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# CMB-S4

## DAQ -DM INTERFACE CONTROL DOCUMENT

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## REVISION HISTORY

Version Letter	Revision Date	Author: Notes
v1	6/29/20	Initial draft
v2	11/4/21	Added some detail
v3	7/17/23	Define boundaries and responsibilities, add technical details

## REFERENCED & APPLICABLE DOCUMENTS

The requirements in the following documents apply, but this document supersedes if there is a conflict.

Reference used within this doc	Version	Title & Description, including Document number if applicable	Notes, relevant part of document

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## 1. PURPOSE AND SCOPE

This document defines and describes the interfaces between the DAQ and the DM.

## 2. ABBREVIATIONS AND DEFINITIONS

### 2.1 ABBREVIATIONS

DAQ	Data Acquisition and Control
DM	Data Management

### 2.2 DEFINITIONS

Housekeeping Data	Low-rate (< 1 Mbit/s) information from various instruments
Detector Data	Microwave-detector data at rates up to 10 Gbit/s

## 3. MECHANICAL/STRUCTURAL INTERFACES

### 3.1 COMPUTATION

There is at least one computer which functions as both data acquisition and control, located in a centralized facility. These data acquisition computers will transfer data to data management for storage and analysis through one or more switches. The physical demarcation point between DM and DAQ is the DM-bound ethernet cable attached to the DAQ computer.

DAQ-DM-0001 Cable layout from DAQ computers to switch

DAQ-DM-002 Cable layout from DM computers to switch

## 4. SIGNAL INTERFACES

### 4.1 FILE FORMAT

DAQ will determine and document the file format for data collection, in consultation with DM and the scientific collaboration. Files include all detector and housekeeping data and will be pushed to data management rather than pulled. It is assumed that the data from a variety of sources may be asynchronous and will occur at different rates.

[File Format Specification TBD - to be updated]

#### **4.2 DATA RATE**

DAQ will transmit uncompressed instrument data at an average rate not to exceed 4 Gbit/sec per site (expected average rate is 3.2 Gbit/s). Transfer is likely to have a spiky rate profile between DAQ and DM as buffers are flushed, with 3.2 Gbit/s a long-term average.

#### **4.3 TRANSFER PROTOCOL**

Data will be transferred from DAQ-controlled computers as files transferred over the network using standard file-transfer protocols (e.g. rsync).

### **5. MONITORING**

DAQ will provide real-time monitoring of housekeeping systems and detector-based metadata (number of detectors in transition, etc) and a multi-tiered alarming protocol. Monitoring of quantities which require reading data from disk (white noise floors from a full observation, etc) are the domain of DM. Data quality statistics, plots, etc, from DM will not necessarily be generated in real time and are not part of the real-time monitoring or alarms systems.

### **6. NETWORK SECURITY**

DAQ will provide an access control framework for the control system to manage scenarios with competing control requests, but will not provide network security infrastructure for any site computation.