

STAR-1100

Product Description

HIGHLIGHTS	1
OVERVIEW	2
Designed for Comprehensive Protection	2
STAR-1100 Components	3
STAR-1100 Background Run	3
Tape Inventory File (TIF)	3
Media Manager (Interface)	3
Console Interface	3
Scratch Pool Selector Server	3
Reports	3
Vault Management System (VMS)	4
Integration with External Products	4
STAR-1100 Integration with Library Manager	4
Integration with Automated Cartridge Libraries	4
HOW THE TAPE PROTECTION WORKS	4
Establishing Tape Retention and Ownership	5
User Encoded Values in the @ASG Statement	5
Using the Automatic Attribute Feature (AAF)	5
Automatically Defining Tape Ownership	6
Data Privacy	6
Integrity in the Tape Labeling Process	6
CRUCIAL ROLE OF THE TAPE INVENTORY FILE	6
Ensuring the Integrity of the Tape Inventory File	7
Multiple Partitions	7

Separate Instances of STAR and the TIF	7
Shared Library Subsystem.....	8
LIBRARY MANAGEMENT FUNCTIONS	9
Managing Scratch Pools	9
Populating Scratch Pools	9
Replenishing Scratch Pools.....	9
Reports	9
Librarians Maintain Tape Information.....	9
Coordinating Off-Site Storage	10
External Libraries	10
Managing Scratch Tapes in the DSI Libraries.....	10
Scratch Pool Selector Server	11
PRODUCT DOCUMENTATION.....	11

Formula Consultants Incorporated

P.O. Box 544
 Anaheim, California 92815

714/778-0123
 714/778-6364 (Fax)

sales@formula.com
 www.formula.com

CONFIDENTIAL AND PROPRIETARY PROPERTY

Subject to certain restrictions and non-disclosure requirements of Formula Consultants Incorporated.

Copyright © 2020 by Formula Consultants Incorporated. The computer software described in this document is confidential. The proprietary contents of the program may not be disclosed without the express written consent of Formula Consultants Incorporated.

No part of this material may be reproduced in any form without permission in writing from Formula Consultants Incorporated.

Highlights

STAR-1100 protects your tape data across the full range of media types and recording densities. STAR provides utilities, tools, and procedures for your librarian and operations staff to productively manage your tapes.

With robotic and virtual libraries, much of tape processing is now automated and transparent to the user. However, behind that efficient automation, or even lights-out operations, STAR-1100 is doing a lot to protect your data assets on tape.

Current Release	Current release, STAR-1100 8RIA
Installation	Standard installation w/ COMUS and SOLAR
Protection for tape data	Protects tape data across all tape media, densities supported on OS 2200 Tight integration with Unisys' Media Manager routine for tape labeling Protection for unlabeled tapes Special protection for FAS backup tapes Protection for volumes in virtual and physical libraries
STAR-1100 data store	Tape metadata stored in Tape Inventory File (TIF) Backup for Tape Inventory File, including short- and long-recovery
OS 2200 security	Operates under all security levels offered by Unisys in OS 2200
Multiple partitions	SLS (Shared Library Subsystem) distributes Tape Inventory File in peer-to-peer network for unified library. Designed for extreme high-availability.
Scratch pools	Scratch tapes can be organized into named pools in STAR configuration Users can specify a scratch pool in their @ASG statement Pools are automatically replenished via scheduled batch run
Integration w external libraries	DSI virtual and physical libraries via FCI's Library Manager Oracle automated (physical) libraries
Off-site storage	Vault Management System to coordinate off-siting of physical tapes

