



SDI GRB Appliance Operator's Manual



Version 1.1 (January 2018)

This document is available online at:

https://www.ssec.wisc.edu/mcidas/doc/sdi_man/sdi_grb_oper_manual.pdf

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Chapter 1 - Introduction

The SDI GRB Appliance is a networked device pre-configured with software to ingest and distribute GOES-R Series satellite data from the GRB (GOES Rebroadcast) data stream. This SDI (SSEC Data Ingestor) is the third generation of satellite ingestors produced by the University of Wisconsin-Madison Space Science and Engineering Center. Hereafter, the terms *SDI* and *appliance* in this manual refer specifically to the SDI GRB Appliance.

The SDI has four primary functions - Ingest, Notify, Distribute and Monitor.

- **Ingest:** Data ingest in the SDI is accomplished using the [CSPP Geo GRB](#) software to create mission-standard netCDF-4 files.
- **Notify:** Open source [RabbitMQ](#) software is used by the SDI to notify data consumers when data becomes available at one of its standard network interfaces.
- **Distribute:** The SDI supports SFTP and NFS as standard output interfaces. Optionally the SDI supports the McIDAS ADDE data interface.
- **Monitor:** The SDI can be monitored using [Check_MK](#) for standard and custom properties.

The SDI is not a general purpose server; users are discouraged from adding additional software because this can interfere with system performance and result in data loss.

The SDI requires input from a data stream provider like [SSEC Satellite Data Services](#) or from a user-supplied antenna system providing demodulated GRB packets via direct gigabit Ethernet connection to the SDI.

Chapter 2 - Installation and Configuration

This chapter contains the instructions for the SDI GRB Appliance initial setup, future software updates, and site-configurable items. Go to the corresponding section below to complete the tasks.

- [Initial Checkout, Power Up and Status Check](#)
- [Installing a Software Update](#)
- [Site-configurable Items](#)

Initial Checkout, Power Up and Status Check

Each site receives an installation and configuration guide with their shipment that is created specifically for their order. The information below also appears in that document.

The contents of a standard SDI GRB Appliance shipment are listed below. If you ordered multiple units you will receive these items in each package.

- **Dell PowerEdge R430 Server** - includes bezel, rail racks and power cords
- **System Software USB flash drive** - contains backup copy of preinstalled system software (complete system consisting of the operating system and utilities, SDI configuration and applications, CSPP Geo GRB and other packages appropriate for the system you ordered), configured with the local settings listed below
- **SSH Keys and Example Client Scripts USB flash drive** - contains SSH keys to access your SDI GRB Appliance and example client scripts that can be run to access data using the RabbitMQ Messaging System

The appliance is shipped to sites with the system software installed and is preconfigured with the following settings (for static network configurations, i.e., DHCP is not being used) in order to customize it for the receiving site. This is intended to make the system ready to run as soon as it is assembled and powered up.

- IP address for SDI
- Netmask
- Gateway
- IP address(es) of nameserver(s)
- Optional: IP address(es) of specific NTP server(s)

Perform the steps below to power up your new SDI GRB Appliance.

1. Connect the demodulator cable to the 1 gigabit port labeled *DMOD*.
2. Connect the LAN ethernet cable to the 10 gigabit port labeled *LAN*.
3. Connect the console, keyboard and mouse that you chose for your system.
4. Connect the dual hot-plug redundant power cords to initiate the power up sequence.

Once the appliance completes the power up sequence, login as user **root**. If you don't know the password, send an email to sdi.help@ssec.wisc.edu with your contact information and we will then call you and relay it over the phone.

The system is designed to immediately start ingesting GRB data if your data feed is in place. Data is ingesting if the two conditions below are met:

- the log file, **/data/sdidata/complete/log/grb.log**, is updating
- data is accumulating in the **/data/sdidata/complete/goes** directory

If data is not ingesting, see [Appendix B - Troubleshooting](#) for diagnostic procedures.

Installing a Software Update

The SDI GRB Appliance is shipped to sites with the system software installed and is preconfigured with the local settings provided to SSEC. You will not need to install software upon receiving your appliance.

The instructions below are provided for installing future software updates you receive from SSEC. The updates will be provided on a USB flash drive specific for each appliance with a hard-coded network configuration. The flash drive includes the complete system: operating system and utilities, SDI configuration and applications, CSPP Geo GRB and other packages appropriate for the system ordered. During the update procedure you will have the option to remove the existing GRB data or to leave it intact (step 5 below).

1. Insert the supplied USB flash drive into a USB port on the appliance and then reboot the system with command **reboot** or by pressing **Ctrl+Alt+Delete**. You can ignore any unmounting errors that appear.
2. Closely watch the console. When the menu listing the function key actions appears, immediately press **F11** to bring up the *Boot Manager*.

Note: You must press the F11 key within 10 seconds; otherwise the system will continue booting off the hard drive.

