA10IW-X
LD Raceway Installation	
Installation tool:	LDW*-V
LD Raceway Surface Mount Outlet/Junction Boxes	
Low Voltage*:*	
Single gang, one–piece :	JB1IW-A
Single gang, one-piece, deep:	JB1DIW-A
Single gang, two-piece :	JBX3510IW-A
Single gang, two-piece, fast snap:	JB1FSIW-A
In-wall box adapter:	JBA-X
Power rated*:*	
Single gang, two-piece:	JBP1IW
Single gang, two-piece, deep:	JBP1DIW
Single gang, two-piece, extension:	JBP1EIW
Single gang, two-piece, intermediate:	JBP1IIW
Single gang, two-piece, snap on:	JBP1FSIW
Single gang, two-piece, round:	RJBX3510IW
Double gang, two-piece:	JBP2IW
Double gang, two-piece, deep:	JBP2DIW
Double gang, two-piece, divided:	JBP2SIW
Double gang, two-piece, snap on:	JBP2FSIW

* Insert raceway size of 3, 5, or 10
** Insert raceway length of 6', 8', or 10'
All parts listed in International White (IW) color. To order other colors substitute Electrical Ivory (EI), International Gray (IG), and White (WH).

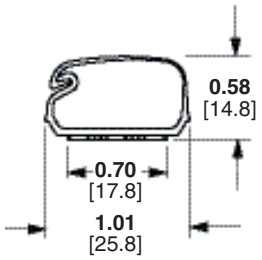
Wire Fill

Raceway Type and Configuration	Fill Area (in^2)	Electrical Cables			Data Grade Cables 24 AWG/UTP CM								Audio/Video		Fiber Optic Cable	
		14 AWG	12 AWG	10 AWG												
		THHN/T90			Cat 5e – Plenum		Cat. 6		Cat. 6A		Cat. 6A (SD)		RG6		2 Strand	
		0.111	0.130	0.164	DIA. = 0.193		DIA. = 0.24		DIA. = 0.30		DIA. = 0.24		DIA. = 0.275		DIA. = 0.175	
		FILL			FILL		FILL		FILL		FILL		FILL		FILL	
		MAX	MAX	MAX	SPEC	MAX	SPEC	MAX	SPEC	MAX	SPEC	MAX	SPEC	MAX	SPEC	MAX
		(UL Temp Rise Test)			40%	60%	40%	60%	40%	60%	40%	60%	40%	60%	40%	60%
LD3	0.21	**	**	**	2	4	1	2	1	1	1	2	1	2	3	5
LD5	0.38	**	**	**	5	7	3	5	2	3	3	5	2	3	6	9
LD10	1.00	**	**	**	13	20	8	13	5	8	8	13	6	10	16	24

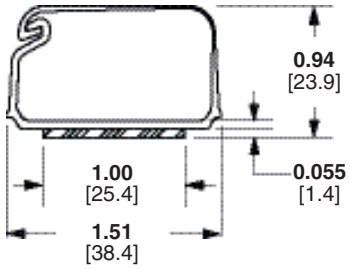
LD Raceway



LD3

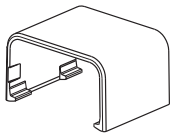


LD5



LD10

Fittings



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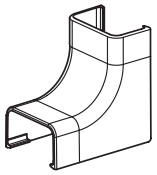
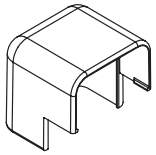
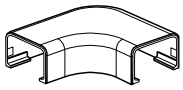


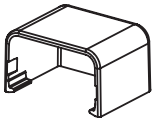
ICFC



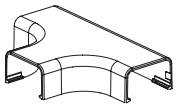
OCFC



RAFC



ECF



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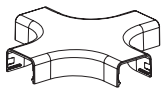

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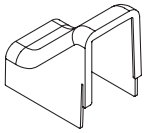

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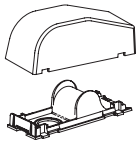

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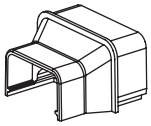
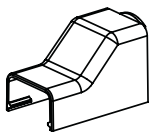


