GE VERNOVA

Learning & Development
Learning Module

G500/G100 ARRM

Learning Module Objective

At the completion of this module you will be able to identify and recite all concepts presented.

If you are viewing this as part of a structured training program *PLEASE* complete the associated assessment test. You are required to score above 80%.

Here’s What is Covered in this Module

1. ARRM Overview
2. File Retrieval Trigger
3. Configure Applications – Company and Station
4. Configure Applications – Device and File Server (1)
5. Configure Applications – Device and File Server (2)
6. Configure Applications – File Set
7. Configure Applications – Duplicate Selected Configuration
8. Configure File Set Template – Standard
9. Configure File Set Template – Sel ASCII
10. Configure File Set Template – Pre-defined File Set Templates
11. Oscillography Files and IEEE File
12. ARRM Viewer
13. ARRM Application Pseudo Points
14. ARRM Connection Status File
15. ARRM Storage and Records Deletion

ARRM Overview

The Automated Record Retrieval Manager (ARRM) retrieves and stores record files from connected devices to your MCP (G500/G100) using **FTP/SFTP/TFTP/ IEC61850 MMS or SEL Binary/Generic ASCII** to transmit the files over a LAN or serial connection. You can then retrieve downloaded records from the MCP using any **FTP/SCP/SFTP** client as needed or on a scheduled basis. You can also configure the MCP to automatically push the files to a remote location using the **Sync Manager** utility.

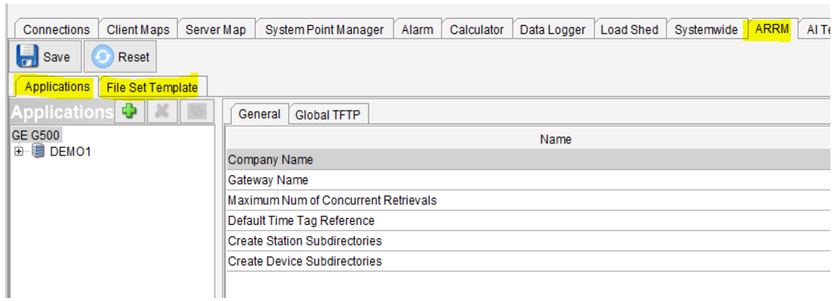
The ARRM has the following primary features and functions:

- Automatic, manual, or connection poll-based retrieval of records from devices
- File naming based on configurable parameters or the IEEE C37.232-2007 File Naming Convention for Time Sequence Data
- File storage organized by device and/or station
- Clearing the file available status on the GE D25 IED
- Easy to use interface accessible through the Online HMI
- Visual indication of device online/offline status
- A simple configuration interface
- Pseudo points to trigger file retrievals and to view application status
- Support for MCP system redundancy

To Configure:

The **ARRM** tab on the DSAS Editor's Configuration allows you to configure the ARRM application. The page is split into two sub-tabs:

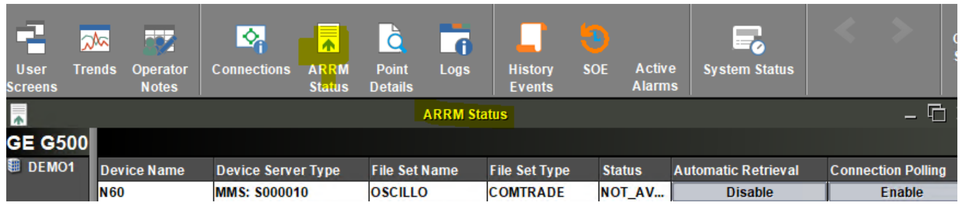
- Applications (stations, devices, and file sets)
- File Set Template (parameters for retrieving files from different types of devices)



To View:

During runtime, **ARRM Viewer (Status)** on the Power Bar of the Runtime HMI can be used to view the status of the application and to initiate manual retrieval

ARRM pseudo points are presented to the operator under "Atmtd Rcrd Rtrvl Mngr" application name on the **Application** tab on **Point Details** page



ARRM application requires additional license.

Examples of files are: Oscillography COMTRADE, SOE logs, Events, Generic data, Information about the IED, IEC 61850 SCL files (IID)

In a redundant system setup, the active unit is responsible for retrieving records from devices. Redundancy is supported by mirroring retrieved files on both the active and standby units. The MCP redundancy manager is notified of file or directory changes by the active unit and automatically synchronizes them on the standby unit. This is done as soon as possible but notifications are not made more than every 10 seconds to reduce network traffic.

File Retrieval Trigger

Depending on the IED types and schema used, ARRM file retrievals are triggered by:

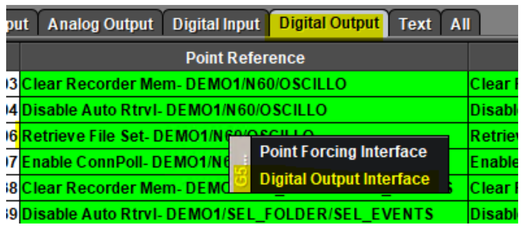
Automatic

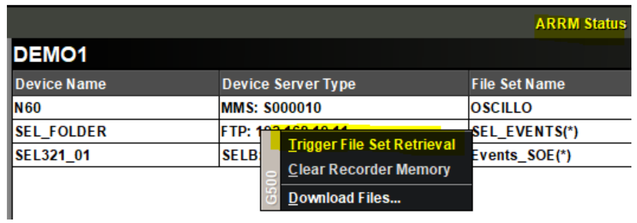
- The transition of the *RcdMade* digital input point from 0 to 1, or
- A change in the *FaultNumber* analog input or accumulator point

Recording Made (RcdMade) Enable	false
RcdMade Mapped DI Point	
Fault Number Point Enable	true
Fault Number Point	N60_141Gen/OscRDRE1.FltNum.stVal[ST]
Reset Recorder Memory (MemRs) Enable	false

Manual

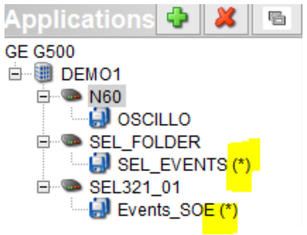
- Operation of the file retrieval pseudo point, or
- Manual activation through the ARRM application

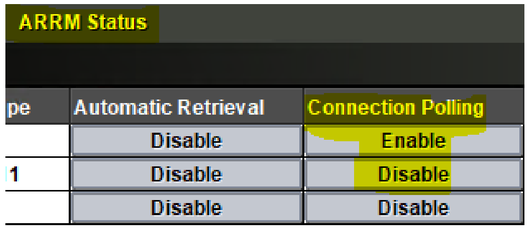




Periodic Connection Polling

- Configure either Global or Device Connection Polling Interval in addition to their configured event trigger
- No restriction on files to be included – none, one, more or all
- An asterisk (*) is appended to each file set that is supported by periodic polling once configured
- Can be activated or deactivated through the runtime HMI - ARRM viewer.



