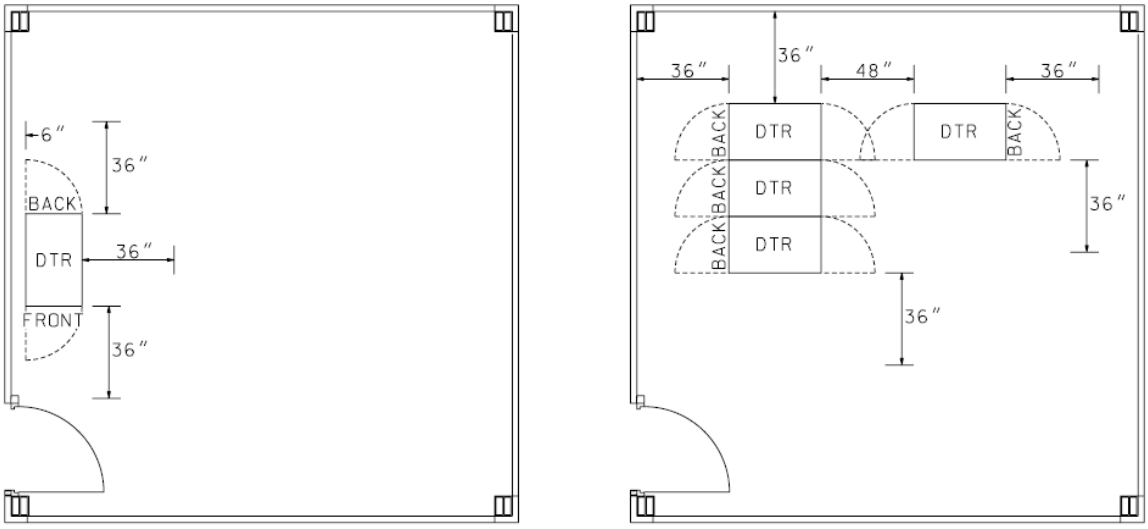
# DATA TERMINATION RACK (DTR)

Function: This section explains the requirements for the Data Termination Rack (DTR).

General Summary: All target training network cables on all ranges except for Live Fire Shoothouses are interconnected at the ROC in floor mounted racks which are designated as DTRs. The network cables for Live Fire Shoothouses shall interconnect to the ROC in a wall mounted patch panel. DTRs are located in Large ROC, Small ROC, Large AAR, Small AAR, Control Towers, and CACTF training buildings. Each DTR except for the CACTF training buildings ROC's shall be an industry standard 19" (22" outer dimension), 36" deep, 84" tall enclosed rack. The DTR for the CACTF training buildings shall be an industry standard NEMA 12, 19" (23" outer dimension), 31.5" deep, 79" tall rack. The racks shall be installed such that there is adequate working space around the rack. For installations in which only one rack is required there shall be a minimum of 36" working space in front, back and one side; the oppose side shall have a minimum of 6" clearance to the nearest wall. For installations where multiple racks are installed racks may be joined at adjacent sides and there shall be a minimum of 36" clearance on the front, back, and side not connected to other rack. Where racks are located across from each other there shall be a 48" minimum aisle space between the racks.




Example DTR Installations (Not to Scale)

Location: DTRs are located in ROCs, AARs, Control Towers, and CACTF training buildings. All data cables installed in the Milcon construction contract will be terminated in a DTR. The Milcon construction contract shall include at a minimum the number of DTRs required to terminate all cables installed by the construction contract. Careful consideration shall be given when populating the DTRs so the amount of space consumed

is at a minimum because the OPA instrumentation contractor will install equipment in some DTRs provided by the Milcon contractor. See the section for each building type to see additional information as to number of DTRs required for each building type. For digital and urban ranges the OPA instrumentation contractor will provide and install additional DTRs for range instrumentation equipment. The Milcon contract will provide power and grounding provisions for OPA provided DTRs.

Data: The method that data cables enter DTRs is dependant upon the type of building. For DTRs installed in ROCs and Control Towers the cables will be routed under the racks. For DTRs installed in AARs and CACTF training buildings the data cables shall be routed through the top of the rack. In CACTF training building racks where the cables route through the top the NEMA 12 rating of the DTR shall not be violated due to the opening in the top for the cables.