3. When the Boot Manager Main Menu appears, select the *One-shot BIOS Boot Menu* option and press **Enter**.
4. When the Boot Manager Root Menu appears, select the *DataTraveler n.n* option (where *n.n* is a version number, e.g., 3.0) to use the USB flash drive inserted in step 1 above and press **Enter**.

5. When the blue SSEC SDI Installer screen appears, select the appropriate option for your system and press **Enter**. The options are:

Upgrade SSEC SDI system

or

Install SSEC SDI system

The *Upgrade* option does a fresh install of the complete system* but leaves the contents of */data*, including the completed GRB data, intact. The system drive will be reformatted.

The *Install* option does a fresh install of the complete system* and removes the existing GRB data (everything in */data*, including log files). Do not select the Install option unless you are sure that you want to reformat the system and data drives. Systems configured with the ADDE (rather than BASIC) option that have local changes will also lose them during the Install and thus will need to be re-added later. See [Site-configurable Items](#) below.

** The complete system includes the operating system and utilities, SDI configuration and applications, CSPP Geo GRB and other packages appropriate for the system ordered.*

Note that it will likely take several minutes for the Install or Upgrade to complete.

6. When the message appears saying that the CentOS Install is complete,
 - a. remove the USB flash drive
 - b. then click the Reboot button in the bottom right to reboot the system.

The SDI GRB Appliance software update is complete. The system is designed to immediately start ingesting GRB data if your data feed is in place. Data is ingesting if the two conditions below are met:

- the log file, */data/sdidata/complete/log/grb.log*, is updating
- data is accumulating in the */data/sdidata/complete/goes* directory

If data is not ingesting, see [Appendix B - Troubleshooting](#) for diagnostic procedures.

Site-configurable Items

An option to change the number of days to scour from the default of 7 to the site's preferred number of days is being considered. SDI GRB Appliances configured with the ADDE (rather than BASIC) option allow you to choose ADDE dataset names other than the defaults by uploading two files. See [Appendix D - McIDAS ADDE Configuration](#) for instructions.

Chapter 3 - Accessing the Appliance

This chapter describes how to access your SDI GRB Appliance. Four types of access are discussed:

- [Root access](#)
- [SFTP read/write access](#)
- [SFTP read access](#)
- [NFS access](#)

Root access

Root access provides complete access to the SDI and thus should only be used when necessary by SDI administrators to perform tasks such as the following:

- power up or restart
- start and stop services
- troubleshoot problems

Root access is available by logging in at the console or using the **root.ssh** key found on the *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system. The example below shows how to use the key to login to the SDI as user **root** from any workstation that has the key installed.

```
Type: ssh -i /path-to/root.sshkey root@<appliance_IP>
```

SFTP read/write access

SFTP read and write access to the to the **/data/sdidata** directories is available using the **sdiwrite.ssh** key found on the *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system. This key is intended for use by SDI administrators to perform tasks such as the following:

- download log files
- upload site-specific files (ADDE only; see [Appendix D - McIDAS ADDE Configuration](#))
- remove completed data files
- remove log files
- access data ingested by the appliance

The example command below shows how to use the key to start an sftp prompt.

```
Type: sftp -i /path-to/sdiwrite.sshkey sdiwrite@<appliance_IP>
```

SFTP read access

SDI administrators can provide their users the **sdiread.ssh** key to copy data files to their local workstation with SFTP. Using the key allows read-only access to the data files in the **/data/sdidata/complete** directories. The users must specify **/complete** as the root (starting) directory in their sftp commands.

The example command below (all one line) copies a netCDF file from one of the subdirectories.

```
Type: sftp -o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null  
-o "IdentityFile=/path-to/sdiread.sshkey"  
sdiread@<appliance_IP>:/complete/goes/grb/goes16/2017/  
2017_09_08_251/abi/L1b/RadM1/OR_ABI-L1b-RadM1-M3C03_  
G16_s20172511408250_e20172511408307_c20172511408348.nc
```

Note: The above command uses **-o UserKnownHostsFile=/dev/null** because it eliminates SSH prompts when trying to automate SFTP scripts. Alternatively, the **\$HOME/.ssh/config** file can be updated to include the following three lines.

```
host <appliance_IP_number> <appliance_IP_name>  
StrictHostKeyChecking no  
UserKnownHostsFile /dev/null
```


