Ramona Optics WebAPI Available Functions

The goal of this document is to outline the required features for the development of the MCAM driver in the context of automation software. For the purposes of this document, this other software will be considered the **Client**.

At the end of development, the driver should be able to expose the core functionality of the MCAM and to allow users to adjust assay parameters based on their experiment specific details.

The API can be separated into 4 distinct sections.

1. MCAM connection refers to the ability to establish and terminate communication between the server on the MCAM and the **Client software**.
2. MCAM mechanical state is used to insert and eject the sample stage.
3. The synchronous assay section is where the user will make blocking calls to our MCAMs assay functions.
4. The asynchronous assay section is where the user will make non-blocking calls to our MCAMs assay functions. The main advantage of the asynchronous assay workflow is that it enables front end applications such as **Client** software to display a progress bar of the assays.

Finally, as part of the driver development, users should be able to transfer their data from the local MCAM computer storage to a longer term storage. This step is optional and the end user should have control on whether or not they want to invoke it.

5. Data transfer from the MCAM's local storage to a more permanent storage.

During Ramona's installation of the MCAM at the customer site, we created 5 executables that accomplished the bare minimum functionality for the given demonstration.

Details of the endpoint parameters are found at https://docs.ramonaoptics.com/webapi.html.

1) MCAM Connection

The following endpoints accomplish tasks related to establishing a connection with the MCAM device. Depending on how the users are expected to use the **Client** software, they do not need to be invoked manually by the end user, but they are necessary to discover the available instruments, and to establish a successful connection to the MCAM.

Request Type	Endpoint	Required	Description
POST	/v1/mcam/{serial_number}	**Required upon startup**	Connect to given serial number **Sample Script Provided**

DELETE	/v1/mcam/{serial_number}	**Required upon shutdown**	Disconnect from given serial number **Sample Script Provided**
GET	/v1/status	Optional (helps debug)	Displays available serial numbers and mounted drives
GET	/v1/mcam/search	Optional (helps debug)	List available serial numbers
GET	/v1/mcam/{serial_number}	Optional (helps debug)	Get status of given serial number

2) MCAM Mechanical State

These endpoints relate to the instrument's sample stage. The user is expected to be able to use these endpoints through the **Client** software to extend and retract the sample stage and check the success of those operations.

Request Type	Endpoint Name	Required	Description
POST	/v1/mcam/{serial_number} /state	**Required**	Set the mechanical state of the MCAM **Sample Script Provided for inserting and ejecting**
GET	/v1/mcam/{serial_number} /state/search	**Required**	List available mechanical states for the given MCAM serial number
GET	/v1/mcam/{serial_number} /state	Optional (helps debug)	Get the current mechanical state of the MCAM with the given serial number

3) Synchronous Assay

The following endpoints relate to the blocking assays available on the MCAM instrument. The user is expected to be able to call these endpoints to tell the instrument the parameters, include metadata from **Client** software, specify a save location, and specify a configuration file location.

The authors of the client **Client** should consult the synchronous assay diagram in our documentation to see the control format.

Request Type	Endpoint Name	Required	Description
POST	/v1/mcam/{serial_number}/assay/{assay_name}	**Required**	Run assay on MCAM **Sample Script Provided**
GET	/v1/mcam/{serial_number}/assay/search	Optional (helps debug)	List available assays for given MCAM
GET	/v1/mcam/{serial_number}/assay/{assay_name}	Optional (helps debug)	List parameters for given assay
GET	/v1/mcam/{serial_number}/assay/{assay_name}/configuration	Optional (helps debug)	List available configurations for given assay

4) Asynchronous Assay

The following endpoints relate to the blocking assays available on the MCAM instrument. The user is expected to be able to call these endpoints to tell the instrument the parameters, include metadata from **Client** software, specify a save location, and specify a configuration file location. This user should also be able to run, stop or check the status of currently running assays. The user should also be able to call “result” in order to get the results of the assay.
Client should consult the asynchronous assay diagram in our documentation to see the control format.

Request Type	Endpoint Name	Required	Description
POST	/v1/mcam/{serial_number}/assay/{assay_name}	**Required**	Start assay on MCAM **Sample Script Provided**
POST	/v1/mcam/{serial_number}/assay/stop	**Required**	Request MCAM to stop currently running assay
POST	/v1/mcam/{serial_number}/assay/result	**Required**	Wait for current assay to complete
POST	/v1/mcam/{serial_number}/assay/status	**Required**	Request the status of the current MCAM assay
GET	/v1/mcam/{serial_number}/assay/search	Optional (helps debug)	List available assays for given MCAM

GET	/v1/mcam/{serial_number}/assay/{assay_name}	Optional (helps debug)	List parameters for given assay
GET	/v1/mcam/{serial_number}/assay/{assay_name}	Optional (helps debug)	List available configurations for given assay