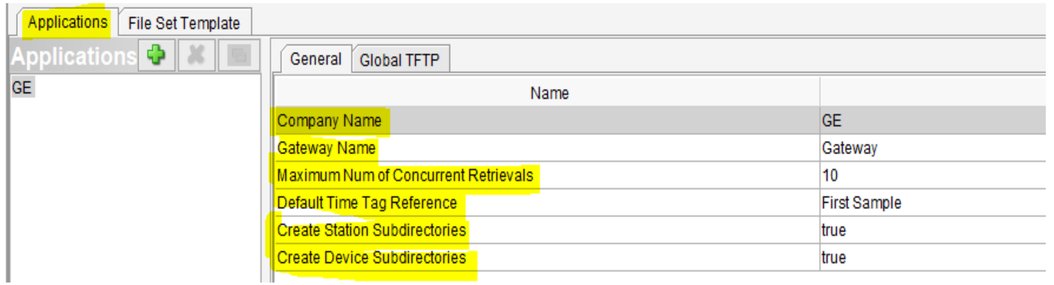


In the case of fault number-based file sets which are included in connection polling, ARRM always retrieve files with the last fault number value. Consideration must be given to the files included in connection polling so redundant files are not created unnecessarily

Configure Applications – Company and Station

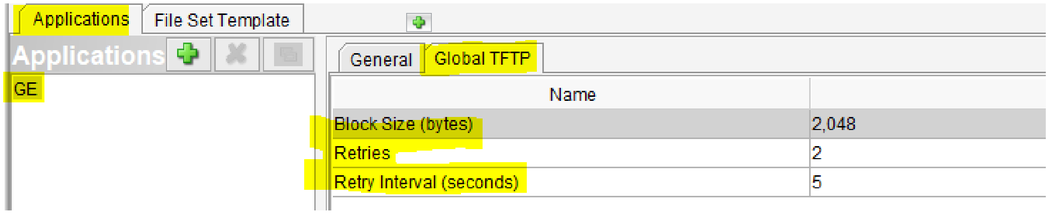
The **Applications** tab of the **ARRM** configuration window allows you to configure company, stations, devices, and file sets. A company named "GE" is created by default. In **Company -> General** subtab, you can configure:

- Company Name (Default: GE)
- MCP Gateway Name (Default: Gateway)
- Maximum Num of Concurrent Retrievals (Default: 10)
- Default Time Tag Reference (Default: First Sample)
- Create Station Subdirectories (Default: True)
- Create Device Subdirectories (Default: True)



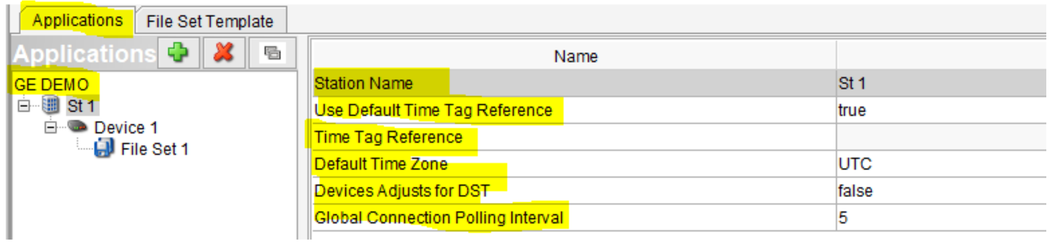
In **Company -> Global TFTP** subtab, you can configure:

- Block Size (Default: 2048 bytes)
- Retries (Default: 2 times)
- Retry Interval (Default: 5 seconds)



Click the  button to create a new **Station** when the **Company** is selected. A default device with a default File Set is also created automatically.

- Station Name (Default: St x)
- Use Default Time Tag Reference (Default: True)
- Time Tag Reference (Default: Disabled)
- Default Time Zone (Default: UTC)
- Devices Adjust for DST (Default: False)
- Global Connection Polling Interval (Default: 5 minutes)

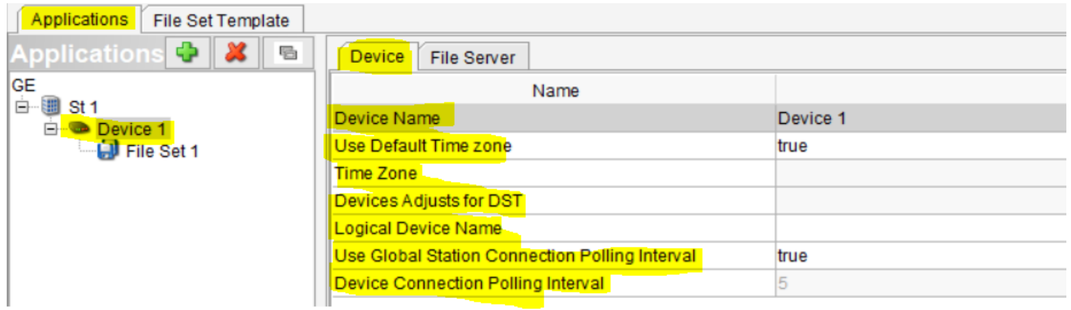


It is recommended that the creation of Station and Device Subdirectories be enabled when using non-IEEE file naming, to prevent mixing different Substations and IEDs files in the same folder. This is also required for correct file structuring when pushing the files to Enterprise systems.

Configure Applications – Device and File Server (1)

Click the button to create a new **Device** when the **Station** is selected:

- Device Name (Default: Device x)
- Use Default Time Zone (Default: True)
- Time Zone (Default: Disabled)
- Devices Adjust for DST (Default: Disabled)
- Logical Device Name (Default: Empty)
- Use Global Connection Polling Interval (Default: True)
- Device Connection Polling Interval (Default: 5 minutes)

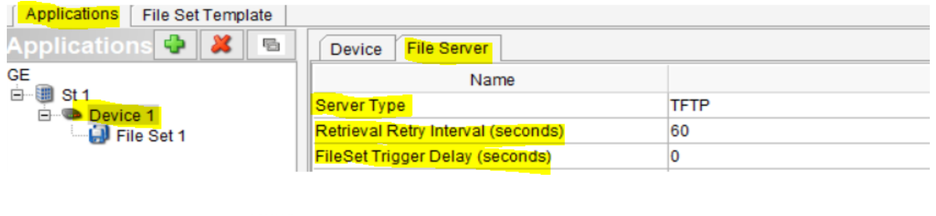


In **Device -> File Server** subtab, you can configure:

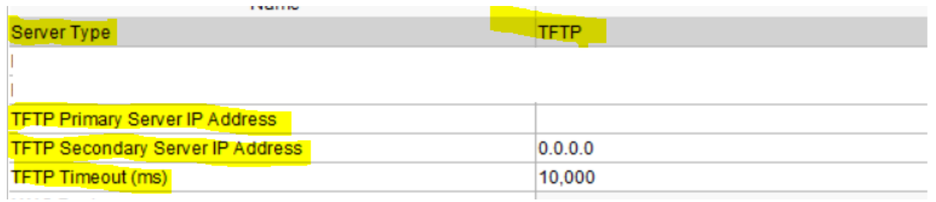
- Server Type (Default: TFTP)
- Retrieval Retry Interval (Default: 60 seconds)
- FileSet Trigger Delay (Default: 0 second)