NFS access

If your SDI is configured with NFS rather than SFTP, you can mount the SDI directory **/data/sdidata/complete** to the NFS client. If users wish to take advantage of the RabbitMQ event messages, it is best to use a mount point of **/complete** on your NFS client. Doing so makes scripting more efficient because event messages contain the location of individual files found on the SDI. For example, the path and filename are bolded in the sample RabbitMQ event message below.

```
geo.goes.g16.abi.adde.sdi.ncdf.band.end: '{"adde_dataset": "GOES16/M2", "server_ip":
"<appliance_IP>", "start_time": "2017-11-13 15:01:57.0", "server_type": "sdi",
"path":
"/complete/goes/grb/goes16/2017/2017_11_13_317/abi/L1b/RadM2/OR_ABI-L1b-RadM2-M3C09_
G16_s20173171501570_e20173171502033_c20173171502065.nc", "satellite_ID": "G16",
"create_time": "2017-11-13 15:02:06.5", "message_type": "band", "instrument": "ABI",
"signal_type": "grb", "title": "ABI L1b Radiances", "status": "end", "mode": "3",
"satellite_family": "GOES", "coverage": "Mesoscale-2", "band": 9, "end_time":
"2017-11-13 15:02:03.3", "medium": "adde", "satellite_location": "GOES-Test"}'
```

The mount point **/complete** must be created on the NFS client prior to mounting the SDI's **/data/sdidata/complete** directory. Run the three commands below while logged in as **root** on the NFS client to complete these tasks.

```
Type: cd /
```

```
Type: mkdir complete
```

```
Type: mount -o resvport <appliance_IP>:/data/sdidata/complete /complete
```

If the NFS client will be used as a McIDAS ADDE Remote Server, you will need to update its **RESOLV.SRV** file with the ADDE group and dataset names that you choose for your data. The lines you will need to add are complex because they must include the full path name with wildcards in the MASK= value. Therefore it's best to use the example lines listed in [Appendix D - McIDAS ADDE Configuration](#) as a template. Note that you will need to change the beginning of the MASK= values from **/data/sdidata/complete/** to **/complete/** because the latter is used as the mount point on NFS clients.

Chapter 4 - Operations

This chapter contains information about operating your SDI GRB Appliance. The following topics are discussed:

- [Process Control](#)
- [Data File Locations](#)
- [Log Files](#)
- [RabbitMQ Event Notifications](#)
- [File System Maintenance](#)

Process Control

The SDI GRB Appliance runs two main processes, Ingest and Event. The Ingest process receives the data feed from the GOES Rebroadcast (GRB) across ports 50010 and 50020. The Event process moves completed images to a logical directory structure and publishes RabbitMQ event messages. Both processes are set up as services and automatically start when the software is installed or updated.

Under normal operations the Ingest and Event processes run continuously. SDI administrators can check the status and, if necessary, start, stop or restart either of the services with the commands below. The commands must be run from the console or while logged in using the **root.ssh** key (see [Chapter 3 - Accessing the Appliance](#)).

To check or change the Ingest process status:

```
Type: service ssecsdi <action>
```

```
where <action> is status, stop, start or restart
```

To check or change the Event process status:

```
Type: service ssecevent <action>
```

```
where <action> is status, stop, start or restart
```

Data File Locations

The ingest process uses the three working directories listed in the table below.

Directory	Contents
<code>/data/sdidata/holding/RT-CSPP</code>	ccsds packets ingested from the GRB datastream
<code>/data/sdidata/holding/tmp</code>	temporary location of netCDF files being filled with the ccsds packets
<code>/data/sdidata/holding/GRB-R</code>	temporary location of a completed netCDF file

The Event process moves completed netCDF files from `/data/sdidata/holding/GRB-R` to a directory with the naming convention below (all one line).

```
/data/sdidata/complete/goes/grb/goes<NN>/<CCYY>/<CCYY_MM_DD_JJJ>/<instrument>/
<product_level>/<coverage>/
```

For example, the location and name of the completed netCDF file for the 19 October 2017 GOES-16 16:37:27 UTC Mesoscale 1 image is listed below (all one line).

```
/data/sdidata/complete/goes/grb/goes16/2017/2017_10_19_292/abi/L1b/RadM1/OR_AB
I-L1b-RadM1-M3C16_G16_s20172921637268_e20172921637337_c20172921637372.nc
```

Log Files

All processes write a set of rotating log files found in the `/data/sdidata/complete/log` directory. The table below lists the log file written for each process.

Service	Process	Log File
ssecsdi	CSPP packet ingest CSPP Geo netCDF reconstructor	<code>grb.log</code> <code>grb-events.log</code>
ssecevent	Event process error Event log location tracker	<code>sdi_event_error.log</code> <code>sdi_event_track_log.log</code>
crontab	ssecevent service restart Data scour SFTP client access log	<code>ssecevent-service.log</code> <code>storage-scour.log</code> <code>sftp.log</code>

RabbitMQ Event Notifications

The Event process, **ssecevent**, continually reads the contents of the **grb-events.log** file. For each line in the file a RabbitMQ event message is published to a queue using Advanced Message Queuing Protocol (AMQP). The queue of messages is local to the SDI and is made available using a RabbitMQ server. Users (clients) can subscribe to the queue and watch for the events to start their own post-processing scripts. The *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system includes the **amqpfind** script that listens for messages and example scripts that demonstrate how to use **amqpfind**. See [Appendix C - Accessing Data with Example Client Scripts](#).

