# Overview

LECO Cornerstone software is an integral part of LECO analytical instrumentation. The software allows operators to logon, add samples, initiate analysis sequences, and review results – all through the interactions of a touch screen.

Cornerstone software also allows customer-developed software to logon, add samples, initiate analysis sequences, and review results – all through the interactions of a data stream. LECO’s Remote Control Client Application serves as an example to help in the development of customer-developer software. The program and source code can be found here: [https://github.com/LECOSoftware/Remote-Control-Client-Application/tree/master/App](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2FLECOSoftware%2FRemote-Control-Client-Application%2Ftree%2Fmaster%2FApp&data=04%7C01%7CKevin_Russell%40lecotc.com%7Cece6c7b5add946532eed08da01dec1b2%7C6e8d87892ea245cabba993f8fe350455%7C0%7C0%7C637824353492093965%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=TkqkA1xNuQFIU3ylctdZ8XXJxDOkpvMX43x1FOr3vy0%3D&reserved=0)).

The data stream is initiated by customer-developed software via an RS-232 serial or a TCP/IP network connection. The serial connection is configurable with respect to the port, baud rate, parity, etc. and the network connection is configurable with respect to the port.

Once connected, the data stream is formatted in XML, using Unicode character set. All correspondence is initiated by the customer-developed software, which sends a command, followed by the Cornerstone software sending a response. The available commands are grouped into five categories:

1. **Remote Authentication** commands allow the customer-developed software to logon to the instrument.
2. **Remote Query** commands allow the customer-developed software to retrieve data regarding the current state of the instrument.
3. **Remote Messaging** commands allow the customer-developed software to configure the messaging system.
4. **Remote Sample Login** commands allow the customer-developed software to add new samples for later analysis.
5. **Remote Control** commands allow the customer-developed software to command the instrument to take actions.

Remote Authentication commands are always accepted by Cornerstone software. Authentication is required before any of the other commands categories are accepted. Once authenticated, Remote Query, Remote Messaging and Remote Sample Login commands are always accepted by Cornerstone software. Remote Control commands, however, requires that the operator places Cornerstone software into remote control mode.

When Cornerstone software is in remote control mode, Remote Sample Login will cause samples to be added immediately. When not in remote control mode, Remote Sample Login will cause the operator to be visually notified that new samples have been received. Once the operator accepts the notification, the new samples will be added.

Steps To configure Cornerstone software to respond to customer-developed software:

* Contact LECO to program the security key with the appropriate authorization
  + RQ for Remote Query
  + RSL for Remote Sample Login
  + RC for Remote Control
* Enable User Security in Cornerstone
  + Navigate to Settings->Users
  + Selected Administrator and perform the Edit action
  + Change ‘Enable User Security’ to Yes
  + Change ‘Allow Remote Control Access’ to Yes
  + Save
  + Repeat for any other user accounts needed
* For Remote Control, place Cornerstone software into Remote Control mode
  + Navigate to Instrument->Remote Access
  + Adjust Remote Port and Encoding, if using something other than the default
  + Start Remote Control mode with the ‘Enter Mode’ action button
* Connect to Cornerstone using the example Remote Control Client Application
  + Go to ‘Connect to Cornerstone’ tab.
  + Ensure the connection parameters match those set in Cornerstone software.
  + Execute the Connect action.
  + Fill in the Username and Password fields.
  + Execute the Log On action

# Disconnect

This command disconnects the client application from Cornerstone. This command does not require a client application to first perform the Logon command.

## Syntax

<Disconnect/>

## Reply

No reply is sent.

# Heartbeat

This command is useful to verify connection with Cornerstone. The command does not require a client application to first perform the Logon command.

## Syntax

<Heartbeat/>

## Reply

<Heartbeat ErrorCode=”0” ErrorMessage=”Success”/>

# InstrumentInfo

This command returns information about the Cornerstone instrument, such as machine name, product, and serial number. This command does not require a client application to first perform the Logon command.

## Syntax

<InstrumentInfo/>

## Reply

<InstrumentInfo ErrorCode=”0” ErrorMessage=”Success”>

<Field Label="MachineName" width="100">MUHLENKAMP440</Field>

<Field Label="Product" width="100">ONH836</Field>

<Field Label="Serial" width="100">3004</Field>

<Field Label="Version" width="100">3.0.22711.0</Field>

<Field Label="Family" width="100">Inorganic36</Field>

<Field Label="CommandVersion" width="100">6.2</Field>

<Field Label="Options" width="100">HeAr WL GD DFC OMI IPH IS MFC SLC PWDB PF AT RQ012035 SL20 AC SC</Field>

<Field Label="Detectors" width="100">IRx03 IRx06 IRx14 IRx33 TC</Field>

<Field Label="Ranges" width="100">OL=IRx03+IRx06 OH=IRx03+IRx33 N=TC H=IRx14</Field>

<Field Label="Analytes" width="100">O=OL+OH N=N H=H</Field>

<Field Label="LocalTime" width="100">06/27/2019 15:23:35</Field>

<Field Label="UTCTime" width="100">06/27/2019 19:23:35</Field>

<Field Label="TimeZoneStandardName" width="100">Eastern Standard Time</Field>

<Field Label="TimeZoneDaylightName" width="100">Eastern Daylight Time</Field>

<Field Label="UTCOffset" width="100">-04:00:00</Field>

<Field Label="IsDaylightSavingTime" width="100">True</Field>

<Field Label="LecoCaresParticipationLevel" width="100">Chm1</Field>

<Field Label="SupportsLeakCheck" width="100">True</Field>

<Field Label="SupportsSystemCheck" width="100">True</Field>

<Field Label="SupportsIrCellDetectors" width="100">True</Field>

<Field Label="SupportsLeakCheckHistory" width="100">False</Field>

<LoaderLocations>

<LoaderLocation>A1</LoaderLocation>

<LoaderLocation>A2</LoaderLocation>

<LoaderLocation>A3</LoaderLocation>

<LoaderLocation>A4</LoaderLocation>

<LoaderLocation>A5</LoaderLocation>

<LoaderLocation>A6</LoaderLocation>

<LoaderLocation>A7</LoaderLocation>

<LoaderLocation>A8</LoaderLocation>

<LoaderLocation>A9</LoaderLocation>

<LoaderLocation>A10</LoaderLocation>

<LoaderLocation>A11</LoaderLocation>

<LoaderLocation>A12</LoaderLocation>

<LoaderLocation>A13</LoaderLocation>

<LoaderLocation>A14</LoaderLocation>

<LoaderLocation>A15</LoaderLocation>

<LoaderLocation>A16</LoaderLocation>

<LoaderLocation>A17</LoaderLocation>

<LoaderLocation>A18</LoaderLocation>

<LoaderLocation>A19</LoaderLocation>

<LoaderLocation>A20</LoaderLocation>

</LoaderLocations>

<HasLoader>True</HasLoader>

<SampleTypes>

<SampleType Id="Sample" Label="Sample" />

<SampleType Id="Standard" Label="Standard" />

<SampleType Id="Blank" Label="Blank" />

<SampleType Id="Drift" Label="Drift" />

<SampleType Id="GasDose" Label="Gas Dose" />

</SampleTypes>

<Analytes>

<Analyte Label="Oxygen">Oxygen</Analyte>

<Analyte Label="Nitrogen">Nitrogen</Analyte>

<Analyte Label="Hydrogen">Hydrogen</Analyte>

</Analytes>

</InstrumentInfo>

## Possible Error Codes

6 – Exception

# Logoff

This command logs the user off. Sending this command will have no effect if there is not a currently logged on user.

## Syntax

<Logoff/>

## Reply

<Logoff ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

5 - LogonRequired

6 – Exception

# Logon

This command logs the user on. This is required in order to successfully execute Remote Query, Remote Sample Login and Remote Control commands.

## Syntax

<Logon User=”user name” Password=”password”/>

## Reply

<Logon ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

2 – AnotherUserLoggedOn

3 - FailedLogon

6 – Exception

# SupportedCultures

This command returns the supported cultures. This command does not require a client application to first perform the Logon command.

## Syntax

<SupportedCultures/>

## Reply

<SupportedCultures ErrorCode=”0” ErrorMessage=”Success”>

<Culture Key="en-US" Name="English" />

<Culture Key="zh-CHS" Name="中文" />

<Culture Key="fr-FR" Name="français" />

<Culture Key="de" Name="Deutsch" />

<Culture Key="ja" Name="日本語" />

<Culture Key="ru" Name="русский" />

<Culture Key="es-ES" Name="español" />

<Culture Key="pl" Name="polski" />

<Culture Key="cs-CZ" Name="čeština" />

<Culture Key="tr-TR" Name="Türkçe" />

</SupportedCultures>

## Possible Error Codes

6 – Exception

# Version

This command returns the version for the protocol and the version of the Cornerstone application. This command does not require a client application to first perform the Logon command.

## Syntax

<Version/>

## Reply

<Version ErrorCode=”0” ErrorMessage=”Success”>

<Commands>3.0</Commands>

<Program>2.0.0</Program>

</Version>

## Possible Error Codes

6 – Exception

# Ambient

This command retrieves the detail data for the ambient corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific ambient for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Ambient Key="4467577170595717216"/>

## Reply

<Ambient ErrorCode=”0” ErrorMessage=”Success”>

<Name>Low CO₂</Name>

<Key>4467577170595717216</Key>

<Id>4467577170595717216</Id>

<Min RawValue=”…”>…</Min>

<Max RawValue=”…”>…</Max>

<Value RawValue=”…”>…</Value>

<Units>V</Units>

<InWarning>False</InWarning>

<Type>IRCell</Type>

</Ambient>

## Possible Error Codes

6 - Exception

11 – RequestedItemNotFound

# Ambients

This command retrieves general data about each ambient on the instrument.

## Syntax

<Ambients/>

## Reply

<Ambients ErrorCode=”0” ErrorMessage=”Success”>

<Ambient>

<Name>Low CO₂</Name>

<Key>4467577170595717216</Key>

<Id>4467577170595717216</Id>

<Min RawValue=”…”>…</Min>

<Max RawValue=”…”>…</Max>

<Value RawValue=”…”>…</Value>

<Units>V</Units>

<InWarning>False</InWarning>

<Type>IRCell</Type>

</Ambient>

…

</Ambients>

## Possible Error Codes

6 - Exception

# AnalysisAbortReason

This command returns the most recent analysis abort reason.

## Syntax

<AnalysisAbortReason/>

## Reply

<AnalysisAbortReason ErrorCode=”0” ErrorMessage=”Success”>reason will appear here</AnalysisAbortReason>

## Possible Error Codes

6 - Exception

# AnalyteStats

This command retrieves the analyte stats data for the specified sets and replicates. There is no restriction on how many sets can be specified.