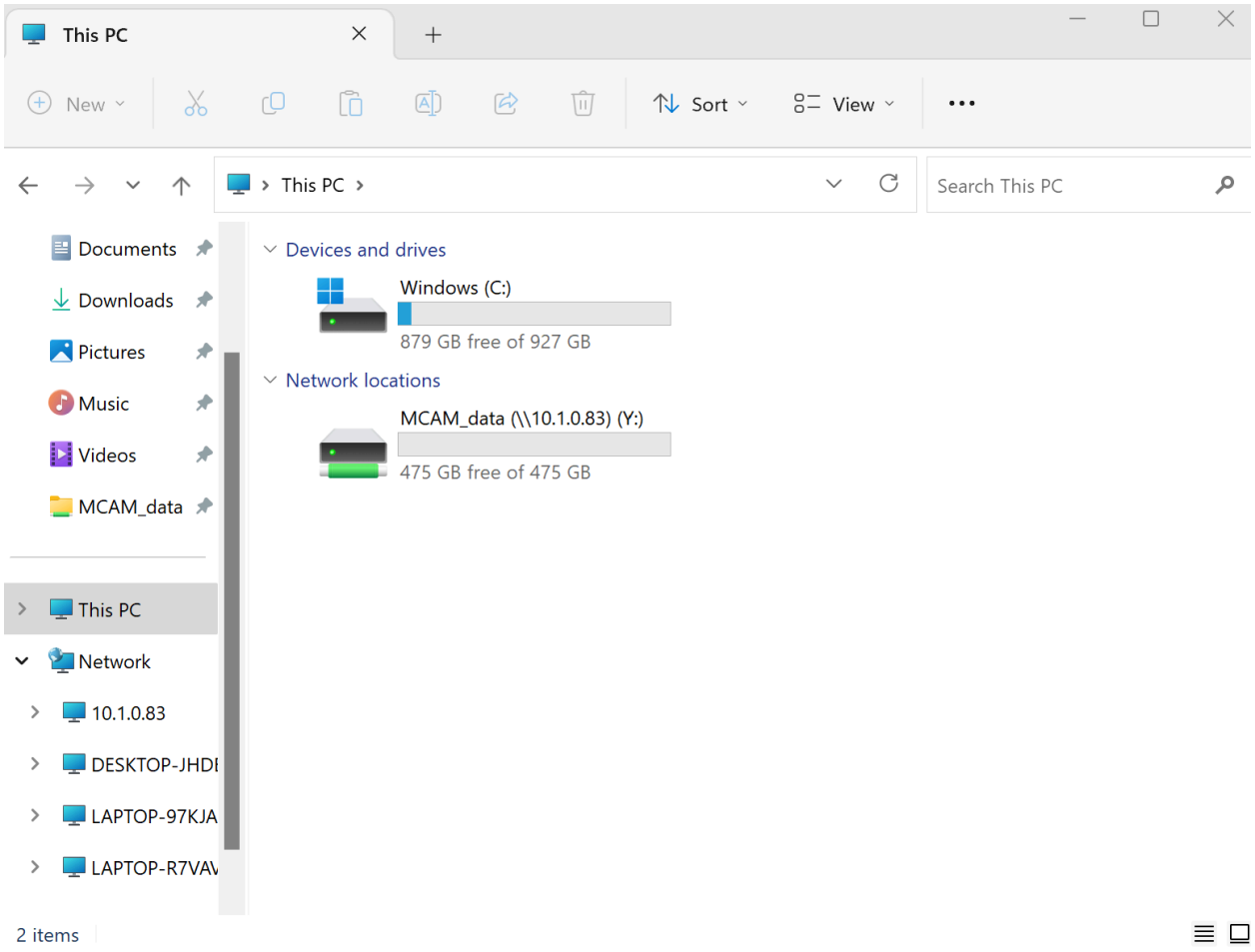
5) Data Transfer

The MCAM computer exposes itself as a SAMBA server. The default SAMBA configuration is outlined in Ramona Optics' knowledge base: https://docs.ramonaoptics.com/knowledge_base.html#setting-up-a-samba-drive-on-the-mcam-computer

End users can connect to with by connecting to it via:

- smb://mcam_computer_ip
    - This IP will be linked to a given MCAM serial number.
    - The MCAM Serial Number is assigned at manufacturing time by Ramona Optics.
    - The IP address is assigned by the end user's network team.
- Username: ramona
- Password: gigapixel
- Drive: MCAM_data

A typical configuration would have the SAMBA drive MCAM_data folder mapped to the local directory "/MCAM_data" on the MCAM computer. On the computer where the **Clientsoftware**, users will have mapped this SAMBA as a local drive. One network connected drive (mapped to a single drive letter) will exist for each MCAM computer. Customers are anticipated to have multiple MCAM Computers (and thus drive letters) mapped to a single **Client** installation.



The **Client** software should be able to schedule a transfer of the files generated as part of the acquisition to another folder of interest to the end user.

This step is optional and the end user should have control on whether or not they want to invoke it.