The DTRs shall only be used to terminate Training Cable, which is defined as the cable used for the control and operation of the range. Common User Cable, cable used for telephone and LAN data, shall terminate in separate racks and patch panels. The requirements for the Common User Cable equipment installed under the Milcon construction contract are not governed by this publication. Verify these requirements with the local DOIM office. In buildings where both Common User Cable and Training Cable are installed each cable shall have the "Common User" or "Training" designation on the permanent cable tags.

For ROCs, AARs, and Control Towers; only one type of data cable shall be run into the DTR. For example, if it is determined that fiber optic cable is required for some targets; then only fiber optic cable shall be used from the DTR. This will limit the type of equipment supplied by the OPA contractor to one media type. All fiber optic cables entering the DTR shall be terminated in "SC" connector type patch panels, and all CAT 5E or better cables shall be terminated in RJ-45 connector patch panels. For CACTF training buildings both fiber optic cables and CAT 5E or better cables will be installed in the DTR. All patch panels shall be installed in DTRs to allow the maximum amount of space for the installation of the OPA contractor target control equipment. IT SHOULD BE ASSUMED THAT ADDITIONAL EQUIPMENT INSTALLED BY OTHERS WILL BE ADDED TO THE DTRS FOLLOWING THE COMPLETION OF THE MILCON CONTRACT.

Power: Power requirements for DTRs vary depending on the type of range.

> Non-digital ranges: The DTRs for these ranges shall be supplied power via two dedicated 20-amp circuits to a quad outlet. The quad outlet shall be located under DTR. There are no AARs for these types of ranges.
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> Digital ranges: Provide power to DTRs in the ROC from the UPS fed panelboard. Provide power to the DTRs in the AAR from a normal building power panel board. In both the ROC and AAR communication room each DTR

shall be supplied power via two dedicated 20-amp circuits to a quad outlet. The outlet shall located under the raised floor beneath the DTR in the ROC, and shall be located on the nearest adjacent wall to the DTR in the AAR. There are multiple racks in the ROC communication room provided by the OPA instrumentation contractor, and power shall be supplied to each of these future racks. In the AAR control rooms provide a dedicated 20-amp circuit to a duplex outlet to one OPA provided DTR in each control room.

CACTF ranges: In AAR communication room the DTR shall be supplied power via two dedicated 20-amp circuits to a quad outlet. The outlet shall be located on the nearest adjacent wall to the DTR in the AAR. Power shall be provided to two DTRs in the ROC with two 60A wall mounted disconnect switches. These disconnect switches shall be installed in Communications Room for rack mounted UPS to be installed by others. An empty conduit with pull string shall be installed from each disconnect to a junction box mounted above the drop ceiling. The junction box location shall be coordinated with PEO-STRI.. Provide power to the DTRs located in the CACTF training buildings via two dedicated 20-amp circuits to a quad outlet located in the bottom of the rack enclosure. This quad outlet shall be install as low in the rack as possible to maximize the amount of available space in the rack for installation of OPA installed instrumentation equipment.

Live Fire Shoothouse (AAR only): In the AAR for the shoothouse a wall mounted patch panel shall be provided where the fiber optic cable from the Shoothouse is terminated. The OPA contractor will provide two DTRs. Power shall be provided to the two OPA provided DTRs via NEMA L5-30R outlets mounted flush in the ceiling above each DTR. There is no ROC for a live fire shoothouse.

Ventilation: Proper ventilation of equipment installed inside the DTRs is essential to the successful operation of the range. Design consideration shall be given to the ventilation of the equipment installed inside the DTR and the ventilation for the room housing the DTR. The room HVAC requirements are provided in the section for each building. In some instances the DTR shall be provided with integral exhaust fans in the top of the enclosure to ensure the equipment is adequately ventilated.

CACTF training buildings will have rack coolers which will be provided and installed by the OPA contractor. Additional power will be required to these racks that require rack coolers, coordinate the power requirements for the rack coolers with OPA funded agency. The rack coolers will include an evaporator to eliminate condensate from building on the electric room floors. The rack cooler and evaporator will be provided and installed by OPA, but the MCA design shall include provisions for running power to these devices.

Grounding: Each DTR shall be provided with an integral copper bus bar. Provide a minimum size of green insulated #6 AWG grounding conductor DTR grounding bus bar

from the Telecommunication Main Ground Bus bar (TMGB). For ranges where the OPA contractor will provide additional racks, ensure that there is a means for their racks to be grounded to the TMGB.