## Parameters

**Set Key**: The unique key that identifies the specific set. Leading zeros may be omitted.

**Rep Tag**: The replicate tag.

## Syntax

<AnalyteStats>

…

<Set Key="…">

…

<Rep Tag="…"/>

<Rep Tag="…"/>

<Rep Tag="…"/>

…

</Set>

…

</AnalyteStats>

## Reply

<AnalyteStats ErrorCode=”0” ErrorMessage=”Success”>

<Analyte Name="Carbon" Label="Carbon">

<RSD RawValue="5.8148004782750107">5.81 %</RSD>

<Average RawValue="-2.0406141031023947E-05">-0.00204 %</Average>

<StdDev RawValue="1.1865763862694538E-06">± 0.000119 %</StdDev>

<N>6</N>

<Units>%</Units>

</Analyte>

<Analyte Name="Hydrogen" Label="Hydrogen">

<RSD RawValue="7.3790006308566083">7.38 %</RSD>

<Average RawValue="2.2795303772946648E-05">0.00228 %</Average>

<StdDev RawValue="1.6820656092114133E-06">± 0.000168 %</StdDev>

<N>6</N>

<Units>%</Units>

</Analyte>

<Analyte Name="Nitrogen" Label="Nitrogen">

<RSD RawValue="10.726673325057549">10.7 %</RSD>

<Average RawValue="2.14459535031667E-05">0.00214 %</Average>

<StdDev RawValue="2.3004373737284276E-06">± 0.000230 %</StdDev>

<N>6</N>

<Units>%</Units>

</Analyte>

</AnalyteStats>

## Possible Error Codes

4 - MalformedRequest

6 - Exception

# AutomationStatus

This command retrieves status data for the installed automation functionality.

## Parameters

**Id**: When a value is present in this parameter, the command will retrieve only data for the automation functionality with the specified id, otherwise the data for all installed automation system.

## Syntax

<AutomationStatus Id="…"/>

## Reply

<AutomationStatus ErrorCode=”0” ErrorMessage=”Success”>

<Automation Id="AutoCleaner" OperationMode="Enabled">

<CleanInterval>10</CleanInterval>

<NumberOfCleanCycles>2</NumberOfCleanCycles>

</Automation>

</AutomationStatus>

## Possible Error Codes

6 - Exception

# AvailableLogs

This command returns the identifiers of the various logs that are available for querying.

## Syntax

<AvailableLogs/>

## Reply

<AvailableLogs ErrorCode=”0” ErrorMessage=”Success”>

…

<Log Name="ExceptionNotification" />

<Log Name="Database" />

<Log Name="Performance" />

…

<AvailableLogs>

## Possible Error Codes

6 - Exception

# Counter

This command retrieves the detail data for the counter corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific counter for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Counter Key="13"/>

## Reply

<Counter ErrorCode=”0” ErrorMessage=”Success”>

<Key>0000000000000013</Key>

<Name Label="Name">Incoming Purifier</Name>

<Description Label="Description">Replace when 1/3rd of Copper Oxide turns reddish orange.</Description>

<ExpiresIn Label="Expires In">Excluded</ExpiresIn>

<LastUsed Label="Last Used">01/01/0001 05:00:00</LastUsed>

<LastModified Label="Last Modified">03/11/2014 19:20:59</LastModified>

<Excluded Label="Excluded">True</Excluded>

<Ignore Label="Ignore">True</Ignore>

<CounterType Label="Counter Type">Days</CounterType>

<CountBlanks Label="Count Blanks">False</CountBlanks>

<UseInspect Label="Inspect">True</UseInspect>

<InspectCount Label="Current Count">0</InspectCount>

<NumInspectResets Label="Number of Resets">11</NumInspectResets>

<InspectLimit Label="Inspect Every">8</InspectLimit>

<LastInspectReset Label="Last Reset">02/06/2014 20:18:54</LastInspectReset>

<UsePerform Label="Stop">True</UsePerform>

<PerformCount Label="Current Count">0</PerformCount>

<NumPerformResets Label="Number of Resets">9</NumPerformResets>

<PerformLimit Label="Perform Maintenance Every">180</PerformLimit>

<LastPerformReset Label="Last Reset">02/06/2014 20:18:54</LastPerformReset>

</Counter>

## Possible Error Codes

6 – Exception

11 – RequestedItemNotFound

# Counters

This command retrieves general data about each counter on the instrument.

## Syntax

<Counters/>

## Reply

<Counters ErrorCode=”0” ErrorMessage=”Success”>

<Counter>

<Key>0000000000000013</Key>

<Name Label="Name">Incoming Purifier</Name>

<Description Label="Description">Replace when 1/3rd of Copper Oxide turns reddish orange.</Description>

<ExpiresIn Label="Expires In">Excluded</ExpiresIn>

<LastUsed Label="Last Used">01/01/0001 05:00:00</LastUsed>

<LastModified Label="Last Modified">03/11/2014 19:20:59</LastModified>

<Excluded Label="Excluded">True</Excluded>

</Counter>

…

</Counters

## Possible Error Codes

6 - Exception

# Detectors

This command retrieves information about the instrument’s detectors. It is only supported for instruments that contain IR cells.

## Syntax

<Detectors/>

## Reply

<Detectors ErrorCode=”0” ErrorMessage=”Success”>

<Detectors>

<Detector Id="CO2High" Label="High CO2">

<Field Id="SerialNumber" Label="Cell Serial #">00500042</Field>

<Field Id="EmitterNumber" Label="Cell Emitter #">1</Field>

<Field Id="Reference" Label="Reference" Units="V">2.757450</Field>

<Field Id="Saturation" Label="Saturation" Units="V">0.014453</Field>

<Field Id="SignalToNoiseSignal" Label="Signal">2.46</Field>

<Field Id="SignalPassFail" Label="Signal To Noise Pass/Fail">Passed</Field>

<Field Id="SignalToNoise" Label="Signal-to-Noise Ratio">4.89</Field>

<Field Id="SignalToNoiseResult" Label="Signal To Noise Result Pass/Fail">Passed</Field>

<Field Id="SignalQualityTest" Label="Signal Quality">0.98</Field>

<Field Id="SignalQualityTestResult" Label="Signal To Noise Quality Test Result Pass/Fail">Passed</Field>

<EmitterOnTimes>

<EmitterOnTime Label="Emitter On Time ( - 1)" OnTime="00:00:10" LastWrittenToCell="12/05/2016 20:28:29" />

<EmitterOnTime Label="Emitter On Time (R\_FB)" OnTime="00:00:06" LastWrittenToCell="02/25/2013 15:58:17" />

<EmitterOnTime Label="Emitter On Time (00000251)" OnTime="00:00:42" LastWrittenToCell="02/25/2013 16:04:49" />

<EmitterOnTime Label="Emitter On Time (00500043)" OnTime="9.04:05:55" LastWrittenToCell="06/05/2013 13:41:17" />

<EmitterOnTime Label="Emitter On Time (00500042 - 1)" OnTime="164.00:45:51" LastWrittenToCell="11/09/2016 14:04:22" />

</EmitterOnTimes>

<TuningResults>

<TuningResult LMDC="10.00" HMDC="56.00" Date="12/05/2016 20:31:53" />

</TuningResults>

</Detector>

…

</Detectors>

</Detectors>

## Possible Error Codes

6 - Exception

# DoubleValue

This command returns the value for the specified variable.

## Parameters

**Key**: The unique variable name.

## Syntax

<DoubleValue Key="…”/>

## Reply

<DoubleValue Key=”…” Value=”…” ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 - Exception

11 - RequestedItemNotFound

# DoubleValues

This command returns the values for all the double type variables.

## Syntax

<DoubleValues/>

## Reply

<DoubleValues ErrorCode=”0” ErrorMessage=”Success”>

…

<DoubleValue Name="IR Emitters Temp Stable Minutes" Value="1" />

…

</DoubleValues>

## Possible Error Codes

6 - Exception

# Field

This command returns the current state of the specified user-defined field.

## Parameters

**Key**: The unique key that identifies the field.

## Syntax

<Field Key="24"/>

## Reply

<Field ErrorCode=”0” ErrorMessage=”Success”>

<Key>0000000000000024</Key>

<Name Label="Name">C[CO₂] Avg.</Name>

<FieldIdentifier>UDF: 36</FieldIdentifier>

<Description Label="Description">C[CO₂] equivalency for Carbon in Sets</Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">08/05/2013 17:58:23</LastModified>

<Excluded Label="Excluded">False</Excluded>

<Type Label="Type">Numeric</Type>

<EntryMethod Label="Entry Method">Calculated</EntryMethod>

</Field>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Fields

This command returns the current state of all user-defined fields.

## Syntax

<Fields/>

## Reply

<Fields ErrorCode=”0” ErrorMessage=”Success”>

<Field>

<Key>0000000000000024</Key>

<Name Label="Name">C[CO₂] Avg.</Name>

<FieldIdentifier>UDF: 36</FieldIdentifier>

<Description Label="Description">C[CO₂] equivalency for Carbon in Sets</Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">08/05/2013 17:58:23</LastModified>

<Excluded Label="Excluded">False</Excluded>

</Field>

…

</Fields>

## Possible Error Codes

6 - Exception

# Filters

This command returns the list of user-defined filters.

## Syntax

<Filters/>

## Reply

<Filters ErrorCode=”0” ErrorMessage=”Success”>

<Filter key="00000000000019D8">Types: Standard; Standards: 501-505</Filter>

</Filters>

## Possible Error Codes

6 - Exception

# GasState

This command returns the current gas state of the instrument.

## Syntax

<GasState/>

## Reply

<GasState ErrorCode=”0” ErrorMessage=”Success”>ON/OFF/CONSERVE</GasState>

## Possible Error Codes

6 - Exception

# LeakCheckHistory

This command returns the results from last leak checks. This functionality is not currently supported by all Cornerstone instruments.

