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Muon Electronics Cabling

1. Introduction.

Each muon front-end unit (i.e. PDT, Scintillator or MDT VME crate) located in the D0 collision hall has cable connections to both D0 DAQ system and D0 CDAQ system. D0 DAQ system performs data taking functions and D0 CDAQ system performs control and downloading functions. In addition, each front-end element (e.g. FEB, SFE, MDC, MCEN) has connection to the Level 1 muon trigger system, which is described in the Level 1 cabling document. This document primarily describes cable requirements for the muon front-end electronics.

2. Connections.

DAQ connections:

- one 50 cond. twist and flat cable from MCH to the front-end

- one flat four coaxial cond. cable from MCH to the front-end

Exception: some L1 trigger crates require more than one MRC connection, therefore they use twice or more the above number of cables.

CDAQ connections:

- one shielded twist pair cable from MCH to the front-end (daisy-chained in groups of 16 or less and terminated at the end by 75 ohms terminator)

HV connections:

Each detector system has specific HV connections to the MCH. It is described in a separate detector cabling document.

3. Muon Cable Plant.

The existing muon cable plant has 24 cond. wide flat coaxial ASTRO cables and 50 cond. wide twist-and-flat 3M cables in the cable tray between MCH and the platform. These cables are connecting several patch crates located in the MCH and in the collision hall. These main cables will stay for Run II and have to be tested and repaired, if necessary. The number of cables we are using in this connection will be reduced in comparison with Run I number.

Connections between patch crates and front-ends and in the MCH will be modified. We have to make new flat coaxial cables for the MRC connections eight cond. wide. Therefore, each 24 cond. ASTRO cable will serve up to six front-end units. The patch crate in the MCH will have a plug-ins which separate 24 cond. into three 8 cond. flat coaxial cables and also six separate coaxial connectors (or one AMP connector) for L2 trigger data (L2 connections and cabling is described in a separate document). It might be possible to use old eight wide ASTRO cable jumpers for the MCH connections, but I am not sure, if their length will be adequate (it cannot be changed or otherwise is very time consuming job).

The ASTRO cable jumpers used in Run I between patch crates and detectors will be replaced. The only exception is SAMUS jumpers which have four coax cond. in each jumper. Their use is limited, though, and has to be confirmed. We will need new flat coax. four cond. wide cable jumpers for all front-end units.

The old 50 cond. jumpers can be used after we test and repair them. We may need new ones of this kind, if the number of old ones is smaller than we need.

The 1553 twisted pair cables will be used as they are if possible. We will need new 1553 cables because of different locations of the front-end units in comparison to Run I. The total number of remote terminals we are going to use is about the same as in Run I.

4. Muon Electronics Hardware.

Up-to-date information regarding muon electronics configuration can be found at the following URL:

http://d0sgi0.fnal.gov/~bardon/mu_elec_index.html.

Here are some excerpts from the above document.

Electronics in the collision hall:

Subsystem:	Quantity:	**Location:**
PDT on-chamber electronics:		
FEB	278	PDT
CB	94	PDT
Scintillator VME crates:		
Central region	6	platform
Forward region	12	trusses
MDT VME crates	24	trusses
Level 1 VME crates	4	platform
MCEN crates	4	platform/trusses

Note: many crates may require additional 120 VAC outlets installation

Electronics in the MCH:

Muon readout crates	12	MCH 3rd floor
Level 1 crates	3	MCH 3rd floor
Level 2 crates	2?	MCH 3rd floor

5. Working plan.

Up to date the work on this project has not started yet. Tom Diehl agreed to supervise this project. The muon upgrade schedule shows item 31 “refurbish cable plant” with two ET working for 52 weeks. This is just an

estimate. We need more detailed schedule for this project. The plan is the following:

- Estimate number of cables necessary for the entire muon system
- Estimate manpower and resources needed for this project
- Compile database for existing and new cables
- Design new plug-in modules for muon patch crates
- Correct muon upgrade schedule, if necessary
- Procure necessary components
- Produce, repair, test and install necessary cables and plug-in modules