File System Maintenance

A crontab entry runs the script **storage_scour** every 15 minutes. The script removes files containing data older than 7 days.

Appendix A - Technical Specifications

The SDI GRB Appliance uses Dell PowerEdge Server hardware. See the [Dell website](#) for detailed information on the unit. For example, see the [Dell PowerEdge R430 Spec Sheet](#) for performance information and technical specifications. Enter your unit's serial number in the Dell website's Search field for links to drivers, manuals, and product support and warranty.

Your Quorum Demodulator must be on demod firmware version 2.10 or higher.

Appendix B - Troubleshooting

This section lists issues that may occur with the SDI GRB Appliance. The bullet list below contains a list of all of the questions in this appendix. After the list you will find each individual question paired with its answer.

- Q1: [How do I check whether GRB data is being ingested?](#)
- Q2: [What should I do if GRB data is not being ingested?](#)
- Q3: [What should I do if the ssecsdi and ssecevent daemons are running but GRB data is not ingesting?](#)
- Q4: [What should I do if the grb.log file is updating but data is not filing?](#)
- Q5: [What should I do if data flow is not showing with ncat?](#)
- Q6: [How can I tell if the ingest service has been running continuously or is stopping and restarting?](#)
- Q7: [How do I download log files?](#)
- Q8: [Are there example scripts available for accessing data using the RabbitMQ messaging system?](#)

Q1: How do I check whether GRB data is being ingested?

A1: Upon power up or installing a software update, the system is designed to immediately start ingesting GRB data if your data feed is in place. Data is ingesting if the two conditions below are met:

- the log file, `/data/sdidata/complete/log/grb.log`, is updating
- data is accumulating in the `/data/sdidata/complete/goes` directory

Q2: What should I do if GRB data is not being ingested?

A2: If the two conditions listed in Question 1 above are not met then data is not being ingested. If that's the case, you should first check whether data is being received.

To do so, run the command below.

```
Type: ncat -u -l 192.168.123.105 50030
```

If there is no response, there is a problem with your network connection to the demod. One cause could be that your Quorum GRB-200 demodulator needs to be updated. Therefore, you should verify that your demodulator is on firmware version 2.10 or greater via the display panel on the demodulator.

If there is a response to the `ncat` command above but data is not being ingested, verify that the values of the following demod variables in the output are correct for both LHCP and RHCP inputs: **PLsync** =

LK; EsNo > 6.8; PLFPS = 267; Mode = QPSK. If the values are correct, verify that the ingest and event daemons are running by running the commands below as user **root**:

```
Type: service ssecsdi status
Type: service ssecevent status
```

If the daemons are not running, try to restart them by running the commands below.

```
Type: service ssecsdi restart
Type: service ssecevent restart
```

If they fail to run, send an email to sdi.help@ssec.wisc.edu with a description of the problem and the output from your **grb.log** file.

Q3: What should I do if the ssecsdi and ssecevent daemons are running but GRB data is not ingesting?

A3: Run the command below to verify that the sdi daemons are listening to ports 50010 and 50020.

```
Type: netstat --all --extend --programs | grep -w 500.0
```

The netstat output should look similar to that below (where the *<socket>* and *<pid>* values will vary).

```
udp      0      0  ::ffff:192.168.123.105:50020  *:*    sdi      <socket>  <pid>/java
udp      0      0  ::ffff:192.168.123.105:50010  *:*    sdi      <socket>  <pid>/java
```

If the output does not look similar to that above, send email to sdi.help@ssec.wisc.edu with the results you are seeing.

Q4: What should I do if the grb.log file is updating but data is not filing?

A4: First check whether data is filing into the **/data/sdidata/holding** subdirectories but not the **/data/sdidata/complete** subdirectories. Then send email to sdi.help@ssec.wisc.edu with that information plus the following:

- contents of the files **grb.log**, **grb-events.log**, **sdi_event_error.log** and **ssecevent-service.log**
- a snapshot of the output from command **ncat -u -l 192.168.123.105 50030**; the snapshot should consist of one entire status message, i.e., the block of output beginning with **<GRB200>** and ending with **</GRB200>** (note that the ncat command outputs an entire status message once per second)

Q5: What should I do if data flow is not showing with ncat?

A5: Verify that the antenna equipment and network connections from your Quorum GRB-200 demodulator to your appliance are correct and working. Also check the demodulator status, including that it is on firmware version 2.10 or greater, via the display panel on the demodulator. If needed, send email to sdi.help@ssec.wisc.edu for guidance and suggestions.

Q6: How can I tell if the Ingest service has been running continuously or is stopping and restarting?

A6: Run the command below from the console or logged on as user **root**.

```
Type: ps -C java -o lstart,cmd
```

The output indicates the last time the ingest service was started. You can also look for *STATUS Wrapper Started as Daemon* messages in the **grb.log** file.