## Parameters

**Id**: The unique identifier of the leak check. This value can be obtained by running the LeakCheckIds command.

**MaxResults:** Maximum number of leak check results to return.

## Syntax

<LeakCheckHistory Id="…" MaxResults="…"/>

## Reply

<LeakCheckHistory ErrorCode=”0” ErrorMessage=”Success”>

<LeakChecks>

<LeakCheck Id="SEGMENTEDSYSTEM" Label="Segmented System">

<Result ExecutionDate="05/21/2019 17:49:44" MassiveLeak="false" PressureIncreased="false">

<Segment Type="Furnace" Result="Passed" InitialPressure="330" FinalPressure="329.1" PressureChange="-0.899999999999977" Label="FURNACE" Units="mmHg" />

<Segment Type="Ballast Doser" Result="Passed" InitialPressure="1006" FinalPressure="1007.3" PressureChange="1.29999999999995" Label="FILLED BALLAST AND DOSER" Units="mmHg" />

<Segment Type="Fill" Result="Passed" InitialPressure="1267.3" FinalPressure="1266.6" PressureChange="-0.700000000000045" Label="FILL (LARGE LOOP)" Units="mmHg" />

<Segment Type="Dump" Result="Passed" InitialPressure="951.8" FinalPressure="951.3" PressureChange="-0.5" Label="DUMP (LARGE LOOP)" Units="mmHg" />

</Result>

<Result ExecutionDate="05/21/2019 12:16:33" MassiveLeak="false" PressureIncreased="false">

<Segment Type="Furnace" Result="Passed" InitialPressure="330.7" FinalPressure="329.6" PressureChange="-1.09999999999997" Label="FURNACE" Units="mmHg" />

<Segment Type="Ballast Doser" Result="Passed" InitialPressure="1007.7" FinalPressure="1007.3" PressureChange="-0.400000000000091" Label="FILLED BALLAST AND DOSER" Units="mmHg" />

<Segment Type="Fill" Result="Passed" InitialPressure="1265.5" FinalPressure="1264.8" PressureChange="-0.700000000000045" Label="FILL (LARGE LOOP)" Units="mmHg" />

<Segment Type="Dump" Result="Passed" InitialPressure="952.2" FinalPressure="951.7" PressureChange="-0.5" Label="DUMP (LARGE LOOP)" Units="mmHg" />

</Result>

</LeakCheck>

</LeakChecks>

</LeakCheckHistory>

## Possible Error Codes

6 - Exception

# LeakCheckIds

This command returns the unique identifiers for each type of leak check supported by the instrument. These identifiers are required when using the LeakCheckHistory command.

## Syntax

<LeakCheckIds/>

## Reply

<LeakCheckIds ErrorCode=”0” ErrorMessage=”Success”>

<LeakChecks>

<LeakCheck Id="SYSTEM" Label="System Leak Check" />

<LeakCheck Id="SYSTEM\_BYPASS" Label="System Furnace Bypass Leak Check" />

<LeakCheck Id="SEGMENTED" Label="Segmented Leak Check" />

<LeakCheck Id="SEGMENTED\_BYPASS" Label="Segmented Furnace Bypass Leak Check" />

<LeakCheck Id="PNEUMATIC" Label="Pneumatic Leak Check" />

</LeakChecks>

</LeakCheckIds>

## Possible Error Codes

6 - Exception

# LogData

This command returns the contents of the specified log for the specified time span.

## Parameters

**Log**: The unique identifier of the log. This value can be obtained by running the AvailableLogs command.

**Start:** Time span start date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**End:** Time span end date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**MaxEntries:** Maximum number of log entries to return.

## Syntax

<LogData Log="RQServerResponder" Start="03/08/2019 01:00:00.00000" End="03/08/2019 23:00:00.00000" MaxEntries="1000" />

## Reply

<LogData ErrorCode=”0” ErrorMessage=”Success”>

<LogEntry><![CDATA[2019-03-08T19:04:54.8251409Z Server Comm. Calling remote.lecosoftware.com/Register.aspx. Id = 00000000-0000-0000-0000-000000000000, RequestType = Register]]></LogEntry>

<LogEntry><![CDATA[2019-03-08T19:04:56.6546789Z Server Resp. Received server response for type = Register]]></LogEntry>

…

</LogData>

## Possible Error Codes

4 - MalformedRequest

6 - Exception

# LogDirectory

This command returns the names of the available log directories and which log files are available.

## Syntax

<LogDirectory/>

## Reply

<LogDirectory ErrorCode=”0” ErrorMessage=”Success”>

…

<SubDirectory Name="Database">

…

<File Name="2019041618.log" />

<File Name="2019042515.log" />

…

</SubDirectory>

…

</LogDirectory>

## Possible Error Codes

6 - Exception

# MemoryStats

This command returns the current memory usage of the Cornerstone application.

## Syntax

<MemoryStats/>

## Reply

<MemoryStats ErrorCode=”0” ErrorMessage=”Success”>

<Stats><![CDATA[GC Total memory: 213,167,048

GC Collection Counts (0, 1, 2): 634, 149, 15.

Working set: 551,165,952 (peak: 1,133,309,952)

Virtual memory size: 7,635,087,360 (peak: 7,685,419,008)

Paged memory size: 1,385,279,488 (peak: 1,403,744,256)

Threads: 87

Uptime: 0.00:43:25

]]></Stats>

</MemoryStats>

## Possible Error Codes

6 - Exception

# MessageHistory

This command returns the instrument messages displayed to the user. This is a convenience command that is equivalent to calling the LogData command with a Log parameter of “General”.

## Parameters

**Start:** Time span start date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff). This parameter is optional, however, if it is specified, then the End parameter must also be specified.

**End:** Time span end date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff). This parameter is optional, however, if it is specified, then the Start parameter must also be specified.

**MaxEntries:** Maximum number of log entries to return. This parameter is optional and is only used when both the Start and End parameters are specified.

## Syntax

<MessageHistory/>

<MessageHistory Start="…" End="…" MaxEntries="…" />

## Reply

<MessageHistory ErrorCode=”0” ErrorMessage=”Success” InstrumentID="23556ab6-5d20-452e-bf1e-1466452158c2">

<Message><![CDATA[2016-11-22T16:19:40.5728092Z Unable to depressurize system. Proceed with caution.]]></Message>

<Message><![CDATA[2016-11-22T16:18:53.0582967Z Could not connect to Instrument (error: 10061). Please check connections and power.]]></Message>

….

</MessageHistory>

## Possible Error Codes

4 - MalformedRequest

6 – Exception

12 - GeneralError

# Method

This command returns detail data for the specified method. The method can be specified either by key or by name.

## Parameters

One of the following must be supplied to identify the method. If both are provided, the Key parameter will be used to identify the method.

**Key**: The unique key that identifies the method. Leading zeroes may be omitted.

**Name**: The unique name that identifies the method.

## Syntax

<Method Key="D3"/>

<Method Name="SWV"/>

## Reply

<Method ErrorCode=”0” ErrorMessage=”Success”>

<Key>00000000000000D3</Key>

<Name Label="Name">SWV</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">03/19/2014 15:28:29</LastUsed>

<LastModified Label="Last Modified">06/03/2013 11:36:00</LastModified>

<Excluded Label="Excluded">False</Excluded>

<Sections>

<Section Label="General Parameters">

<Field Label="Purge Time" Units="s" RawValue="10">10 s</Field>

<Field Label="Delay Time" Units="s" RawValue="10">10 s</Field>

<Field Label="Sample Cool Time" Units="s" RawValue="0">0 s</Field>

<Field Label="Furnace Mode" RawValue="Constant">Constant</Field>

<Field Label="Furnace Power" Units="%" RawValue="100">100 %</Field>

</Section>

<Section Label="Element Parameters">

<Subsection Label="Carbon">

<Field Label="Integration Delay" Units="s" RawValue="0">0 s</Field>

<Field Label="Starting Baseline" Units="s" RawValue="2">2 s</Field>

<Field Label="Use Comparator" RawValue="true">Yes</Field>

<Field Label="Comparator Level" Units="%" RawValue="1">1.00 %</Field>

<Field Label="Minimum Integration Time" Units="s" RawValue="40">40 s</Field>

<Field Label="Maximum Integration Time" Units="s" RawValue="60">60 s</Field>

<Field Label="Range Select" RawValue="Auto">Auto</Field>

<Field Label="Range Lower Limit" units="" RawValue="800">800</Field>

<Field Label="Range Upper Limit" Units="" RawValue="950">950</Field>

</Subsection>

…

</Section>

…

</Sections>

</Method>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Methods

This command returns all methods.

## Syntax

<Methods/>

## Reply

<Methods ErrorCode=”0” ErrorMessage=”Success”>

<Method>

<Key>00000000000000D3</Key>

<Name Label="Name">SWV</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">03/19/2014 15:28:29</LastUsed>

<LastModified Label="Last Modified">06/03/2013 11:36:00</LastModified>

<Excluded Label="Excluded">False</Excluded>

</Method>

…

</Methods>

## Possible Error Codes

6 – Exception

# MethodKey

This command returns the key for the method whose name matches the name provided.

## Parameters

**Name**: The unique name that identifies the method.

## Syntax

<MethodKey Name=”…”/>

## Reply

<MethodKey Name="Basic Method" ErrorCode=”0” ErrorMessage=”Success”>

<Key>0000000000000010</Key>

</MethodKey>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# MondoData

This command returns the contents of the specified mondo data log for the specified time span. If the number of data points in the mondo data log for the specified time span is greater than MaxEntries, then the data returned will be the data points starting at Start up to MaxEntries.

## Parameters

**PicId**: The unique identifier of the property whose data should be retrieved from the logs. This value can be obtained from the Id value returned from the Ambient command.

**Start:** Time span start date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**End:** Time span end date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**MaxEntries:** Maximum number of log entries to return.

## Syntax

<MondoData PicId="4467577179185651808" Start="01/01/2019 01:00:00.00000" End="12/01/2019 01:00:00.00000" MaxEntries="1000" />

## Reply

<MondoData ErrorCode=”0” ErrorMessage=”Success”>

…

<DataPoint Date="02/01/2019" Time="20:38:15.56" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:15.97" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:16.37" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:16.78" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:17.19" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:17.59" Data="1.3120000846386" />

…

</MondoData>

## Possible Error Codes

4 - MalformedRequest

6 – Exception

# MondoDataEx

This command returns the contents of the specified mondo data log for the specified time span. It is similar to the MondoData command with one major difference. If the number of data points in the mondo data log for the specified time span exceeds the number specified in the MaxEntries parameter, the data will be averaged across the time span to number of MaxEntries. If the number of data points in the mondo data log for the specified time span is less than MaxEntries, then this method will behave exactly the same as the MondoData command.

## Parameters

**PicId**: The unique identifier of the property whose data should be retrieved from the logs. This value can be obtained from the Id value returned from the Ambient command.

**Start:** Time span start date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**End:** Time span end date and time, specified in UTC format (MM/DD/YYYY HH:MM:SS.fffff)

**MaxEntries:** Maximum number of log entries to return.

## Syntax

<MondoDataEx PicId="4467577179185651808" Start="01/01/2019 01:00:00.00000" End="12/01/2019 01:00:00.00000" MaxEntries="1000" />

## Reply

<MondoData ErrorCode=”0” ErrorMessage=”Success”>

…

<DataPoint Date="02/01/2019" Time="20:38:15.56" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:15.97" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:16.37" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:16.78" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:17.19" Data="1.3120000846386" />

<DataPoint Date="02/01/2019" Time="20:38:17.59" Data="1.3120000846386" />

…

</MondoData>

## Possible Error Codes

4 - MalformedRequest

6 – Exception

# MondoDirectory

This command returns the names of the available mondo data log files are available.