Only one **Server Type** can be configured for a device. **Hint:** If an IED requires more than one protocol for different file types – create alias Devices

Depending on the **Server Type**, these parameters are enabled:

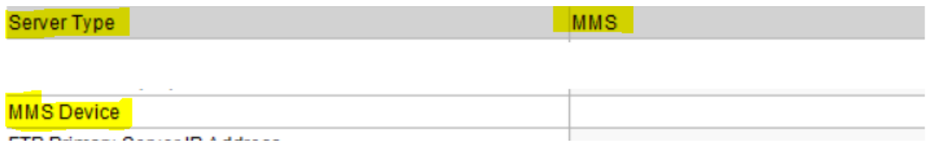


When server type is **TFTP,**



- TFTP Primary Server IP Address (Default: Empty)
- TFTP Secondary Server IP Address (Default: 0.0.0.0)
- TFTP Timeout (Default: 10,000 ms)

When server type is **MMS,**



- MMS Device (Default: Empty, select already configured device in Connections)

When server type is **SELB (SEL Binary),**

- SelBin Device (Default: Empty, select already configured device in Connections)

Device Name: ARRM supports Directory Delta for different FTP ls formats. You must provide the suffix for each format in the device name configuration.

Server Type: MMS is only available if an IEC 61850 configuration is loaded on the MCP.

UR/SFTP is only available if Modbus TCP IED is configured with protocol TCP/SSH.

SELB is only available if an SEL Binary IED is configured, and

GENA is only available if a Generic ASCII IED is configured.

File Set Templates with File retrieval mode as Directory Delta cannot work when server is configured as TFTP.

Configure Applications – Device and File Server (2)

When server type is **GENA (Generic ASCII),**

- GenericASCII Device (Default: Empty, select already configured device in Connections)

When server type is **UR/SFTP,**

- UR/SFTP Device (Default: Empty, select already configured device in Connections)
- UR/SFTP Timeout (Default: 30,000 ms)

When server type is **FTP,**

- FTP Primary Server IP Address (Default: Empty)
- FTP Secondary Server IP Address (Default: 0.0.0.0)
- FTP Server TCP Port (Default: 21)
- FTP Timeout (Default: 10,000 ms)
- FTP Allow Anonymous Login (Default: False)
- FTP Anonymous Login Password (Default: Disabled)
- FTP Login Name (Default: Empty)
- FTP Password (Default: Empty)
- FTP Connection Mode (Default: Active)
- FTP Data Representation Mode (Default: Binary)

When server type is **SFTP,**

- SFTP Primary Server IP Address (Default: Empty)
- SFTP Secondary Server IP Address (Default: 0.0.0.0)
- SFTP Server TCP Port (Default: 22)
- SFTP Timeout (Default: 10,000 ms)
- SFTP Authentication Mode (Default: Public Key)
- SFTP Login Name (Default: Disabled)
- SFTP Password (Default: Disabled)

Server Type	GENA
GenericASCII Device	

Server Type	UR/SFTP
UR/SFTP Device	
UR/SFTP Timeout (ms)	30,000

Server Type	FTP
FTP Primary Server IP Address	
FTP Secondary Server IP Address	0.0.0.0
FTP Server TCP Port	21
FTP Timeout (ms)	10,000
FTP Allow Anonymous Login	false
FTP Anonymous Login Password	
FTP Login Name	
FTP Password	
FTP Connection Mode	Active
FTP Data Representation Mode	Binary

Server Type	SFTP
SFTP Primary Server IP Address	
SFTP Secondary Server IP Address	0.0.0.0
SFTP Server TCP Port	22
SFTP Timeout (ms)	10,000
SFTP Authentication Mode	Public Key
SFTP Login Name	
SFTP Password	

For SFTP Authentication Mode, the user needs to configure SFTP Login name and Password if Password mode is selected.

For Public Key Authentication mode, you need to generate and copy the SSH public key to the location in IED specified by the vendor (click the **Utilities** power bar button in the MCP HMI to **Generate Gateway Key Pair**).

Configure Applications – File Set

Click the  button to create a new **File Set** when the **Device** is selected. Each **File Set** defines the file set template to be used, the file retrieval trigger and pseudo points' references and descriptions.

- File Set Name (Default: File Set x)
- File Set Template (Default: Empty)
- Include in Connection Polling (Default: False)
- Use File Trigger Event Timestamp (Default: False)
- Recording Made (RcdMade) Enable(Default: Disabled)
- RcdMade Mapped DI Point (Default: Disabled)
- Fault Number Point Enable (Default: Disabled)
- Fault Number Point (Default: Disabled)
- Reset Recorder Memory (MemRs) Enable (Default: False)
- DO MemRs Point (Default: Empty)

A list of pseudo points are created for each File Set by ARRM application. Each pseudo point has a reference and a user-definable description. These pseudo points are:

- DI point: Automatic Retrieval Disabled
- DO point: Clear Recorder Memory
- DO point: Disable Automatic Retrieval
- AI point: Retrieval State
- DO point: Retrieve File Set
- DO point: Enable Connection Polling
- DI point: Connection Polling Enabled

Name	
File Set Name	File Set 1
File Set Template Name	
Include In Connection Polling	false
Use File Trigger Event Timestamp	false
Recording Made (RcdMade) Enable	false
RcdMade Mapped DI Point	
Fault Number Point Enable	false
Fault Number Point	
Reset Recorder Memory (MemRs) Enable	false
DO MemRs Point	
Automatic Retrieval Disabled Reference	Auto Rtrvl Disabled- St 1/Device 1/File Set 1
Automatic Retrieval Disabled Description	Automatic Retrieval Disabled for File Set- St 1/Device 1/File Set 1
Clear Recorder Memory Reference	Clear Recorder Mem- St 1/Device 1/File Set 1
Clear Recorder Memory Description	Clear Recorder Memory for File Set- St 1/Device 1/File Set 1
Disable Automatic Retrieval Reference	Disable Auto Rtrvl- St 1/Device 1/File Set 1
Disable Automatic Retrieval Description	Disable Automatic Retrieval for File Set- St 1/Device 1/File Set 1
Retrieval State Reference	Retrieval State- St 1/Device 1/File Set 1
Retrieval State Description	Retrieval State for File Set- St 1/Device 1/File Set 1
Retrieve File Set Reference	Retrieve File Set- St 1/Device 1/File Set 1
Retrieve File Set Description	Retrieve File Set- St 1/Device 1/File Set 1
Enable Connection Polling Reference	Enable ConnPoll- St 1/Device 1/File Set 1
Enable Connection Polling Description	Enable Connection Polling for File Set- St 1/Device 1/File Set 1
Connection Polling Enabled Reference	ConnPoll Enabled- St 1/Device 1/File Set 1
Connection Polling Enabled Description	Connection Polling Enabled for File Set- St 1/Device 1/File Set 1

Pseudo Point Reference:

- A name that can be used for quick indexing and filtering.