Q7: How do I download log files?

A7: The **grb.log** file can be downloaded with SFTP using the *sdiwrite* key. The example below (all one line) copies the **grb.log** file from the appliance to the current directory.

```
Type: sftp -o "IdentityFile=$HOME/.ssh/sdiwrite.sshkey"  
sdiwrite@<appliance_IP>:/complete/log/grb.log
```

Q8: Are there example scripts available for accessing data using the RabbitMQ messaging system?

A8: Yes. The *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system contains example client scripts that can be run to access data using the RabbitMQ messaging system. Go to [Appendix C - Accessing Data with Example Client Scripts](#) for instructions.

Appendix C - Accessing Data with Example Client Scripts

This section contains information about the tools provided on the *SSH Keys and Example Client Scripts* USB flash drive that can be used to access data on your SDI GRB Appliance. There are five sections:

- [Overview](#)
- [Contents of the Flash Drive](#)
- [Using amqpfind](#)
- [Accessing Data via SFTP Using the Event Messaging System](#)
- [Accessing Data via McIDAS](#)

Overview

Your SDI GRB Appliance ingests the GRB signal and creates files in netCDF format. There are multiple methods to access these data from another workstation. The available methods depend on the configuration selected when your system was purchased. If it is configured with the BASIC option, you can access its data from another workstation using either SFTP or NFS (whichever you chose with your order). If it is configured with the ADDE option, you can access its data using either of those methods and also can access it from other workstations using McIDAS-X (which requires a separate license) or another ADDE client.

During the ingest process, messages such as *image start*, *image end* and *band end* are published to a queue on the appliance. The queue of messages is made available to client workstations via a RabbitMQ server running on your appliance. A script using **amqpfind** is provided with your system to let users subscribe to the messages. See the [Using amqpfind](#) section in this appendix for more information.

Scripts using amqpfind together with SFTP, NFS or ADDE can initiate processes to access the data based on the message content. See the last two sections of this appendix for more information about accessing the data using [SFTP](#) and [McIDAS-X](#).

Contents of the Flash Drive

The *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system includes SSH keys necessary to access the netCDF files on the appliance and scripts that take advantage of the event messaging system. The flash drive's directories and their contents are listed in the table below.

Directory	Contents
Client-Testing/amqpfnd	code used to listen to events being sent from the SDI GRB Appliance
Client-Testing/keys	SSH keys to allow root access via SSH, and SFTP read and write to the SDI GRB Appliance
Client-Testing/scripts	amqpfnd, SFTP and McIDAS-X scripts

Using amqpfnd

During the SDI GRB Appliance ingest process, messages such as *image start*, *image end* and *band end* are published to a queue on the appliance. The queue of messages is made available to client workstations by making a connection to the RabbitMQ server on the appliance. The **amqpfnd** script, which is provided on the *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system, creates the connection and takes command line arguments to subscribe to all or a subset of messages being delivered to the client workstation. This information can be used to complete tasks, such as initiate processes to access the data based on the message content.

The default output from amqpfnd includes the keys and a json formatted payload of the message, as shown below.

```
geo.goes.g16.abi.adde.sdi.ncdf.band.end: '{"adde_dataset": "GOES16/M1", "start_time": "2017-10-23 18:52:28.2", "status": "end", "create_time": "2017-10-23 18:52:38.6", "instrument": "ABI", "signal_type": "grb", "end_time": "2017-10-23 18:52:35.1", "satellite_location": "GOES-Test", "server_type": "sdi", "title": "ABI L1b Radiances", "satellite_family": "GOES", "message_type": "band", "coverage": "Mesoscale-1", "mode": "3", "band": 13, "medium": "adde", "path": "/complete/goes/grb/goes16/2017/2017_10_23_296/abi/L1b/RadM1/OR_ABI-L1b-RadM1-M3C13_G16_s20172961852282_e20172961852351_c20172961852386.nc", "satellite_ID": "G16", "server_ip": "sdi.grbbeta.ssec.wisc.edu"}'
```

The amqpfnd flags are listed below.

- H ip address of the SDI GRB Appliance
 - u user (**guest** for the SDI GRB Appliance)
 - p password (**guest** for the SDI GRB Appliance)
 - j output subset of json key values of the message; must be a single quoted string, each key should be surrounded by curly braces; for example: `-j '{start_time} {band} {status}'`
 - C period-separated list of nine subscription keys; specific values or wild card must be specified for all nine keys; for example: `geo.goes.g16.abi.*.*.*.10.end`
- Key definitions:

satellite_type	geo
satellite_family	goes
satellite_ID	g16, g17, ...
satellite_instrument	abi, glm, exis, magnetometer, seiss or suvi
medium	file or adde
server_type	sdi or adde
format	ncdf
classification	band, image or point
status	start, end or complete

The example below starts a client listening for messages published by the SDI GRB Appliance. Both the keys and message payload are output. The script subscribes to all GOES-16 ABI messages with a status of *end*.