## Syntax

<MondoDirectory/>

## Reply

<MondoDirectory ErrorCode=”0” ErrorMessage=”Success”>

…

<File Name="2018101322.log" />

…

</MondoDirectory>

## Possible Error Codes

6 – Exception

# NextToAnalyze

This command returns the set key and tag for the replicate that is next to be analyzed.

## Syntax

<NextToAnalyze/>

## Reply

<NextToAnalyze SetKey="00000000000019BB" ReplicateTag="1" ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

# Prerequisite

This command returns the current state of the specified prerequisite.

## Parameters

**Key**: The unique key that identifies the method. Leading zeroes may be omitted.

## Syntax

<Prerequisite Key="Ready To Analyze"/>

## Reply

<Prerequisite Name="Ready To Analyze" Value="false" ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Prerequisites

This command returns the current state of all prerequisites.

## Syntax

<Prerequisites/>

## Reply

<Prerequisites ErrorCode=”0” ErrorMessage=”Success”>

<Prerequisite Name="Ready To Analyze" Value="false" />

<Prerequisite Name="Hardware In Use" Value="false" />

<Prerequisite Name="Analyzing" Value="false" />

<Prerequisite Name="Gas On" Value="false" />

<Prerequisite Name="Gas Off" Value="false" />

<Prerequisite Name="Gas Conservation" Value="false" />

…

</Prerequisites>

## Possible Error Codes

6 – Exception

# QCStatus

This command returns the current state of quality control for a method.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeroes may be omitted.

## Syntax

<QCStatus MethodKey="D3"/>

## Reply

<QCStatus ErrorCode=”0” ErrorMessage=”Success”>

<MethodKey>00000000000000D3</MethodKey>

<InControlState>NotInControl</InControlState>

<FailReasons>

…

<FailReason>BlankTimeLapse</FailReason>

<FailReason>CheckOutOfRange</FailReason>

…

</FailReasons>

</QCStatus>

## Possible Error Codes

6 – Exception

7 – UnableToExecuteCommand

11 - RequestedItemNotFound

# RemoteControlState

This command returns the flag indicating if the Cornerstone application is currently in Remote Control mode.

## Syntax

<RemoteControlState/>

## Reply

<RemoteControlState ErrorCode=”0” ErrorMessage=”Success”>True/False</RemoteControlState>

## Possible Error Codes

6 – Exception

# RQExp

This command returns the expiration date of the Remote Query functionality

## Syntax

<RQExp/>

## Reply

<RqExp ErrorCode=”0” ErrorMessage=”Success”>

<Month>1</Month>

<Year>2035</Year>

</RqExp>

## Possible Error Codes

6 – Exception

# RepDetail

This command retrieves the detail data for the specified replicate in the specified set.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RepDetail SetKey="10A" Tag="1"/>

## Reply

<RepDetail ErrorCode=”0” ErrorMessage=”Success”>

<SetKey>000000000000010A</SetKey>

<Replicate>

<Tag>1</Tag>

<DetailFields>

<Field Label="Carbon Mass" RegistryId="Carbon Mass"  
 units="g" RawValue="0.0016637569300525586" Id="102" Width="100">0.00166 g</Field>

<Field Label="Carbon Adjusted Area" RegistryId="Carbon Adjusted Area"  
 units="" RawValue="" Id="113" Width="100">Low 0.00223</Field>

<Field Label="Carbon Peak Height" RegistryId="Carbon Peak Height"  
 units="" RawValue="" Id="114" Width="100">Low 608.96956</Field>

…

</DetailFields>

</replicate>

</RepDetail>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Report

This command retrieves the detail data for the report corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific report for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Report Key="19D5"/>

## Reply

<Report ErrorCode=”0” ErrorMessage=”Success”>

<Key>00000000000019D5</Key>

<Name Label="Name">Default</Name>

<Description Label="Description">Built-in default report</Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">04/22/2014 20:09:37</LastModified>

<Excluded Label="Excluded">False</Excluded>

<Printer Label="Printer">[Default]</Printer>

<PageOrientation Label="Page Orientation">Landscape</PageOrientation>

<SetSpacing Label="Spacing between sets">OneLine</SetSpacing>

<SetBeginFields>

<Field Name="Indent" Label="" />

<Field Name="Name" Label="Name" />

<Field Name="Method" Label="Method" />

<Field Name="Carbon Avg." Label="Carbon Average" />

<Field Name="Sulfur Avg." Label="Sulfur Average" />

<Field Name="n=" Label="n=" />

<Field Name="CR/LF" Label="" />

<Field Name="Indent" Label="" />

<Field Name="Description" Label="Description" />

<Field Name="Carbon Std. Dev." Label="Carbon Std. Dev." />

<Field Name="Sulfur Std. Dev." Label="Sulfur Std. Dev." />

<Field Name="Carbon RSD" Label="Carbon %RSD" />

<Field Name="Sulfur RSD" Label="Sulfur %RSD" />

<Field Name="CR/LF" Label="" />

</SetBeginFields>

<ReplicateFields>

<Field Name="Indent" Label="" />

<Field Name="Colored Dot" Label="Colored Dot" />

<Field Name="Mass" Label="Sample Mass" />

<Field Name="Comments" Label="Comments" />

<Field Name="Carbon Concentration" Label="Carbon Concentration" />

<Field Name="Sulfur Concentration" Label="Sulfur Concentration" />

<Field Name="Analysis Date" Label="Analysis Date" />

<Field Name="CR/LF" Label="" />

</ReplicateFields>

<SetEndFields />

</Report>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Reports

This command returns the current state of all prerequisites.

## Syntax

<Reports/>

## Reply

<Reports ErrorCode=”0” ErrorMessage=”Success”>

<Report>

<Key>00000000000019D5</Key>

<Name Label="Name">Default</Name>

<Description Label="Description">Built-in default report</Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">04/22/2014 20:09:37</LastModified>

<Excluded Label="Excluded">False</Excluded>

</Report>

…

</Reports>

## Possible Error Codes

6 – Exception

# RepPlot

This command retrieves plot data for the specified replicate in the specified set

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RepPlot SetKey="10A" Tag="1"/>

## Reply

<RepPlot ErrorCode=”0” ErrorMessage=”Success”>

<Key>000000000000010A</Key>

<Plot>

<Replicate Tag="1" Index="1">

<Analyte Label="Carbon" Value="0.176058934397096" Units="%">

<Trace>

<XMin>0</XMin>

<XMax>635023556952440000</XMax>

<YMin>0</YMin>

<YMax>608.96955624580892</YMax>

<TracePoints>

<TracePoint DateTime="0">0.03540591324117</TracePoint>

<TracePoint DateTime="4000000">0.0198581157788256</TracePoint>

<TracePoint DateTime="8000000">0.00719802712102269</TracePoint>

<TracePoint DateTime="12000000">-0.00821030676779452</TracePoint>

…

<TracePoint DateTime="408000000">5.13798516536813</TracePoint>

<TracePoint DateTime="412000000">4.90620026790337</TracePoint>

<TracePoint DateTime="416000000">4.68418034252164</TracePoint>

</TracePoints>

</Trace>

</Analyte>

…

</Replicate>

</Plot>

</RepPlot>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# SampleForNextDelivery

This command is specific for instruments that implement process loader functionality. This command retrieves the key of the set and tag of the replicate that will be used for the next delivered sample, which is calculated as the next unanalyzed replicate that does not specify a loader location.

## Syntax

<SampleForNextDelivery/>

## Reply

<SampleForNextDelivery ErrorCode=”0” ErrorMessage=”Success”>

<SetKey>0000000000006815</SetKey>

<RepTag>2</RepTag>

</SampleForNextDelivery>

## Possible Error Codes

6 – Exception

# Sequence

This command retrieves the status of the specified sequence.

## Parameters

**Name**: The name of the sequence.

## Syntax

<Sequence Name="Cycle Pump Off"/>

## Reply

<Sequence Name="Cycle Pump Off" Running="false" LastReturnResult="" ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Sequences

This command retrieves the status of each sequence.

## Syntax

<Sequences/>

## Reply

<Sequences ErrorCode=”0” ErrorMessage=”Success”>

…

<Sequence Name="Cycle Furnace Check" Running="false" LastReturnResult=""/>

…

</Sequences>

## Possible Error Codes

6 – Exception

# Set

This command retrieves the detail data for the set corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Syntax

<Set Key="10A"/>

## Reply

<Set ErrorCode=”0” ErrorMessage=”Success”>

<Set>

<Key>000000000000010A</Key>

<HeaderFields>

<Field Label="Type" RegistryId="SampleType" RawValue="Sample" Id="1"  
 Width="100">Sample</Field>

<Field Label="Name" RegistryId="Set Name" Id="2" Width="100">25355 P4</Field>

<Field Label="Description" RegistryId="Description" Id="3" Width="100"></Field>

<Field Label="Method" RegistryId="Method" Id="5" Width="100">SWV</Field>

<Field id="4" RegistryId="Set Analysis Date" Label="Analysis Date"  
 Width="100">4/23/2013 7:13:44 PM</Field>

<Field Label="Carbon Average" RegistryId="Carbon Avg." Units="%"  
 RawValue="0.17605893439709616" Id="100" Width="100">0.176 %</Field>

<Field Label="Sulfur Average" RegistryId="Sulfur Avg." Units="%"  
 RawValue="0.033813161955929379" Id="101" Width="100">0.0338 %</Field>

</HeaderFields>

<SampleType>Sample</SampleType>

<NumRepsInSet>1</NumRepsInSet>

<AnalysisState>Analyzed</AnalysisState>

<IsPaused>false</IsPaused>

<IsExpanded>false</IsExpanded>

<IsSelected>false</IsSelected>

</Set>

<Analytes>

<Analyte Label="Carbon">Carbon</Analyte>

<Analyte Label="Sulfur">Sulfur</Analyte>

</Analytes>

</Set>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# SetKeys

This command retrieves the unique key for each set.