Pseudo Point Description:

- A user-defined block of text that provides a detailed and localized description of the group. Maximum 128 characters

Include in Connection Poling:

If this parameter is true, it is recommended to use the Overwrite option in the File Set Template to avoid High Disk Usage. In the case of COMTRADE files, use the "New file with IEEE naming" option.

Users should include "for connection polling only" files which are always available in the end device, otherwise the connection poll may result in a failed file transfer, due to the file(s) no longer being available in the end device.

User shall not be able to configure file sets that have no means to be retrieved i.e. at least one retrieval trigger (RcdMade Mapped DI Point) or Connection Polling must be "True".

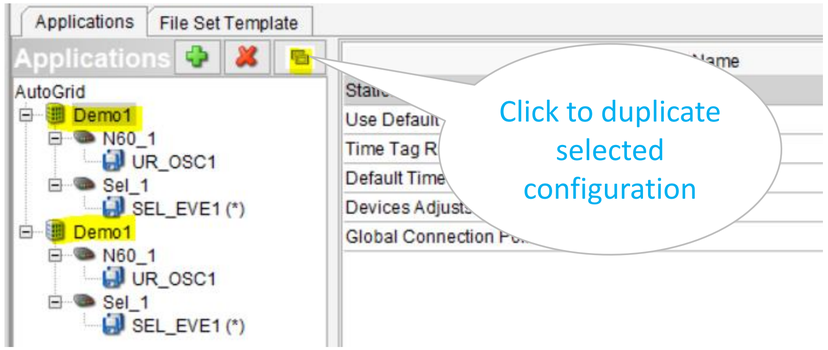
File Retrieval using Static Name in the File Set Template requires either "Include in Connection Polling" or a mapped "RcdMade Mapped DI Point" configured.

Configure Applications – Duplicate Selected Configuration

The "**Duplicate**" button on the **Applications** tab of the **ARRM** configuration window allows to quickly replicate (clone) entire levels when many parameters are the same and only addresses and IDs differ. You can then rename the ID and modify the needed parameters based on that. Click  to duplicate the selected configuration.

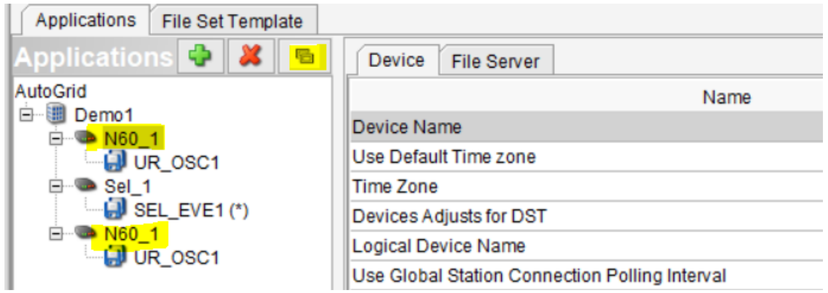
When a **Station** is selected,

- The whole **Station** with all associated **Devices** will be duplicated.
- Action required at least to rename the **Station Name** (ID).



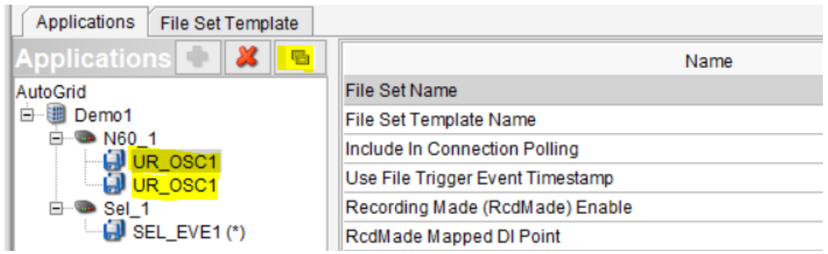
When a **Device** is selected,

- The **Device** with all associated **File Sets** will be duplicated.
- The duplicated **Device** will be placed under the same **Station**.
- Action required at least to rename the **Device Name** (ID).



When a **File Set** is selected,

- The **File Set** will be duplicated.
- The duplicated **File Set** will be placed under the same **Device.**
- Action required at least to rename the **File Set Name** (ID).



Station Name must be unique across the Company.

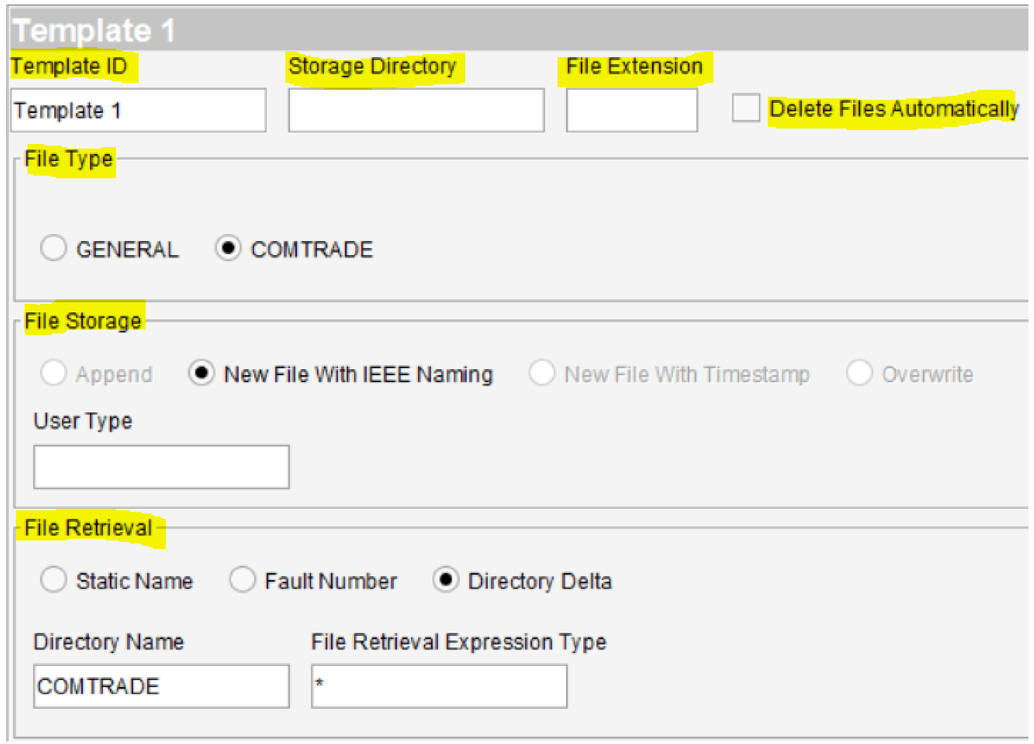
Device Name must be unique across the same Station.

File Set Name must be unique across the same Device.