Type: **cd \$HOME/Client-Testing/scripts**

Type: **./example-start-amqpfnd.bash** *<appliance_IP>*

The output from amqpfnd can be piped into bash, Python or other scripts to trigger post-processing of the netCDF files. The next example runs a script that starts a client listening for messages published by the SDI GRB Appliance. The script subscribes to the same keys as above and triggers **\$HOME/Client-Testing/scripts/example-python.py**.

Type: **cd \$HOME/Client-Testing/scripts**

Type: **./example-event.bash** *<appliance_IP>*

Accessing Data via SFTP Using the Event Messaging System

Example scripts using the SFTP method to access data on your SDI GRB Appliance are included on the *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system. This method is valid for sites that purchased either option (BASIC or ADDE) of the SDI GRB Appliance.

To use the scripts, the following requirements must be met:

- The files in the **Client-Testing** directories on the flash drive must be copied to and run from a workstation other than your SDI GRB Appliance.
- You must be currently ingesting data on the appliance.

This example script starts a client listening for RabbitMQ event messages published by the SDI GRB Appliance and executes a Python script to use SFTP to copy the data locally.

From a terminal start the script that listens for RabbitMQ event messages.

```
Type: cd $HOME/Client-Testing/scripts
Type: ./start-sftp-event.bash <appliance_IP>
```

After the script starts the contents of events published by the SDI GRB Appliance are output to your terminal. The following is an example showing the contents of a message.

```
{'status': 'end', 'satellite_location': 'GOES-East', 'medium': 'adde', 'coverage': 'Full
Disk', 'signal_type': 'grb', 'server_type': 'sdi', 'start_time': '2016-08-20 07:00:34.8',
'title': 'ABI L1b Radiances', 'instrument': 'ABI', 'band': 5, 'create_time': '2016-08-20
07:11:18.1', 'mode': '3', 'server_ip': IP_address_of_SDI_GRB_Appliance, 'satellite_ID':
'G16', 'path':
'/complete/goes/grb/goes16/2016/2016_08_20_233/abi/L1b/RadF/OR_ABI-L1b-RadF-M3C05_G16_s201623
30700348_e20162330711110_c20162330711181.nc', 'satellite_family': 'GOES', 'adde_dataset':
'GOES16/FD', 'message_type': 'band', 'end_time': '2016-08-20 07:11:11.0'}
```

The SFTP script downloads individual ABI data files. For this test, the directory structure from the SDI GRB Appliance is kept intact, so the directory and file name will be similar to the example below (all one line).

```
$HOME/complete/goes/grb/goes16/2016/2016_08_20_233/abi/L1b/RadC/
OR_ABI-L1b-RadC-M3C09_G16_s20162330702163_e20162330704535_c20162330704590.nc
```

Accessing Data via McIDAS-X

Example scripts using the McIDAS-X method to access data on your SDI GRB Appliance are included on the *SSH Keys and Example Client Scripts* USB flash drive that was shipped with your system. This method is valid only for sites that purchased the ADDE option SDI GRB Appliance.

To use the scripts, the following requirements must be met:

- The files in the **Client-Testing** directories on the flash drive must be copied to and run from a workstation other than your SDI GRB Appliance.
- You must be currently ingesting data on the appliance.
- [McIDAS-X](#) and [McIDAS-XRD](#) 2017.1 or later must be installed on the client workstation, and the McIDAS-XRD Python Package must be installed in the user account (not the **mcidas** account) according to the instructions in the [McIDAS-XRD Python Package tutorial](#).

Once the required McIDAS packages are installed, you can run the supplied scripts to access data on the SDI GRB Appliance. The following commands run a script that runs a McIDAS-X IMGCOPY command for each band ingested. To run the script, you need the IP addresses of the SDI GRB Appliance and the NFS server (if using an NFS mount from your McIDAS-X server).

Type: `cd $HOME/Client-Testing/scripts`

Type: `./start-mcidas-event.bash <method> <appliance_IP> <server_IP>`

Where: `<method>` is the data access method, NFS or SDI
`<appliance_IP>` is the IP address of the SDI GRB Appliance
`<server_IP>` is the IP address of the NFS or SDI McIDAS data server