RF



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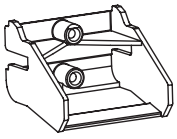


LDW

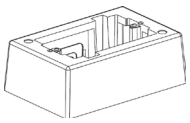
Pan-Way® LD Surface Raceway System

Compatible LD Raceway Surface Mount Outlet/Junction Boxes

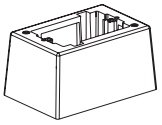
Low Voltage or Fiber Optic ONLY	
***JB1**-A*	Single gang one-piece outlet box with adhesive backing.
***JB1D**-A*	Single gang one-piece deep outlet box with adhesive backing
***JB1FS**-A*	Fast-Snap™ Single Gang Two-Piece Snap Together Outlet Box with adhesive backing.
***JBX3510**-A*	Single gang two-piece snap together outlet box with adhesive backing
JBA-X	In-wall box adapters adapt single gang surface mount outlet boxes to in-wall conduit boxes.
Power, Low Voltage or Fiber Optic	
RJBX3510*	Single gang two-piece screw together round outlet box.
JBP1*	Single gang two-piece screw together outlet box.
JBP1D*	Single gang two-piece screw together deep outlet box.
JBP1E*	Single gang two-piece screw together extvension outlet box.
JBP1I*	Single gang two-piece screw together intermediate outlet box.
JBP2*	Double gang two-piece screw together deep outlet box
JBP2S*	Double gang two-piece screw together divided outlet box
JBP2D*	Double gang two-piece screw together deep outlet box
JBP2FS*	Fast-Snap™ Double Gang Power Rated Two-Piece Snap Together Outlet Box
PSJBX*	Single gang two-piece snap together power source box.

** = Available colors: International White (IW), Electrical Ivory (EI), International Gray (IG), White (WH) or Arctic White (AW).

Surface Mount Outlet/Junction Boxes



JB1



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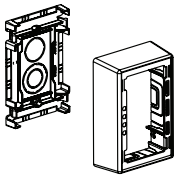

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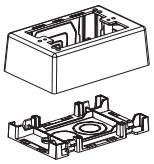
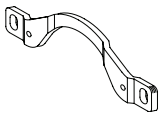
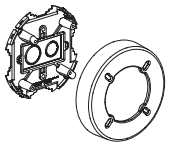


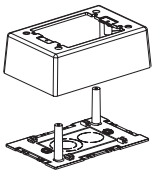
JBX3510



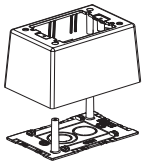
JBA



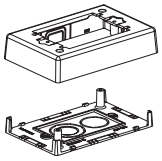
RJBX3510



JBP1



JBP1D



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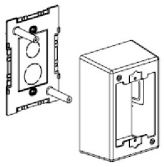
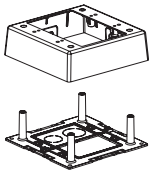
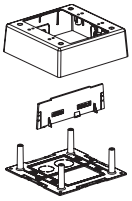


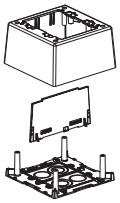
JBP1I



JBP2



JBP2S



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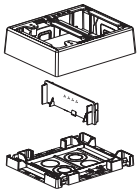
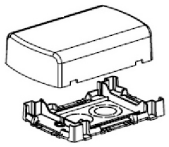