Configure File Set Template – Standard

The **File Set Template** sub-tab of the ARRM configuration window allows you to configure file set templates to be used by ARRM when retrieving records. Click  and choose **Standard** option to create a new standard template to support for File Retrieval using **TFTP, MMS, FTP or SFTP** protocol.

- Template ID:
- Storage Directory
- File Extension
- Delete Files Automatically



File Type:

- GENERAL
- COMTRADE

File Storage:

- Append
  - ❑ Max File Size (Default: 65535)
- New File with IEEE Naming
  - ❑ User Type
- New File With Timestamp
- Overwrite

File Retrieval:

- Static Name
  - ❑ Retrieved File Absolute Path Name
  - ❑ Enable Record Number
  - ❑ Enable File Name to Save
- Fault Number
  - ❑ Retrieved File Absolute Path Name
  - ❑ Max Number of Files (Default: 64)
  - ❑ Fault Number Rollover (2^n-1) (Default: 16)
- Directory Delta
  - ❑ Directory Name (Default: COMTRADE)
  - ❑ File Retrieval Expression Type (Default: *)

Place holder in Storage Directory:

The “&” character is used as a placeholder in the Storage Directory to specify a Local File Extension for retrieved files. This is applicable to files other than the COMTRADE file type.

For example, if you want to save retrieved files with extension “abc” then the Storage Directory is to be configured as “xyz&abc”, where “xyz” represents Storage Directory and “abc” represents the local extension.

Place holders in File Retrieval:

The logical device placeholder "%s" is replaced with the Logical Device Name from the Device that is using this template. For example, /SOE/event%s.

The fault number placeholder "%[fw]u" is replaced with the fault number currently being retrieved. In place of [fw], specify either no number or a number between 1 and 20 to give the field width. For example, %3u is replaced with 003 if the retrieved fault number is 3.

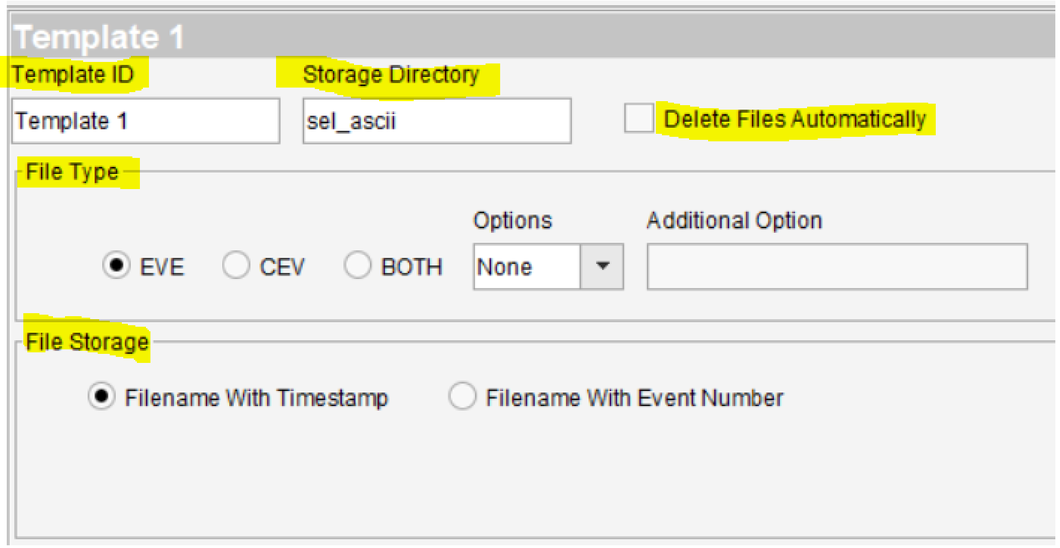
Configure File Set Template – Sel ASCII

ARRM provides an interface to the Sel Binary DCA and the GenASCII DCA applications to retrieve and archive the Event Log files from the SEL IEDs/numerical relays using automated ASCII commands. Two types of fault/event log files can be retrieved and archived: **EVE** (Event Report Files) and **CEV** (Compressed Event Report Files).

Click  under **File Set Template** sub-tab and choose **SelASCII** option to create a new Sel ASCII File Set template to support for File Retrieval using **Sel Binary or Generic ASCII** protocol.

The ARRM application automatically tabulates the number of files present in the SEL IEDs and periodically directs the DCA applications connected to the SEL IEDs to retrieve the event files one after another, sequentially.

- Template ID:
- Storage Directory
- Delete Files Automatically



File Type:

- EVE with Options
- CEV with Options
- BOTH with Options

File Storage:

- Filename With Timestamp (format: *EVE_YYMMDDHHMMSS_Msec.EVE* or *CEV_YYMMDDHHMMSS_Msec.CEV*.)
- Filename With Event Number (format: *EVE_EventNumber.EVE* or *CEV_EventNumber.CEV*)

Refer to the Instruction Manual of SEL Devices to determine which file type(s) is available.

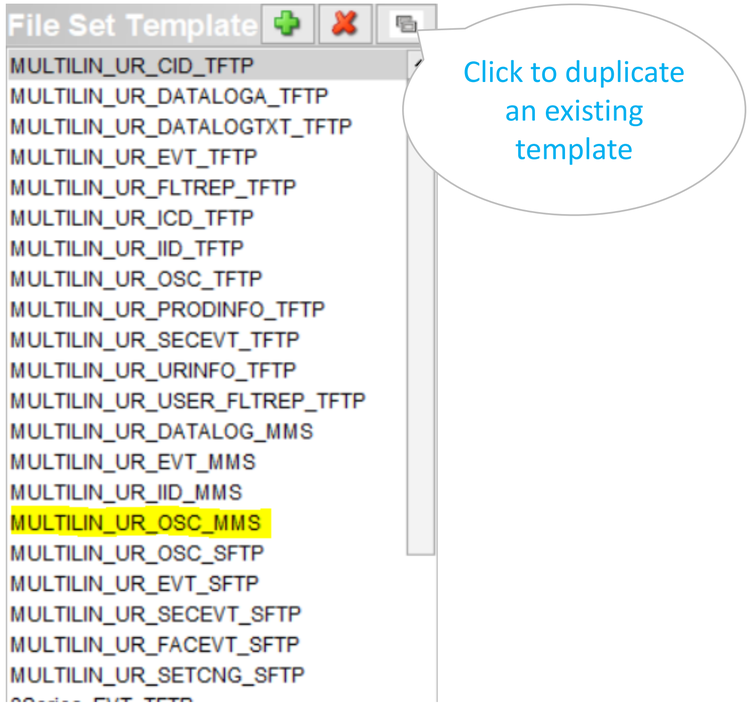
Ensure that the options configured in the File Type setting are supported by the SEL relay before configuring the Template. If a configured option is not supported, this is indicated by the Transaction Failure flags on the ARRM viewer.