## Parameters

**FilterKey**: The unique key that identifies the filter to use when retrieving the sets. Leading zeros may be omitted.

**Method Key**: The unique key that identifies the method when retrieving sets. Leading zeros may be omitted.

**Method Name**: The unique name that identifies the method when retrieving sets.

## Syntax

<SetKeys FilterKey="19D8"/>

<SetKeys MethodKey="2A57"/>

<SetKeys Name="LAS Test"/>

## Reply

<SetKeys ErrorCode=”0” ErrorMessage=”Success”>

<Key>00000000000000DF</Key>

<Key>000000000000067A</Key>

<Key>000000000000068A</Key>

<Key>000000000000069E</Key>

<Key>00000000000006B0</Key>

<Key>00000000000006C2</Key>

<Key>00000000000006DD</Key>

<Key>00000000000006EB</Key>

<Key>00000000000006F7</Key>

<Key>0000000000000704</Key>

<Key>0000000000000A02</Key>

<Key>0000000000000A25</Key>

<Key>00000000000019BB</Key>

<Count>13</Count>

<Analytes>

<Analyte label="Carbon">Carbon</Analyte>

<Analyte label="Sulfur">Sulfur</Analyte>

</Analytes>

</SetKeys>

## Possible Error Codes

6 – Exception

# SetKeysEx2

This command retrieves the unique key for each set, along with the set analysis date.

## Syntax

<SetKeysEx2 />

## Reply

<SetKeysEx2 ErrorCode=”0” ErrorMessage=”Success”>

<Key KeyValue="0000000000000056" AnalysisDate="09/06/2016 19:45:07" />

<Key KeyValue="0000000000000060" AnalysisDate="09/06/2016 22:31:00" />

…

</SetKeysEx2>

## Possible Error Codes

6 – Exception

# SetReps

This command retrieves general data for each replicate in the specified set.

## Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

**IncludeDetailData**: Indicates if the replicate data should include the detail data in addition to the general data.

**Tag:** Optional, specifies the tag number of the replicate to return. If this parameter is not provided, then data for all replicates in the specified set will be returned.

## Syntax

<SetReps Key="10A" IncludeDetailData="False"/>

<SetReps Key="10A" IncludeDetailData="False" Tag=”1”/>

## Reply

<SetReps ErrorCode=”0” ErrorMessage=”Success”>

<Key>000000000000010A</Key>

<Replicates>

<Replicate>

<Tag>1</Tag>

<HeaderFields>

<Field Label="Sample Mass" RegistryId="Sample Mass" ValueStatus=”Normal” units="g"  
 RawValue="0.945" id="11" width="100">0.9450 g</field>

<Field Label="Comments" RegistryId="Comments" Id="12" width="100"></field>

<Field Label="Operator" RegistryId="Operator" Id="13" width="100"></field>

<Field Id="14" RegistryId="Rep Analysis Date" Label="Analysis Date"  
 Width="100">4/23/2013 7:13:44 PM</field>

<Field Label="Carbon" RegistryId="Carbon Concentration" Units="%"  
 RawValue="0.17605893439709616" Id="100" Width="100">0.176 %</field>

<Field Label="Sulfur" RegistryId="Sulfur Concentration" Units="%"  
 RawValue="0.033813161955929379" Id="101" Width="100">0.0338 %</field>

</HeaderFields>

<AnalysisState>Analyzed</AnalysisState>

<RecalculatedDate>0001-01-01T00:00:00</RecalculatedDate>

<IsExcluded>false</IsExcluded>

<IsExpanded>false</IsExpanded>

<IsNext>false</IsNext>

<IsSelected>false</IsSelected>

<PausedState>NotPaused</PausedState>

</Replicate>

</Replicates>

</SetReps>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

The Sample Mass (id = 11) element provides a “ValueStatus” attribute which conveys the state of the mass. There are two possible values for this attribute:

* Normal – this is the default status for the sample mass. When the set’s method has defined a Sample Mass Range and the replicate’s mass is within range, the status value will be Normal. If a Sample Mass Range is not in use for the method, the status value will default to Normal.
* Warning – this is the status value when the set’s method has defined a Sample Mass Range and the replicate’s mass is either not specified (empty) or falls outside of the range.

# Sets

This command retrieves general set data for the number of sets specified.

## Parameters

**Number**: The number of sets to return.

**StartAt**: The index of first set to return. If the default value (-1) is used, then the sets returned will be the most recent # of sets where # is specified in the Number parameter.

## Syntax

<Sets Number="2" StartAt="-1"/>

## Reply

<Sets ErrorCode=”0” ErrorMessage=”Success”>

<FirstIndex>2247</FirstIndex>

<LastIndex>2248</LastIndex>

<TotalSamplesAvailable>2249</TotalSamplesAvailable>

<Sets>

<Set>

<Key>000000000000198E</Key>

<HeaderFields>

<Field Label="Name" RegistryId="Set Name" Id="2" Width="100">Evan</field>

…

</HeaderFields>

<SampleType>Sample</SampleType>

<NumRepsInSet>5</NumRepsInSet>

<AnalysisState>Analyzed</AnalysisState>

<IsPaused>false</IsPaused>

<IsExpanded>false</IsExpanded>

<IsSelected>false</IsSelected>

</Set>

…

</Sets>

<Analytes>

<Analyte label="Carbon">Carbon</Analyte>

<Analyte label="Sulfur">Sulfur</Analyte>

</Analytes>

</Sets>

## Possible Error Codes

6 – Exception

# SetsEx

This command retrieves general set data for the specified sets. It is simpler than calling the Set command repeatedly for each desired set.

## Syntax

<SetsEx>

…

<Set Key=”…”/>

<Set Key=”…”/>

…

</SetsEx>

## Reply

<SetsEx ErrorCode=”0” ErrorMessage=”Success”>

<Set>

<Set>

<Key>000000000000001B</Key>

<HeaderFields>

<Field Label="Type" RegistryId="SampleType" ValueStatus="Normal" RawValue="Standard" Id="1" Width="100">Standard</Field>

<Field Label="Name" RegistryId="Set Name" ValueStatus="Normal" Id="2" Width="100">502-416 0580-65</Field>

<Field Label="Description" RegistryId="Description" ValueStatus="Normal" Id="3" Width="100">bad method</Field>

<Field Label="Method" RegistryId="Method" ValueStatus="Normal" Id="0" Width="100">Basic Method</Field>

<Field Label="Oxygen Average" RegistryId="Oxygen Avg." valueStatus="Normal" Units="%" RawValue="0.0049999764154718893" Id="100" Width="100">0.00500 %</Field>

<Field Label="Nitrogen Average" RegistryId="Nitrogen Avg." valueStatus="Normal" Units="%" RawValue="0.056599170279385658" Id="144" Width="100">0.0566 %</Field>

<Field Label="Hydrogen Average" RegistryId="Hydrogen Avg." valueStatus="Normal" Units="%" RawValue="0.00067463193862789316" Id="162" Width="100">0.000675 %</Field>

<Field id="4" RegistryId="Set Analysis Date" Label="Analysis Date" Width="100">05/11/2011 14:26:45</Field>

</headerFields>

<SampleType>Standard</SampleType>

<NumRepsInSet>3</NumRepsInSet>

<AnalysisState>Analyzed</AnalysisState>

<IsPaused>false</IsPaused>

<AnalyteStats>

<Analyte Name="Oxygen" Label="Oxygen">

<RSD RawValue="1.6593006976147233">1.66 %</RSD>

<Average RawValue="4.9999764154718893E-05">0.00500 %</Average>

<StdDev RawValue="8.29646435424967E-07">± 0.0000830 %</StdDev>

<N>3</N>

<Units>%</Units>

</Analyte>

<Analyte Name="Nitrogen" Label="Nitrogen">

<RSD RawValue="0.10104200904336771">0.101 %</RSD>

<Average RawValue="0.00056599170279385659">0.0566 %</Average>

<StdDev RawValue="5.7188938752167957E-07">± 0.0000572 %</StdDev>

<N>3</N>

<Units>%</Units>

</Analyte>

<Analyte Name="Hydrogen" Label="Hydrogen">

<RSD RawValue="9.945941577229215">9.95 %</RSD>

<Average RawValue="6.7463193862789312E-06">0.000675 %</Average>

<StdDev RawValue="6.70984984772591E-07">± 0.0000671 %</StdDev>

<N>3</N>

<Units>%</Units>

</Analyte>

</AnalyteStats>

</Set>

</Set>

…

<Analytes>

<Analyte Label="Oxygen">Oxygen</Analyte>

<Analyte Label="Nitrogen">Nitrogen</Analyte>

<Analyte Label="Hydrogen">Hydrogen</Analyte>

</Analytes>

</SetsEx>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Solenoid

This command retrieves the detail data for the solenoid corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific solenoid for which detail data is to be retrieved.

## Syntax

<Solenoid Key="4539633652371300352"/>

## Reply

<Solenoid ErrorCode=”0” ErrorMessage=”Success”>

<Name Label="Name">Carrier Inlet</Name>

<Key>4539633652371300352</Key>

<Label>sv101</Label>

<BitState>Unset</BitState>

</Solenoid>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Solenoids

This command retrieves general data about each solenoid on the instrument.

## Syntax

<Solenoids/>

## Reply

<Solenoids ErrorCode=”0” ErrorMessage=”Success”>

<Solenoid>

<Name Label="Name">Carrier Inlet</Name>

<Key>4539633652371300352</Key>

<Label>sv101</Label>

<BitState>Unset</BitState>

</Solenoid>

<Solenoid>

<Name Label="Name">Lance</Name>

<Key>4539633652371300353</Key>

<Label>sv102</Label>

<BitState>Unset</BitState>

</Solenoid>

…

</Solenoid>

## Possible Error Codes

6 – Exception

# Standard

This command retrieves the detail data for the standard corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific standard for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Standard Key="26"/>

## Reply

<Standard ErrorCode=”0” ErrorMessage=”Success”>

<Key>0000000000000026</Key>

<Name Label="Name">501-024 LN 1026</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">04/10/2013 13:45:06</LastUsed>

<LastModified Label="Last Modified">04/23/2013 12:13:52</LastModified>

<Excluded Label="Excluded">True</Excluded>

<GasDoseType Label="Gas Dose">None</GasDoseType>

<GasDoseCycles Label="Number of Doses">1</GasDoseCycles>

<Analytes>

<Analyte label="Carbon">

<Key>Carbon</Key>

<Range Label="Range">High</Range>

<Certified Label="Certified" Units="Percent">0.0341</Certified>

<Uncertainty Label="Uncertainty" Units="Percent">0.0005</Uncertainty>

<LowerControlLimit Label="Lower Control Limit" Units="Percent">0.0336</LowerControlLimit>

<UpperControlLimit Label="Upper Control Limit" Units="Percent">0.0346</UpperControlLimit>

<CheckStandard Label="Check Standard">False</CheckStandard>

</Analyte>

<Analyte Label="Sulfur">

<Key>Sulfur</Key>

<Range Label="Range">Both</Range>

<Certified Label="Certified" Units="Percent">0.00029</Certified>

<Uncertainty Label="Uncertainty" Units="Percent">2E-05</Uncertainty>

<LowerControlLimit Label="Lower Control Limit" Units="Percent">0.00027</LowerControlLimit>

<UpperControlLimit Label="Upper Control Limit" units="Percent">0.00031</UpperControlLimit>

<CheckStandard Label="Check Standard">False</CheckStandard>

</Analyte>

</Analytes>

</Standard>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Standards

This command retrieves general data about each standard on the instrument.