Almost immediately, you will see output similar to the following:

```
Starting amqpfnd
$HOME/Client-Testing/amqpfnd/amqpfnd -H IP_address_of_SDI_GRB_Appliance
geo.goes.g16.abi.*.*.*.end | xargs -P1 -n2 python
$HOME/Client-Testing/scripts/mcidas-event.py
{'status': 'end', 'satellite_location': 'GOES-Test', 'medium': 'adde', 'coverage':
'Mesoscale-1', 'title': 'ABI L1b Radiances', 'start_time': '2017-07-19 16:37:26.8',
'server_type': 'sdi', 'satellite_ID': 'G16', 'instrument': 'ABI', 'create_time': '2017-07-19
16:37:37.2', 'mode': '3', 'server_ip': IP_address_of_SDI_GRB_Appliance, 'band': 16,
'signal_type': 'grb', 'path':
'/complete/goes/grb/goes16/2017/2017_07_19_200/abi/L1b/RadM1/OR_ABI-L1b-RadM1-M3C16_G16_s2017
2001637268_e20172001637337_c20172001637372.nc', 'satellite_family': 'GOES', 'adde_dataset':
'GOES16/M1', 'message_type': 'band', 'end_time': '2017-07-19 16:37:33.7'}
('Using temporary directory: ', '$HOME/mcidas/data/short_IP_Address/16652')
Beginning IMGCOPY
('IMGCOPY ', 'GR/MS1B16 ABI/TEMP BAND=16 SIZE=SAME DAY= 2017-07-19 TIME= 16:37:26
OVERRIDE=NO')
```

```

{'status': 'end', 'satellite_location': 'GOES-Test', 'medium': 'adde', 'coverage':
'Mesoscale-2', 'title': 'ABI L1b Radiances', 'start_time': '2017-07-19 16:37:56.8',
'server_type': 'sdi', 'satellite_ID': 'G16', 'instrument': 'ABI', 'create_time': '2017-07-19
16:38:05.7', 'mode': '3', 'server_ip': IP_address_of_SDI_GRB_Appliance, 'band': 2,
'signal_type': 'grb', 'path':
'/complete/goes/grb/goes16/2017/2017_07_19_200/abi/L1b/RadM2/OR_ABI-L1b-RadM2-M3C02_G16_s2017
2001637568_e20172001638025_c20172001638057.nc', 'satellite_family': 'GOES', 'adde_dataset':
'GOES16/M2', 'message_type': 'band', 'end_time': '2017-07-19 16:38:02.5'}
('Using temporary directory: ', '$HOME/mcidas/data/short_IP_address/16888')
Beginning IMGCOPY
('IMGCOPY ', 'GR/MS2B2 ABI/TEMP BAND=2 SIZE=SAME DAY= 2017-07-19 TIME= 16:37:56
OVERRIDE=NO')

```

Due to the frequency of data, a temporary directory for each IMGCOPY is created. Within this directory, the files, **RESOLV.SRV**, **MCTABLE.TXT** and **AREA0001** are created. The Area file is moved and renamed to the directory above the temporary directory. Finally, the temporary directory is removed. The final name and location of the file will be similar to the example below (all one line).

```

$HOME/mcidas/data/{ip_address_of_wkstn}/G16-Mesoscale2-b04-2016233-070854.area

```

Appendix D - McIDAS ADDE Configuration

SDI GRB Appliances configured with the ADDE (rather than BASIC) option come with two files that define default group/descriptor values for ADDE dataset names. Sites can provide their own version of the files using the process at the end of this appendix. The two files are:

- **RESOLV.SRV**

This file is located in the `/opt/mcidas-adde-sdi/data` directory and is used by the appliance's McIDAS-X servers to locate data files based on a client ADDE data request.

- **adde_datasets.conf**

This file is located in the `/opt/sdi-event/sdi` directory and is used by the appliance's event process. The contents of a RabbitMQ event message contain the ADDE dataset group/descriptor information necessary for McIDAS-X client commands to make a data request.