Configure File Set Template – Pre-Defined File Set Templates

Several pre-defined templates are provided for some popular IED models that include Multilin UR, 8 Series, F650, UR Plus, D25, D2X, MICOM, ABB, SEL and Siemens 7SJ**.**

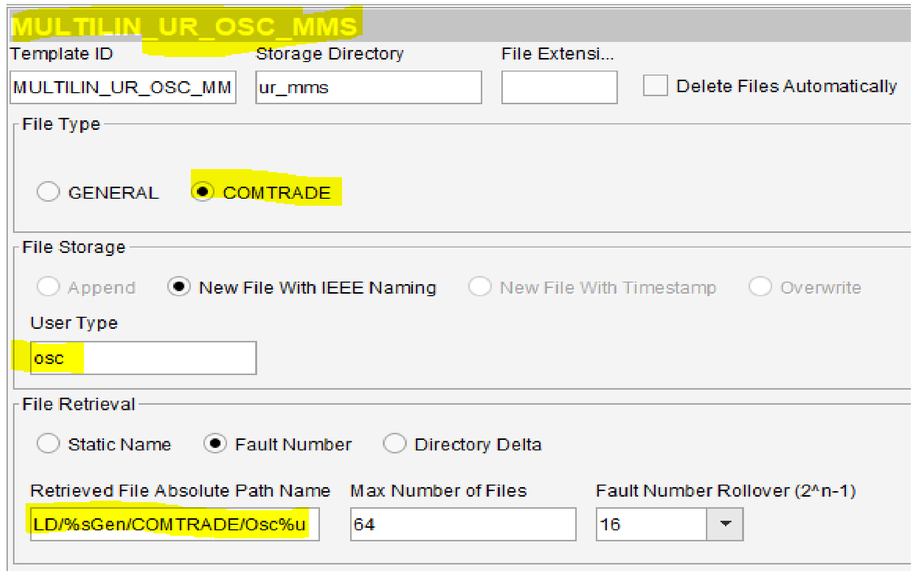
For example, pre-defined File Set Templates for **Multilin UR** device are listed below. They can be used to retrieve Oscillography Files, Event Files, Security Event Files, Datalog Files, COMTRADE Datalogger Files, Production Information Files, Fault Report Files, User Fault Report Files, and ICD/CID/IID Files from UR device using TFTP/MMS/SFTP protocol.

A good practice to create a new template is to duplicate an existing pre-defined template and then rename the Template ID and modify the needed parameters based on that. Click  to duplicate an existing template.



Example: **MULTILIN_UR_OSC_MMS**

- To retrieve Oscillography files using MMS (IEC61850) from GE Multilin UR device



Normally, pre-defined File Set Templates are named in the convention of [Device]_[File Type]_[Protocol]

Oscillography Files and IEEE File

Oscillography files are saved in **COMTRADE** format. The COMTRADE standard defines a file format that contains transient waveform and event data collected from power systems. Each oscillography record consists of a file set. The files have the same file name but different extensions: .hdr, .cfg, and .dat for header (optional), configuration, and data files respectively. ARRM downloads oscillography files directly from IEDs and automatically generates a new file name for each COMTRADE file set based on the IEEE File Naming Convention for Time Sequence Data.

IEEE File Naming Convention for Time Sequence Data

<Start Date>, <Start Time>, <Time Code>, <Station>, <Device>, <Company>, <Type>. <Extension>

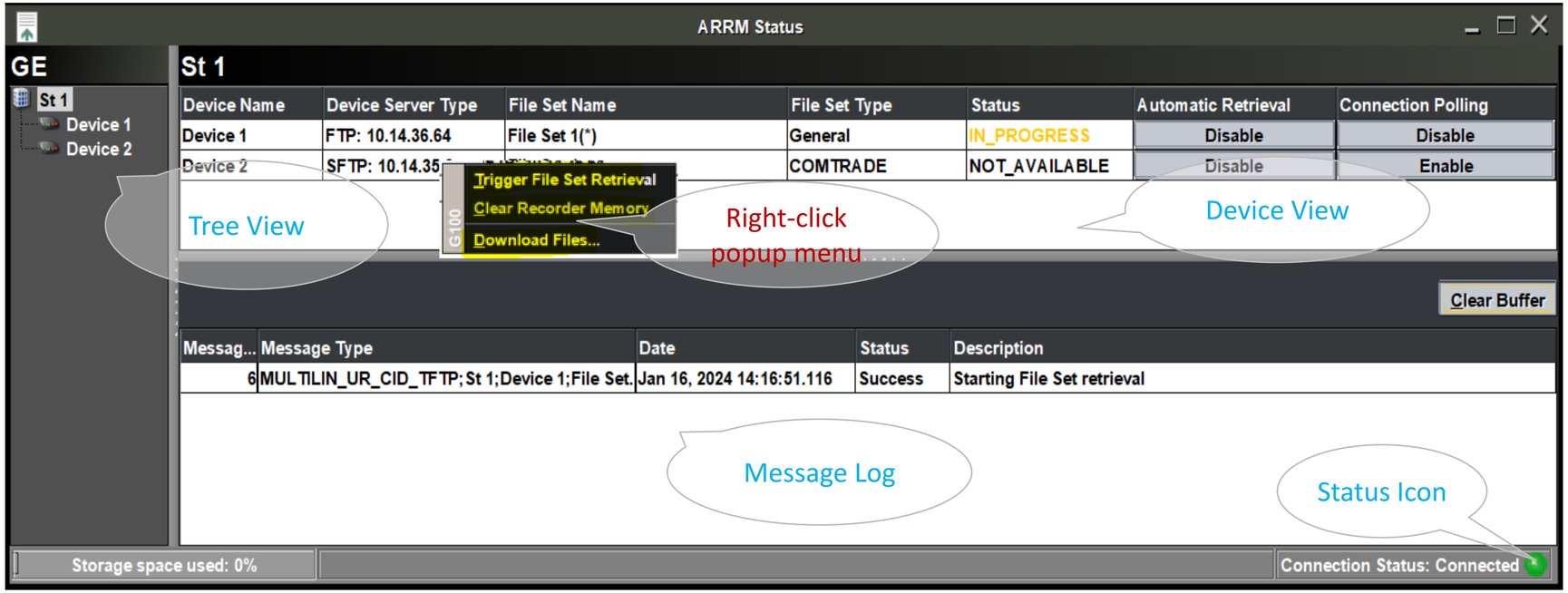
Where:

- **<Start Date> :** The date when the file was updated. Format: YYMMDD (6 characters) where YY = Year, MM = Month, DD = Day.
- **<Start Time> :** The time when the file was updated. Format: HHMMSSMMMMMM (12 characters) where HH is hours, MM is minutes, SS is seconds, MMM is milliseconds, and MMM is microseconds.
- **<Time Code> :** The time zone offset for the start date and time field.
- **<Station> :** The configured station name.
- **<Device> :** The configured device name.
- **<Company> :** The configured company name.
- **<Type> :** DFR, PQ, or ADCP
- **<Extension> :** DAT, CFG, or HDR

The time code ends with an "s" if the device always reports standard time, or an "a" if the device adjusts for daylight savings time. If the device is using Universal Time, neither character is appended.