## Syntax

<Standards/>

## Reply

<Standards ErrorCode=”0” ErrorMessage=”Success”>

<Standard>

<Key>0000000000000026</Key>

<Name Label="Name">501-024 LN 1026</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">04/10/2013 13:45:06</LastUsed>

<LastModified Label="Last Modified">04/23/2013 12:13:52</LastModified>

<Excluded Label="Excluded">True</Excluded>

<GasDoseType Label="Gas Dose">None</GasDoseType>

<GasDoseCycles Label="Number of Doses">1</GasDoseCycles>

</Standard>

<Standard>

<Key>0000000000000027</Key>

<Name Label="Name">501-506 R0296</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">05/08/2013 18:08:23</LastUsed>

<LastModified Label="Last Modified">04/23/2013 13:16:03</LastModified>

<Excluded Label="Excluded">False</Excluded>

<GasDoseType Label="Gas Dose">None</GasDoseType>

<GasDoseCycles Label="Number of Doses">1</GasDoseCycles>

</Standard>

…

</Standards>

## Possible Error Codes

6 – Exception

# Status

This command returns the current status of the instrument, such as the state of the "Analyzing" flag, the "ReadyToAnalyze" flag, the "HardwareInUse" flag, the "NeedsMaintenance" flag, as well as optionally the current values of the main screen gauges, the most recent leak check results, and the most recent system check results.

## Parameters

**IncludeGauges**: Indicates whether to include the current value of the main screen gauges in the response data.

**IncludeSystemCheckResults**: Indicates whether to include the results from the latest system check in the response data.

**IncludeLeakCheckResults**: Indicates whether to include the results from the latest leak check in the response data.

## Syntax

<Status IncludeGauges="True" IncludeSystemCheckResults="True" IncludeLeakCheckResults="True"/>

## Reply

<Status ErrorCode=”0” ErrorMessage=”Success”>

<Elements>

<User>jmh</User>

<Analyzing>False</Analyzing>

<ReadyToAnalyze>False</ReadyToAnalyze>

<Paused>False</Paused>

<SamplesRemaining>3</SamplesRemaining>

<HardwareInUse>False</HardwareInUse>

<NeedsMaintenance>False</NeedsMaintenance>

<HardwareStatus>Not Ready To Analyze.</HardwareStatus>

</Elements>

<Widgets>

<Widget Label="Grid Current" Id="1" Units="mA" Warning="false"></Widget>

</Widgets>

<SystemCheckResults>

<SystemCheck Id="QUICK">

<Result ExecutionDate="6/3/2013 12:28:00 PM">

<Segment Type="StatusMessage" Result="COMPLETED,27,27,26,1" />

</Result>

</SystemCheck>

</SystemCheckResults>

<LeakCheckResults>

<LeakCheck Id="SYSTEM" Label="System Leak Check">

<Result ExecutionDate="6/4/2013 4:39:58 PM" MassiveLeak="False" PressureIncreased="False">

<Segment Type="Detector" Result="Failed" InitialPressure="1533.10347444096" FinalPressure="1520.81305229154" PressureChange="-12.2904221494232" Label="System" />

</Result>

</LeakCheck>

</LeakCheckResults>

</Status>

## Possible Error Codes

6 – Exception

# StringValue

This command returns the value for the specified variable.

## Parameters

**Key**: The unique variable name.

## Syntax

<StringValue Key="…”/>

## Reply

<StringValue Key=”…” Value=”…”/>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# StringValues

This command returns the values for all the string type variables.

## Syntax

<StringValues/>

## Reply

<StringValues ErrorCode=”0” ErrorMessage=”Success”>

…

<StringValue Name="System Detector State" Value=””/>

…

</StringValues>

## Possible Error Codes

6 – Exception

# Switch

This command retrieves the detail data for the standard corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific standard for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Switch Key="4539633648093110272"/>

## Reply

<Switch ErrorCode=”0” ErrorMessage=”Success”>

<Name Label="Name">Pedestal Up</Name>

<Key>4539633648093110272</Key>

<Label>sw5</Label>

<BitState>Ignore</BitState>

</Switch>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Switches

This command retrieves general data about each standard on the instrument.

## Syntax

<Switches/>

## Reply

<Switches ErrorCode=”0” ErrorMessage=”Success”>

<Switch>

<Name Label="Name">Pedestal Up</Name>

<Key>4539633648093110272</Key>

<Label>sw5</Label>

<BitState>Ignore</BitState>

</Switch>

<Switch>

<Name label="Name">Pedestal Down</Name>

<Key>4539633648093110273</Key>

<Label>sw6</Label>

<BitState>Ignore</BitState>

</Switch>

…

<Switches>

## Possible Error Codes

6 – Exception

# SystemParameters

This command returns the instrument’s system parameter data.

## Syntax

<SystemParameters/>

## Reply

<SystemParameters ErrorCode=”0” ErrorMessage=”Success”>

…

<Field Label="Gas Standby Mode" RawValue="Disable">Disable Standby</field>

<Field Label="Dust Filter Temperature" units="°C" RawValue="110">110 °C</field>

<Field Label="Back Pressure Control" units="mmHg" RawValue="790">790 mmHg</field>

<Field Label="Weekday Wake Up" RawValue="false">Disabled</field>

<Field Label="Saturday Wake Up" RawValue="false">Disabled</field>

<Field Label="Sunday Wake Up" RawValue="false">Disabled</field>

<Field Label="Gas Doser" RawValue="false">Enabled</field>

…

</SystemParameters>

## Possible Error Codes

6 – Exception

# SystemParametersEx

This command is similar to the SystemParameters command, with the exception that the system parameter data returned by this command is segregated into sections, similar to how it is displayed within the Cornerstone application.

## Syntax

<SystemParametersEx/>

## Reply

<SystemParameters ErrorCode=”0” ErrorMessage=”Success”>

<Section Label="Gas Standby">

<Field Label="Mode" ValueStatus="Normal" RawValue="Conservation">Conserve Gas</Field>

<Field Label="Time" ValueStatus="Normal" Units="min." RawValue="90">90 min.</Field>

</Section>

<Section Label="Gas Wake Up">

<Field Label="Weekday" ValueStatus="Normal" RawValue="true">Enabled</Field>

<Field Label="Weekday Time" ValueStatus="Normal">7:30 AM</Field>

<Field Label="Saturday" ValueStatus="Normal" RawValue="false">Disabled</Field>

<Field Label="Sunday" ValueStatus="Normal" RawValue="false">Disabled</Field>

<Field Label="Run Leak Check" ValueStatus="Normal" RawValue="false">No</Field>

</Section>

<Section Label="Bypass OMI">

<Field Label="Bypass OMI" ValueStatus="Normal" RawValue="false">No</Field>

<Field Label="Bypass OMI in Conservation" ValueStatus="Normal" RawValue="true">Yes</Field>

</Section>

<Section Label="Analytes">

<Field Label="Analyze Oxygen" ValueStatus="Normal" RawValue="true">Enabled</Field>

<Field Label="Analyze Nitrogen" ValueStatus="Normal" RawValue="true">Enabled</Field>

<Field Label="Analyze Hydrogen" ValueStatus="Normal" RawValue="true">Enabled</Field>

</Section>

<Section Label="Leak Check">

<Field Label="Maximum System leak" ValueStatus="Normal" Units="mmHg" RawValue="1">1.0 mmHg</Field>

<Field Label="Maximum Incoming segment leak" ValueStatus="Normal" Units="mmHg" RawValue="1">1.0 mmHg</Field>

<Field Label="Maximum Detector segment leak" ValueStatus="Normal" Units="mmHg" RawValue="1">1.0 mmHg</Field>

<Field Label="Maximum State 1 segment leak" ValueStatus="Normal" Units="psi" RawValue="1">1.0 psi</Field>

<Field Label="Maximum State 2 segment leak" ValueStatus="Normal" Units="psi" RawValue="1">1.0 psi</Field>

</Section>

<Section Label="Other System Settings">

<Field Label="Gas Type" ValueStatus="Normal" RawValue="Helium">Helium</Field>

<Field Label="Calculation Flags" ValueStatus="Normal" Units="" RawValue="5">5 </Field>

<Field Label="Gas Doser" ValueStatus="Normal" RawValue="false">Enabled</Field>

<Field Label="Low Cabinet Fan Speed" ValueStatus="Normal" Units="" RawValue="50">50</Field>

<Field Label="High Cabinet Fan Speed" ValueStatus="Normal" Units="" RawValue="65">65</Field>

<Field Label="Auto Increment Sample Name" ValueStatus="Normal" RawValue="false">Disabled</Field>

<Field Label="Pressure Corrections" ValueStatus="Normal" RawValue="true">Enabled</Field>

</Section>

</SystemParameters>

## Possible Error Codes

6 – Exception

# Transport

This command retrieves the detail data for the transport corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific transport for which detail data is to be retrieved. Leading zeros may be omitted.

## Syntax

<Transport Key="19D9"/>

## Reply

<Transport ErrorCode=”0” ErrorMessage=”Success”>

<Key>00000000000019D9</Key>

<Name Label="Name">New Transport</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">04/23/2014 14:05:13</LastModified>

<Excluded Label="Excluded">False</Excluded>

<TransmitOption Label="Transmit Option">File</TransmitOption>

<TransportAutomatically Label="Transport Automatically">False</TransportAutomatically>

<TransportFormat Label="Transport Format">Delimited</TransportFormat>

<TransportUnits Label="Transport Units With Results">True</TransportUnits>

<CharacterEncoding Label="Character Encoding">UTF8NoBOM</CharacterEncoding>

<ExportOptions Label="Export Options">Append</ExportOptions>

<ExportFileName Label="Export File Name">[Default]</ExportFileName>

<TransmitBegin Label="Transmit Begin"></TransmitBegin>

<TransmitEnd Label="Transmit End"></TransmitEnd>

<SetEnd Label="Set End"></SetEnd>

<ReplicateEnd Label="Replicate End"></ReplicateEnd>

<FieldBegin Label="Field Begin"></FieldBegin>

<FieldEnd Label="Field End"></FieldEnd>

<SetBeginFields>

<Field Name="Name" Label="Name" />

<Field Name="Type" Label="Type" />

<Field Name="Method" Label="Method" />

<Field Name="CR/LF" Label="" />

</SetBeginFields>

<ReplicateFields>

<Field Name="Carbon Mass" Label="Carbon Mass" />

<Field Name="Sulfur Mass" Label="Sulfur Mass" />

<Field Name="Carbon Concentration" Label="Carbon Concentration" />

<Field Name="Sulfur Concentration" Label="Sulfur Concentration" />

<Field Name="CR/LF" label="" />

</ReplicateFields>

<SetEndFields />

</Transport>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# Transports

This command retrieves general data about each transport on the instrument.