JBP2FS



PSJBX

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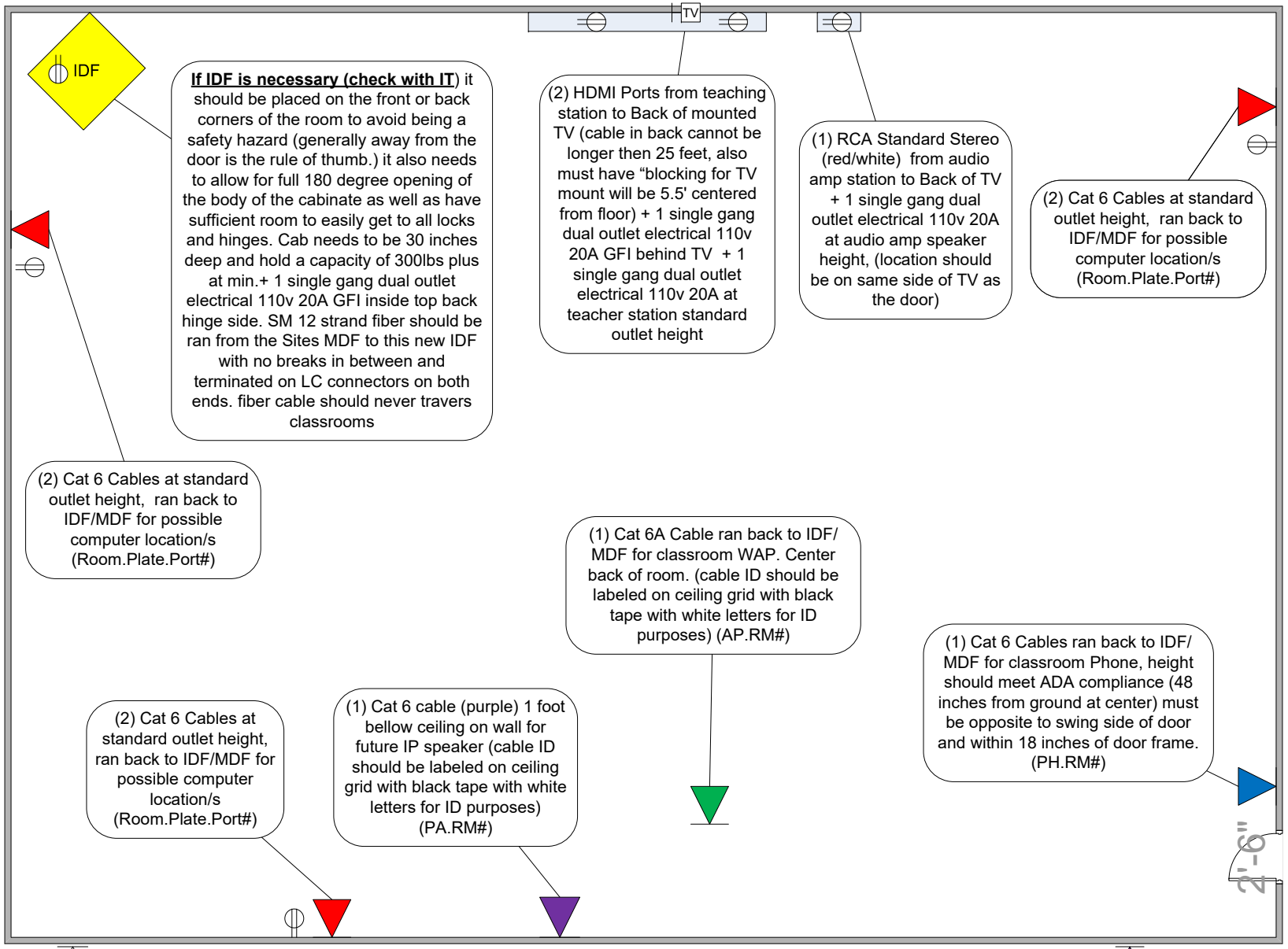
SRSP21--WW-ENG
Replaces WW-SRSP10
6/2015



This map excludes Camera locations and external IP speaker locations. If this is a modernization project then any external camera locations and external Speaker locations need to be replaced in kind

Parties Present:
Howard Cohen
Adam lint
Dan Weiser
David Kenney
Jason Velasquez

Total "Data" Drops = 9 -11
Total "HDMI" Drops = 2
Total RCA Stereo Drops = 1 (red/white)

LEGEND

- "White" CCTV Camera
- "Blue" Phone C-6
- "Red" Wall outlet C-6
- "Green" Wifi C-6A
- "Purple" PA C-6
- IDF — **IDF**
- MDF — **MDF**

Date: **08/16/18**

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