ARRM Viewer

During runtime, **ARRM Viewer (Status)** on the Power Bar of the Runtime HMI can be used to view the status of the application and to initiate manual retrieval. The **ARRM Viewer** window is comprised of several areas:



To perform actions on devices:

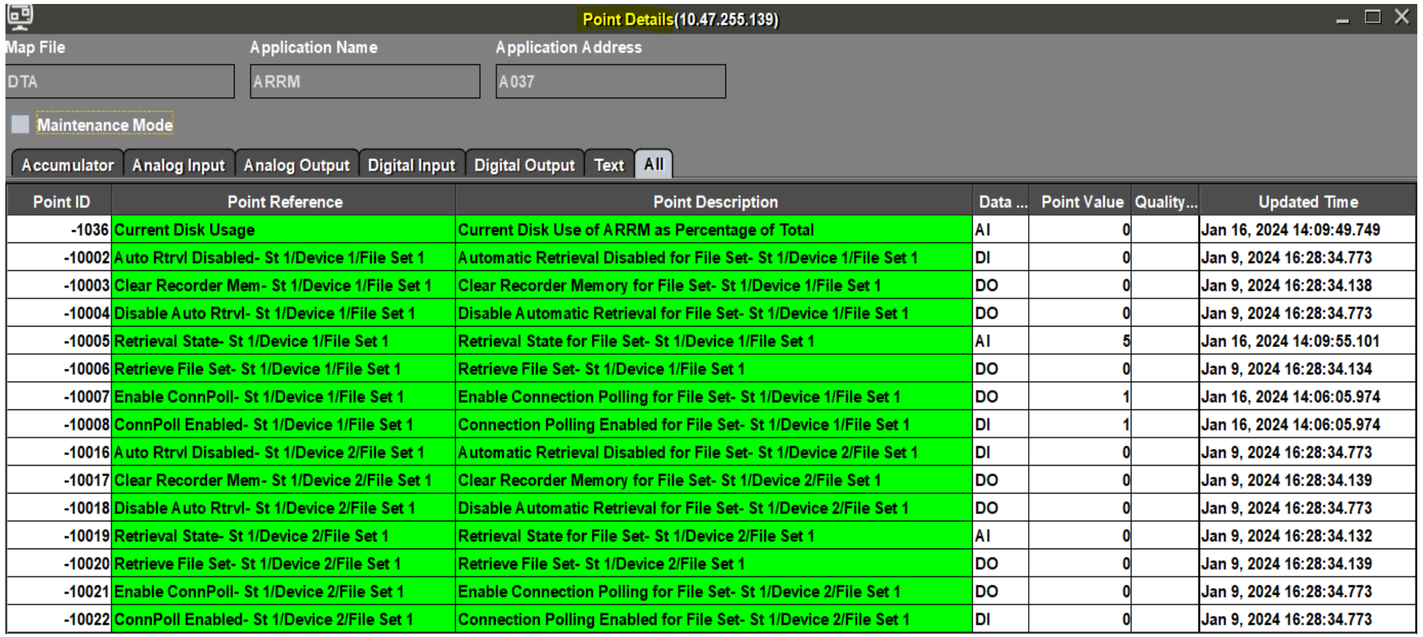
1. Select the station containing the desired device. A listing of devices and file sets within the station is shown.
2. Right-click the row containing the desired file set.
3. On the popup menu, select:
   - **Triger File Set Retrieval**
   - **Clear Recorder Memory**
   - **Download Files**

ARRM Viewer is **NOT** for viewing files content but for viewing the status of the application.

Entries in Message log area are ordered as they are received, and not necessarily chronologically by their timestamp.

ARRM Application Pseudo Points

The **ARRM** application makes a list of pseudo points available which are presented to the operator on the **Application** tab on **Point Details** page. The point description for each Per-File Set pseudo point can be defined when you configure ARRM **Device -> File Set**.



Point ID	Point Reference	Point Description	Data ...	Point Value	Quality...	Updated Time
-1036	Current Disk Usage	Current Disk Use of ARRM as Percentage of Total	AI	0		Jan 16, 2024 14:09:49.749
-10002	Auto Rtrvl Disabled- St 1/Device 1/File Set 1	Automatic Retrieval Disabled for File Set- St 1/Device 1/File Set 1	DI	0		Jan 9, 2024 16:28:34.773
-10003	Clear Recorder Mem- St 1/Device 1/File Set 1	Clear Recorder Memory for File Set- St 1/Device 1/File Set 1	DO	0		Jan 9, 2024 16:28:34.138
-10004	Disable Auto Rtrvl- St 1/Device 1/File Set 1	Disable Automatic Retrieval for File Set- St 1/Device 1/File Set 1	DO	0		Jan 9, 2024 16:28:34.773
-10005	Retrieval State- St 1/Device 1/File Set 1	Retrieval State for File Set- St 1/Device 1/File Set 1	AI	5		Jan 16, 2024 14:09:55.101
-10006	Retrieve File Set- St 1/Device 1/File Set 1	Retrieve File Set- St 1/Device 1/File Set 1	DO	0		Jan 9, 2024 16:28:34.134
-10007	Enable ConnPoll- St 1/Device 1/File Set 1	Enable Connection Polling for File Set- St 1/Device 1/File Set 1	DO	1		Jan 16, 2024 14:06:05.974
-10008	ConnPoll Enabled- St 1/Device 1/File Set 1	Connection Polling Enabled for File Set- St 1/Device 1/File Set 1	DI	1		Jan 16, 2024 14:06:05.974
-10016	Auto Rtrvl Disabled- St 1/Device 2/File Set 1	Automatic Retrieval Disabled for File Set- St 1/Device 2/File Set 1	DI	0		Jan 9, 2024 16:28:34.773
-10017	Clear Recorder Mem- St 1/Device 2/File Set 1	Clear Recorder Memory for File Set- St 1/Device 2/File Set 1	DO	0		Jan 9, 2024 16:28:34.139
-10018	Disable Auto Rtrvl- St 1/Device 2/File Set 1	Disable Automatic Retrieval for File Set- St 1/Device 2/File Set 1	DO	0		Jan 9, 2024 16:28:34.773
-10019	Retrieval State- St 1/Device 2/File Set 1	Retrieval State for File Set- St 1/Device 2/File Set 1	AI	0		Jan 9, 2024 16:28:34.132
-10020	Retrieve File Set- St 1/Device 2/File Set 1	Retrieve File Set- St 1/Device 2/File Set 1	DO	0		Jan 9, 2024 16:28:34.139
-10021	Enable ConnPoll- St 1/Device 2/File Set 1	Enable Connection Polling for File Set- St 1/Device 2/File Set 1	DO	0		Jan 9, 2024 16:28:34.773
-10022	ConnPoll Enabled- St 1/Device 2/File Set 1	Connection Polling Enabled for File Set- St 1/Device 2/File Set 1	DI	0		Jan 9, 2024 16:28:34.773

Per-Application Pseudo Points

- Current Disk Usage (as a percentage of Total)

Per-File Set Pseudo Points

- DI point: Automatic Retrieval Disabled
- DO point: Clear Recorder Memory
- DO point: Disable Automatic Retrieval
- AI point: Retrieval State
- DO point: Retrieve File Set
- DO point: Enable Connection Polling
- DI point: Connection Polling Enabled

Retrieval State reports the status of the associated file set with the following status numbers:

0 - Not Available. This is the initial state of a file set after creation.