## Syntax

<Transports/>

## Reply

<Transports ErrorCode=”0” ErrorMessage=”Success”>

<Transport>

<Key>00000000000019D9</Key>

<Name Label="Name">New Transport</Name>

<Description Label="Description"></Description>

<LastUsed Label="Last Used">01/01/0001 00:00:00</LastUsed>

<LastModified Label="Last Modified">04/23/2014 14:05:13</LastModified>

<Excluded Label="Excluded">False</Excluded>

</Transport>

</Transports>

## Possible Error Codes

6 – Exception

# UserPermissions

This command retrieves the permissions for the currently logged on user.

## Syntax

<UserPermissions/>

## Reply

<UserPermissions ErrorCode=”0” ErrorMessage=”Success”>

…

<Permission Type="None" HasPermission="false" />

<Permission Type="Analyze" HasPermission="false" />

…

</UserPermissions>

## Possible Error Codes

6 – Exception

# ValveState

This command retrieves the data for the specified valve state.

## Parameters

**Name**: The unique key that identifies the valve state.

## Syntax

<ValveState Name="Gas Off 1"/>

## Reply

<ValveState Name="Gas Off 1" ErrorCode=”0” ErrorMessage=”Success”>

<Solenoids>

<Solenoid Name="Carrier Inlet" State="Unset" />

<Solenoid Name="OMI Bypass 1" State="Unset" />

<Solenoid Name="OMI Bypass 2" State="Unset" />

<Solenoid Name="Furnace Bypass" State="Unset" />

<Solenoid Name="Bypass and Purge Makeup" State="Set" />

<Solenoid Name="Purge Exhaust" State="Unset" />

<Solenoid Name="Exhaust" State="Set" />

<Solenoid Name="Pneumatic Supply" State="Set" />

<Solenoid Name="Load Head Cover Lift" State="Ignore" />

<Solenoid Name="Slide Block Seal" State="Unset" />

<Solenoid Name="Slide Block" State="Unset" />

<Solenoid Name="Electrode Safety" State="Set" />

<Solenoid Name="Electrode 1" State="Unset" />

<Solenoid Name="Electrode 2" State="Unset" />

<Solenoid Name="Dose A Gas" State="Unset" />

<Solenoid Name="Dose B Gas" State="Unset" />

<Solenoid Name="Dose A Pneumatic" State="Unset" />

<Solenoid Name="Dose B Pneumatic" State="Unset" />

<Solenoid Name="Coolant System Control" State="Ignore" />

<Solenoid Name="Sample Drop" State="Unset" />

</Solenoids>

</ValveState>

## Possible Error Codes

4 - MalformedRequest

6 – Exception

# ValveStates

This command retrieves state of each valve state on the instrument.

## Syntax

<ValveStates/>

## Reply

<ValveStates ErrorCode=”0” ErrorMessage=”Success”>

<ValveState Name="Unknown" Active="False" />

<ValveState Name="Gas Off" Active="False" />

<ValveState Name="Oxygen Off HeAr On" Active="False" />

…

</ValveStates>

## Possible Error Codes

6 – Exception

# AssignRepNotifyOnComplete

This command will turn on/off the analysis complete notification for the specified replicates.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag:** The tag number of the replicate to return.

**Notify:** Specify “T” to turn notification on, specify “F” to turn notification off.

## Syntax

<AssignRepNotifyOnComplete>

…

<Replicate SetKey=”…” Tag=”…” Notify=”T/F”/>

…

</AssignRepNotifyOnComplete>

## Reply

<AssignRepNotifyOnComplete ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 - RequestedItemNotFound

# Messages

This command returns the list of messages for the logged in user.

## Syntax

<Messages/>

## Reply

<Messages ErrorCode=”0” ErrorMessage=”Success”>

<Messages>

<Message>

<Id>#</Id>

<Type>…</Type>

<Label>…</Label>

<Date>…</Date>

<Data>…</Data>

<Message>…</Message>

</Message>

</Messages>

<TotalMessagesAvailable>#</TotalMessagesAvailable>

</Messages>

## Possible Error Codes

6 – Exception

# MostRecentMessageId

This command returns the most recent message Id.

## Syntax

<MostRecentMessageId/>

## Reply

<MostRecentMessageId ErrorCode=”0” ErrorMessage=”Success”>#</MostRecentMessageId>

## Possible Error Codes

6 – Exception

# NotificationSettings

This command returns the notification settings for the currently logged in user.

## Syntax

<NotificationSettings/>

## Reply

<NotificationSettings ErrorCode=”0” ErrorMessage=”Success”>

<Notification Id="#" Excluded="…" Frequency="…" FrequencyUnits="…" Label="…" Description="…">

<MobileAppMailbox>T/F</MobileAppMailbox>

<Email>T/F</Email>

<TextMessage>T/F</TextMessage>

</Notification>

…

</NotificationSettings>

## Possible Error Codes

6 – Exception

# RemoveMessages

This command removes the specified messages for the logged in user.

## Parameters

**Id**: The unique key that identifies the specific message to remove. Leading zeroes may be omitted.

## Syntax

<RemoveMessages>

<Message Id="1234">

</RemoveMessages>

## Reply

<RemoveMessages ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

# SaveNotificationSettings

This command sets the notifications settings for the current logged in user

## Syntax

<SaveNotificationSettings>

<Notification Id="#">

<MobileAppMailbox>T/F </MobileAppMailbox>

<Email>T/F</Email>

<TextMessage>T/F</TextMessage>

</Notification>

…

</SaveNotificationSettings>

## Reply

<SaveNotificationSettings ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

# AddSamples

This command creates new replicates to be added to an existing set or into a new set. This command will have a different behavior depending upon whether or not Cornerstone is in remote control mode. If the application is not in remote control mode, when this command is executed the Cornerstone operator will be alerted that new samples are being requested to be added remotely. Only when the user acknowledges this alert will the samples be added to Cornerstone. When Cornerstone is in remote control mode, the samples will be added immediately.

## Parameters: Add Replicates to an Existing Set

**SetKey**: The unique key that identifies the specific set into which new replicates will be added. Leading zeroes may be omitted.

## Parameters: Add Replicates to a New Set

Each parameter to apply to the new set is contained in an element named “Field”. The Field element should specify which parameter it is representing by the use of the “Id” attribute. Values for the field are specified as the value of the “Field” element. The common parameter “Id” values are described below. In order to specify a value for a user-defined field, the “Id” attribute should be given the identifier value of the field, which is contained in the “FieldIdentifier” element of the response to the Field or Fields command.

**SampleType**: The sample type of the set. Valid values are "Blank", "GasDose", "Sample" and "Standard".

**Name**: The name for the set. This parameter only applies for sets with sample types of "Blank" and "Sample". For other sample types this parameter is not used and can be omitted.

**Description**: The set description. This parameter is optional.

**MethodKey**: The unique key that identifies the specific method to assign to the set. Leading zeros may be omitted.

**MethodName**: The unique name that identifies the specific method to assign to the set.

**StandardKey**: The unique key that identifies the specific standard to assign to the set. Leading zeros may be omitted. This parameter only applies for sets with sample types of "GasDose" and "Standard". For other sample types this parameter is not used and can be omitted.

## Parameters: Replicates

Each parameter to apply to the new set is contained in an element named “Field”. The Field element should specify which parameter it is representing by the use of the “Id” attribute. Values for the field are specified as the value of the “Field” element. The common parameter “Id” values are described below.

**Mass**: The replicate mass. This parameter is optional.

**Comments**: The replicate comments. This parameter is optional.

**Location**: The replicate location when using a shuttle loader automation system. This parameter is optional.

## Parameters: PromptOperatorForEntry

**PromptOperatorForEntry**: Indicates if the operator should be prompted to add the remotely added samples or if the remotely added samples should be added immediately. If this value is not specified, then the operator will be prompted and the samples will not be added until the operator acknowledges the prompt.

## Syntax: Add Replicates to an Existing Set

<AddSamples>

<PromptOperatorForEntry>True</PromptOperatorForEntry>

<SetKey>1234</SetKey>

<Replicates>

<Replicate>

<Field Id=”Mass”>1.1</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”RepId”>Rep 1</Field>

</Replicate>

<Replicate>

<Field Id=”Mass”>1.2</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

<Field Id=”RepId”>Rep 2</Field>

</Replicate>

</Replicates>

</AddSamples>

## Syntax: Add Replicates to a New Set

<AddSamples>

<PromptOperatorForEntry>True</PromptOperatorForEntry>

<Set>

<Field Id=”SampleType”></Field>

<Field Id=”Name”></Field>

<Field Id=”Description”></Field>

<Field Id=”MethodKey”>0</Field>

<Field Id=”StandardKey”>0</Field>

<Field Id=”UDF: 1111”>User defined field value here</Field>

<Field Id=”SetId”>Set 1</Field>

</Set>

<Replicates>

<Replicate>

<Field Id=”Mass”>1.0</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

<Field Id=”RepId”>Rep 1</Field>

</Replicate>

<Replicate>

<Field Id=”Mass”>1.0</Field>

<Field Id=”Comments”></Field>

<Field Id=”Location”></Field>

<Field Id=”UDF: 1234”>User defined field value here</Field>

<Field Id=”RepId”>Rep 2</Field>

</Replicate>

</Replicates>

</AddSamples>

## Reply

The reply is immediate. A successful reply does not necessarily mean that the samples were actually added, if the PromptOperatorForEntry value was not specified or was specified with a value of True.

<AddSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

4 - MalformedRequest

6 – Exception

13 - UserDoesNotHavePermissionToExecuteCommand

# LastRemoteAddedSets

This command returns the keys of the sets that were created from the most recent call to the AddSamples command.

## Syntax

<LastRemoteAddedSets/>

## Reply

<LastRemoteAddedSets ErrorCode=”0” ErrorMessage=”Success”>

<Set Key="0000000000001EAE" />

…

</LastRemoteAddedSets>

## Possible Error Codes

6 – Exception

# Abort

This command aborts any sequences currently running on the instrument.

## Syntax

<Abort/>

## Reply

<Abort ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

13 - UserDoesNotHavePermissionToExecuteCommand

# AddQcRectifyTrigger

This command will insert a replicate to trigger the necessary blanks, check standards and calibration standards to be analyzed in order to bring QC for the specified method back into control. The inserted replicate will be marked as the next sample to be analyzed. Upon completion of the analysis of the QC blanks, check standards and calibration standards, the trigger replicate will not be analyzed, but rather will be marked as aborted.