The default values in the supplied version of the **RESOLV.SRV** file are listed below.

```
N1=GOES16,N2=FD,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/???
?/????_??_??_???/abi/L1b/RadF/OR_ABI-L1b-RadF-*.nc,C=All GOES-R Simulated Full Disk images,
N1=GOES16,N2=M1,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/???
?/????_??_??_???/abi/L1b/RadM1/OR_ABI-L1b-RadM1-*.nc,C=All GOES-R Simulated Meso Scale 1 images,
N1=GOES16,N2=M2,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/???
?/????_??_??_???/abi/L1b/RadM2/OR_ABI-L1b-RadM2-*.nc,C=All GOES-R Simulated Meso Scale 2 images,
N1=GOES16,N2=M,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/????
/????_??_??_???/abi/L1b/RadM?/OR_ABI-L1b-RadM*-*.nc,C=All GOES-R Simulated Meso Scale images,
N1=GOES16,N2=CONUS,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/
????/????_??_??_???/abi/L1b/RadC/OR_ABI-L1b-RadC-*.nc,C=All GOES-R Simulated CONUS images,
N1=EAST,N2=FD,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/????/
????_??_??_???/abi/L1b/RadF/OR_ABI-L1b-RadF-*.nc,C=GOES-16 Full Disk images,
N1=EAST,N2=M1,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/????/
????_??_??_???/abi/L1b/RadM1/OR_ABI-L1b-RadM1-*.nc,C=GOES-16 Meso Scale 1 images,
N1=EAST,N2=M2,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/????/
????_??_??_???/abi/L1b/RadM2/OR_ABI-L1b-RadM2-*.nc,C=GOES-16 Meso Scale 2 images,
N1=EAST,N2=M,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/????/?
???_??_??_???/abi/L1b/RadM?/OR_ABI-L1b-RadM*-*.nc,C=All GOES-16 Meso Scale images,
N1=EAST,N2=CONUS,TYPE=IMAGE,RT=N,K=ABIN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes16/??
??/????_??_??_???/abi/L1b/RadC/OR_ABI-L1b-RadC-*.nc,C=GOES-16 CONUS images,
N1=EAST,N2=GLM-FLASH,TYPE=POINT,RT=N,K=GLMN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes1
6/20??/????_??_??_???/glm/L2/LCFA/*.nc,Q=/opt/mcidas-adde-sdi/data/GLM_FLASH.cfg,C=GLM FLASH Data,
N1=EAST,N2=GLM-EVENT,TYPE=POINT,RT=N,K=GLMN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes1
6/20??/????_??_??_???/glm/L2/LCFA/*.nc,Q=/opt/mcidas-adde-sdi/data/GLM_EVENT.cfg,C=GLM EVENT Data,
N1=EAST,N2=GLM-GROUP,TYPE=POINT,RT=N,K=GLMN,R1=1,R2=999999,MASK=/data/sdidata/complete/goes/grb/goes1
6/20??/????_??_??_???/glm/L2/LCFA/*.nc,Q=/opt/mcidas-adde-sdi/data/GLM_GROUP.cfg,C=GLM GROUP Data,
```

The default values in the supplied version of the **adde_datasets.conf** file are listed below.

```
'Full Disk',EAST/FD
CONUS,EAST/CONUS
Mesoscale-1,EAST/M1
Mesoscale-2,EAST/M2
```

The [Upload Site-Specific ADDE Dataset Names](#) and [Revert to Default ADDE Dataset Names](#) sections below contain the instructions used to complete the procedures.

Upload Site-Specific ADDE Dataset Names:

The following items apply to sites wanting to change the contents of their **RESOLV.SRV** and **adde_datasets.conf** files from their default values.

- You should never edit the **RESOLV.SRV** and **adde_datasets.conf** files in their system-installed locations (**/opt/mcidas-adde-sdi/data** and **/opt/sdi-event/sdi**, respectively). You can, however, change their settings using the information in the following bullets.
- You can create **RESOLV.SRV** and **adde_datasets.conf** files on another workstation then upload them using *sdiwrite* permissions to the SDI's user configuration directories, **/config/mcidas/data** for **RESOLV.SRV**, and **/config/event** for **adde_datasets.conf**. The McIDAS servers will use the ones in the user configuration directories rather than the default files described in the first bullet.
- In the files you upload you can only change the group name, datasets, and file name patterns in **RESOLV.SRV**; do not change the data paths under **/data/sdidata/complete**. You must also update the **adde_datasets.conf** file to match the new datasets in order for RabbitMQ client requests to be successful.

Complete the procedure below to update the contents of the files.

1. Create your desired **RESOLV.SRV** and **adde_datasets.conf** files on a workstation other than the SDI GRB Appliance. The workstation you create them on must have the appropriate SSH keys.
2. Run the command below (all one line) to upload the new **RESOLV.SRV** file to the **/config/mcidas/data** directory on your appliance.

```
Type: sftp -o "IdentityFile=/path-to/sdiwrite.sshkey"
      sdiwrite@<appliance_IP>:/config/mcidas/data <<< ' put RESOLV.SRV '
```


3. Run the command below (all one line) to upload the new **adde_datasets.conf** file to the **/config/event** directory on your appliance.

```
Type: sftp -o "IdentityFile=/path-to/sdiwrite.sshkey"  
sdiwrite@<appliance_IP>:/config/event <<< ' put adde_datasets.conf '
```

Revert to Default ADDE Dataset Names:

To revert to using the default ADDE dataset names, remove the **RESOLV.SRV** file from the **/config/mcidas/data** directory, and remove the **adde_datasets.conf** file from the **/config/event** directory.

Run the command below (all one line) to remove the **RESOLV.SRV** file via SFTP.

```
Type: sftp -o "IdentityFile=/path-to/sdiwrite.sshkey"  
sdiwrite@<appliance_IP>:/config/mcidas/data <<< ' rm RESOLV.SRV '
```

Run the command below (all one line) to remove the **adde_datasets.conf** file via SFTP.

```
Type: sftp -o "IdentityFile=/path-to/sdiwrite.sshkey"  
sdiwrite@<appliance_IP>:/config/event <<< ' rm adde_datasets.conf '
```