1 - Available. This is the state reported when ARRM detects the file set is available for retrieval, but automated file set retrieval is disabled.

2 - Queued. File retrieval has been postponed. This may occur if ARRM is at the maximum number of configured retrievals.

3 - In Progress. ARRM is in the process of retrieving the associated file set.

4 - Complete. The last file transfer has been completed successfully.

5 - Failed. The last file retrieval operation has failed and a retry attempt has been scheduled.

ARRM Connection Status File

The ARRM Connection Status file contains connection status lines for each File-Set and is constantly updated whenever ARRM performed and finalized an action on a file, either because of a trigger or by periodic polls. This file can be used by enterprise system to monitor the connection status per-File Set.

The name of the ARRM Connection Status file is *ARRM_Conn_Status.txt* and is stored in the */mnt/datalog/Logs* folder in the MCP.

The status line format is based on IEEE C37.232 with additional data fields as required for this functionality (i.e., Delimiters, Storage Directory, File Set Name, and File Transfer Result) as followed:

<Start Date>, <Start Time>, <Time Code>, <Station>, <Device>, <Company>, <Type>, <Storage Directory> | <File Set Name> : <File Transfer Result>

ARRM Connection Status File Example:

ARRM_Conn_Status.txt

```
1  240117,001615128282,0ht,ARRM,Gateway,GE,stat|Application:1
2  240117,001615128282,0ht,St 1,Device 1,GE,genr,ur_tftp|File Set 1:0
3  240109,212834772077,0ht,St 1,Device 2,GE,dlog,ur_tftp|File Set 1:0
```

Where:

- **<Start Date> :** The date when the row was updated. Format: YYMMDD (6 characters) where YY = Year, MM = Month, DD = Day.
- **<Start Time> :** The time when the row was updated. Format: HHMMSSMMMMMM (12 characters) where HH is hours, MM is minutes, SS is seconds, MMM is milliseconds, and MMM is microseconds.
- **<Time Code> :** The time zone offset for the start date and time field.
- **<Station> :** The configured station name.
- **<Device> :** The configured device name.
- **<Company> :** The configured company name.
- **<Type> :** The retrieved file type as per the File Set.
- **<Storage Directory> :** The local “Storage Directory” configured in the File Set Template.
- **<File Set Name> :** The “File Set Name” configured in ARRM.
- **<File Transfer Result> :** The last known transfer state of this specific File Set.

For **the first row** of ARRM Connection Status File:

The Start Date and Start Time always show the value when this file was last updated, for whatever reason.

Station is always set to “ARRM” to reflect a generic / virtual “station name” associated with the MCP Gateway

Device is the name of the MCP Gateway name configured in Company -> General tab.

Type is always “stat” (status) in the first row.

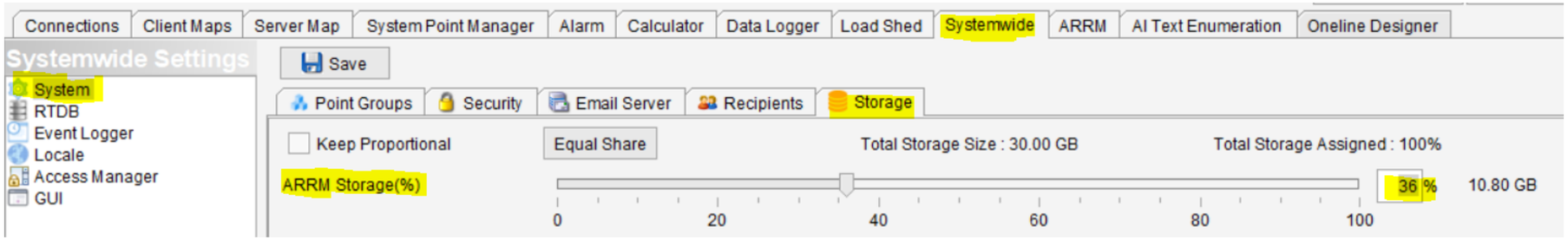
Storage Directory is not applicable to the first row.

File Set Name is always “Application” in the first row.

File Transfer Result is always 1 (SUCESSFUL) in the first row even if all IEDs have their file transfers disabled or offline.

ARRM Storage and Records Deletion

The **System -> Storage** under **Systemwide** tab on the DSAS Editor's Configuration allows you to allocate storage size for various subsystem including ARRM. You can change the storage settings, if desired and **Save** and **Commit Changes** to apply the changes to the MCP.

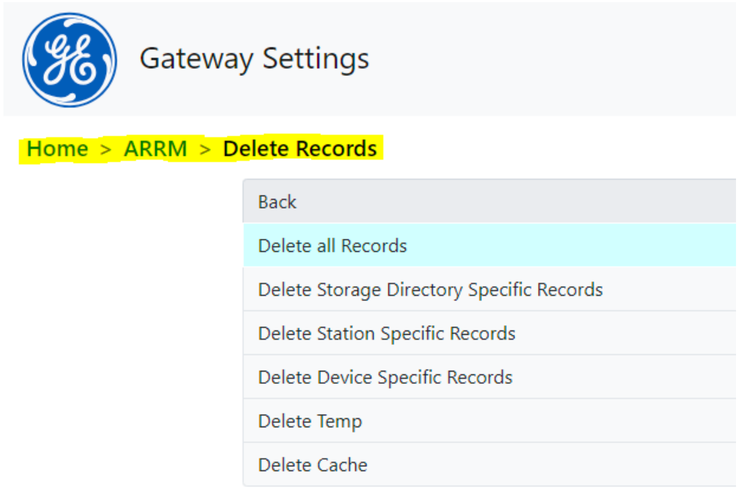


Delete ARRM Records

The retrieved files are stored on the MCP file system in the folder */mnt/datalog/arrm/* with the stored path based on Storage Directory on the File Set template. You can use the **ARRM** menu of **MCP Settings GUI** or **MCP Local Configuration Utilities (mcpcfg)** to delete the contents of these folder structures, as well as temp and cache files, while leaving the directory structure intact for future downloads.

The **Delete Records** function is used to perform the following actions:

- Delete all Records
- Delete Storage Directory Specific Records
- Delete Station Specific Records
- Delete Device Specific Records
- Delete Temp
- Delete Cache



Directory Delta records will not be retrieved again once deleted. Delete Cache Files to retrieve the old records.

Thank You for Watching this Module.

If you are watching this as part of a structured learning program, please don’t forget to take the test.

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