If QC is not enabled or is already in control, then no trigger replicate will be added.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeros may be omitted.

## Syntax

<AddQcRectifyTrigger MethodKey=”D3”/>

## Reply

<AddQcRectifyTrigger ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

8 - CommandCurrentlyUnavailable

11 - RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# Analyze

This command starts the analysis sequence.

## Syntax

<Analyze/>

## Reply

<Analyze ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

13 - UserDoesNotHavePermissionToExecuteCommand

# AssignNextToAnalyze

This command specifies the next replicate to analyze. If the ReplicateTag attribute is omitted or the value left at the default (0), then the first unanalyzed replicate within the specified set will be marked as next to analyze.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**ReplicateTag**: The identifier of the replicate within the set.

## Syntax

<AssignNextToAnalyze SetKey="1234"/>

<AssignNextToAnalyze SetKey="1234" ReplicateTag="1" />

## Reply

<AssignNextToAnalyze ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

11 - RequestedItemNotFound

# ClearAbortFlag

This command sets the Abort flag to false. The logged in user must have Analyze permissions in order to successfully execute this command.

## Syntax

<ClearAbortFlag/>

## Reply

<ClearAbortFlag ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

13 - UserDoesNotHavePermissionToExecuteCommand

# ContinueAnalysis

This command continues the analysis sequence when Cornerstone has prompted the user to perform an action and indicates when analysis should continue.

## Syntax

<ContinueAnalysis/>

## Reply

<ContinueAnalysis ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

8 - CommandCurrentlyUnavailable

13 - UserDoesNotHavePermissionToExecuteCommand

# DeleteSamples

This command deletes the specified sets and replicates. Analyzed replicates must first be marked as "Excluded" before being deleted.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<DeleteSamples>

<Set Key="1234"/>

</DeleteSamples>

<DeleteSamples>

<Replicate SetKey="1234" Tag="1"/>

</DeleteSamples>

## Reply

<DeleteSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 – RequestedItemNotFound

13 – UserDoesNotHavePermissionToExecuteCommand

14 - UnableToDeleteItemReferenedBy

16 - CannotDeleteSamplesThatAreNotExcluded

17 – CannotDeleteSamplesThatAreBeingAnalyzed

18 - CannotDeleteSamplesThatAreBeingLoaded

# ExcludeSamples

This command marks the specified sets and replicates as excluded.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<ExcludeSamples>

<Set Key="1234"/>

</ExcludeSamples>

<ExcludeSamples>

<Replicate SetKey="1234" Tag="1"/>

</ExcludeSamples>

## Reply

<ExcludeSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 – RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# ExecuteSequence

This command performs the specified action on the instrument.

## Parameters

**Sequence**: Name of sequence to execute. This can be obtained from the Sequences command.

**Additional attributes:** Any additional attributes will be included as parameters to the sequence to execute.

## Syntax

<ExecuteSequence Sequence="Clean" Attribute1=”True” Attribute2=”100”/>

## Reply

<ExecuteSequence ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

8 – CommandCurrentlyUnavailable - This error code will be returned if the specified sequence is already executing at the time the command is sent.

9 – UnknownParameterValue

# IncludeSamples

This command marks the specified sets and replicates as included.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<IncludeSamples>

<Set Key="1234"/>

</IncludeSamples>

<IncludeSamples>

<Replicate SetKey="1234" Tag="1"/>

</IncludeSamples >

## Reply

<IncludeSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 – RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# InvalidateQCComponent

Resets the specified portion of quality control in order for it to be rectified the next time quality control runs.

## Parameters

**MethodKey**: The unique key that identifies the method. Leading zeros may be omitted.

**Component**: The quality control component to reset. Valid values are:

* “Blanks”
* “Checks”
* “All” – resets both Blanks and Checks.

## Syntax

<InvalidateQCComponent MethodKey="D3" Component=”All”/>

## Reply

<InvalidateQCComponent ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

7 - UnableToExecuteCommand

11 - RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# ModifySamples

This command modifies the values of fields in sets and in replicates.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

**Field Id**: Valid values include: Description.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

**Field Id**: Valid values include: Comments.

## Syntax

<ModifySamples>

<Set Key="1234"/>

<Field Id="Description">My Description</Field>

</ModifySamples>

<ModifySamples>

<Replicate SetKey="1234" Tag="1"/>

<Field Id="Comments">My Comments</Field>

</ModifySamples >

## Reply

<ModifySamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

4 - MalformedRequeste  
6 – Exception

10 - MissingAttribute

11 - RequestedItemNotFound

15 - FieldIsNotEditable

# PauseSamples

This command modifies the paused state of the specified replicates.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

**Paused**: Valid values are "ManuallyPaused" and "NotPaused".

## Syntax

<PauseSamples>

<Replicate SetKey="1234" Tag="1" Paused="ManuallyPaused"/>

</PauseSamples>

## Reply

<PauseSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

7 - UnableToExecuteCommand

10 – MissingAttribute

11 - RequestedItemNotFound

# PerformInstrumentAction

This command performs the specified action on the instrument.

## Parameters

**Action**: Indicates the action to perform on the instrument. If this parameter is not provided or the value is blank, the list of available actions is returned. Some of the valid actions are: Clean, TogglePedestal, SystemLeakcheck, SegmentedLeakcheck, PneumaticLeakcheck, SystemCheck, and Vacuum.

## Syntax

<PerformInstrumentAction Action="Clean"/>

## Reply

<PerformInstrumentAction ErrorCode=”0” ErrorMessage=”Success”>

<Actions>

<Action>Clean</Action>

<Action>TogglePedestal</Action>

<Action>SystemLeakcheck</Action>

<Action>SegmentedLeakcheck</Action>

<Action>PneumaticLeakcheck</Action>

<Action>SystemCheck</Action>

<Action>Vacuum</Action>

</Actions>

</PerformInstrumentAction>

<PerformInstrumentAction ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

7 – UnableToExecuteCommand

11 - RequestedItemNotFound

# RecalcSamples

This command performs a recalculation on the specified sets and replicates.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<RecalcSamples>

<Set Key="1234"/>

</RecalcSamples>

<RecalcSamples>

<Replicate SetKey="1234" Tag="1"/>

</RecalcSamples>

## Reply

<RecalcSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 - RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# ResetCounter

This command performs a reset on the counter corresponding to the specified key.

## Parameters

**Key**: The unique key that identifies the specific counter on which a reset will be performed. Leading zeros may be omitted.

## Syntax

<ResetCounter Key="1234"/>

## Reply

<ResetCounter ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttibute

11 - RequestedItemNotFound

# ResetCounters

This command performs a reset on all counters.

## Syntax

<ResetCounters/>

## Reply

<ResetCounters ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

# SetGasState

This command sets the gas state on the Cornerstone instrument to the specified state.

## Parameters

**State**: Gas state to set on instrument. Valid values are "ON", "OFF", and "CONSERVE".

## Syntax

<SetGasState State="ON" />

## Reply

<SetGasState ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

8 - CommandCurrentlyUnavailable

9 – UnknownParameterValue

10 – MissingAttribute

13 - UserDoesNotHavePermissionToExecuteCommand

# SetSampleState

This command sets the analysis state of the specified replicate.

## Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

**State**: Analysis state; valid values are "Analyzed", "Unanalyzed", “Analyzing”, and "Aborted".

## Syntax

<SetSampleState SetKey="…" Tag="…" State="…"/>

## Reply

<SetSampleState ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

# TransmitSamples

This command transmits the specified set and replicate data using the specified transport.

## Parameters

**Key**: The unique key that identifies the transport. Leading zeros may be omitted.

## Set Parameters

**Key**: The unique key that identifies the set. Leading zeros may be omitted.

## Replicate Parameters

**SetKey**: The unique key that identifies the set. Leading zeros may be omitted.

**Tag**: The identifier of the replicate within the set.

## Syntax

<TransmitSamples Key="5678">

<Set Key="1234"/>

</TransmitSamples >

<TransmitSamples Key="5678">

<Replicate SetKey="1234" Tag="1"/>

</TransmitSamples >

## Reply

<TransmitSamples ErrorCode=”0” ErrorMessage=”Success”/>

## Possible Error Codes

6 – Exception

10 – MissingAttribute

11 - RequestedItemNotFound

13 - UserDoesNotHavePermissionToExecuteCommand

# Error Codes

|  |  |  |
| --- | --- | --- |
| **Error code** | NAME | DESCRIPTION |
| 0 | None | None. |
| 1 | UnknownCommand | An unknown command was received which Cornerstone does not recognize. |
| 2 | AnotherUserLoggedOn | Another user is currently logged-on to Cornerstone. |
| 3 | FailedLogon | Log on attempt failed; either user name or password is incorrect. |
| 4 | MalformedRequest | Received data was not in XML format and therefore could not be parsed, or data elements were not valid for the type of data they are supposed to represent, i.e. data intended to be used as a date value that does not represent a valid date. |
| 5 | LogonRequired | Execution of command requires user to be logged on. |
| 6 | Exception | An exception has occurred. The ErrorMessage element will contain the exception description. |
| 7 | UnableToExecuteCommand | The current remote control state of Cornerstone does not allow the supplied command to be executed. |
| 8 | CommandCurrentlyUnavailable | The current state of Cornerstone does not allow the supplied command to be executed. The ErrorMessage element will contain further details. |
| 9 | UnknownParameterValue | Command contained unknown parameters. The ErrorMessage element will contain further details. |
| 10 | MissingAttribute | One or more command attributes were not supplied. The ErrorMessage element will contain further details. |
| 11 | RequestedItemNotFound | The requested data item (i.e. a set, a counter, a method, etc.) was not found. |
| 12 | GeneralError | General error. The ErrorMessage element will contain further details. |
| 13 | UserDoesNotHavePermissionToExecuteCommand | User does not have permission to execute requested command. |
| 14 | UnableToDeleteItemReferenedBy | Unable to delete item as it is referenced by other items. |
| 15 | FieldIsNotEditable | Unable to modify sample field because field is not editable. |
| 16 | CannotDeleteSamplesThatAreNotExcluded | Cannot delete samples that are not excluded. |
| 17 | CannotDeleteSamplesThatAreBeingAnalyzed | Cannot delete samples that are being analyzed. |
| 18 | CannotDeleteSamplesThatAreBeingLoaded | Cannot delete samples that are being loaded. |
| 19 | MissingElement | One or more command elements were not supplied. The ErrorMessage element will contain further details. |
| 20 | QcNotRequired | Quality Control rectification not required. |
| 21 | TimeoutWaitingForCommandData | Complete command data not received within timeout period. |