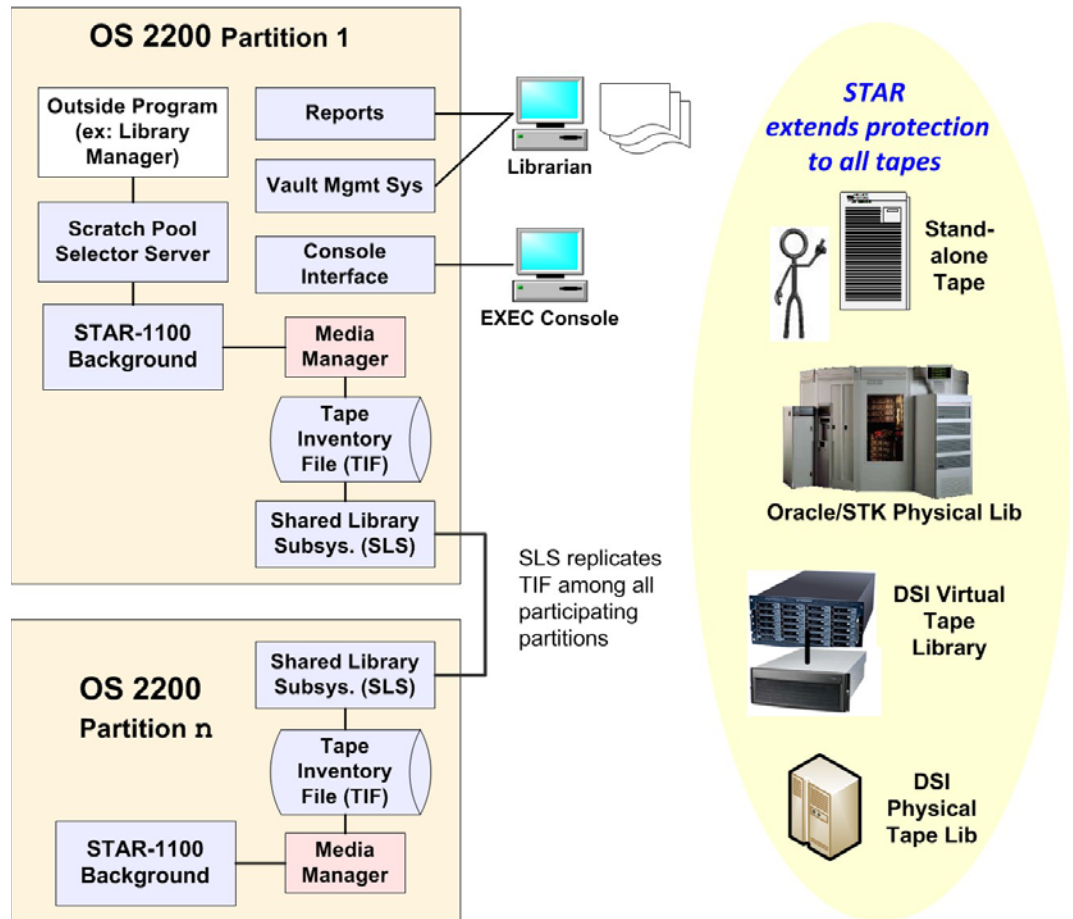
Overview

Designed for Comprehensive Protection

STAR-1100 was designed in the days of round-reel volumes, when tape operations involved hands-on activities. Today, with virtual tapes and high degrees of automation, operators and librarians have less contact with physical media.

What hasn't changed in all those years is the need for the utmost in reliability and integrity in protecting tape data. These requirements were designed into STAR from the beginning.

The diagram and subsequent topics below present the major components of STAR-1100.



STAR-1100 Components

STAR-1100 Background Run

The STAR-1100 background run has privileges for important EXEC functions, notably the Media Manager. Operators issue commands to control the STAR-1100 background run via a console interface.

Tape Inventory File (TIF)

The Tape Inventory File (TIF) is the foundation of STAR-1100. It:

- stores a record for each tape in library, with data for permanent attributes of each tape and the activity of the tape over time,
- is designed for efficient performance and high availability,
- has redundancy and recoverability, including an audit trail, and,
- can be distributed, peer-to-peer, across multiple OS 2200 partitions, giving all partitions the same view of the tape library.

Media Manager (Interface)

The Media Manager is a facility within the EXEC, responsible for validating tape labels. It is implemented as an Independently Linked Exec Subsystem (ILES) and has an API, which STAR uses whenever a tape is mounted or dismounted. The tight integration of STAR with the Media Manager ensures that STAR can exert control of the tape handling and prevent unauthorized or inadvertent writing of in-use tapes.

Console Interface

STAR has a console interface which operators use to issue commands to manage the operation of STAR-1100 at the site.

Scratch Pool Selector Server

The Scratch Pool Selector Server provides a volser of a scratch tape in a specific pool, when requested by a calling program. See the topic below.

Reports

STAR-1100 offers pre-defined and ad hoc reports about the status of the tape library.

Vault Management System (VMS)

The Vault Management System provides an organized facility for sending tape volumes to off-site locations, and recalling them, as necessary. Many sites have substantially migrated to virtual tapes. However, their business continuance and disaster recovery policies may require off-site backups.

Integration with External Products

STAR-1100 Integration with Library Manager

FCI's product, Library Manager, enables the deployment of DSI virtual and physical tape libraries on OS 2200 systems. STAR is closely integrated with Library Manager so that tape protection can be extended to the tapes under the operation of a DSI virtual or physical tape libraries.

Integration with Automated Cartridge Libraries

STAR-1100 can also extend its tape protection and library management to external automated cartridge libraries.

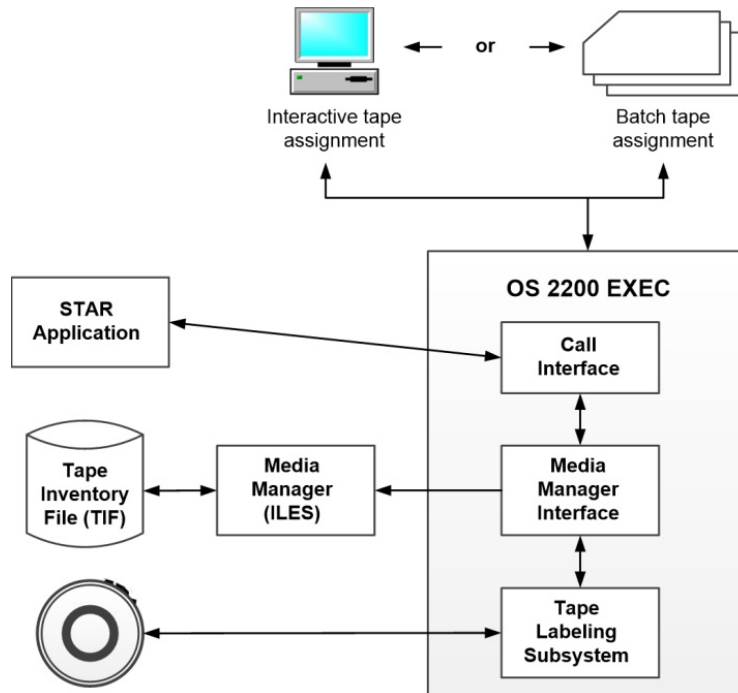
How the Tape Protection Works

Before a tape is read or written, the OS 2200 EXEC must validate the tape label or confirm that the tape is unlabeled. The EXEC then passes control to STAR-1100/Media Manager for additional processing. STAR-1100 uses the volume number as the key to retrieve the tape record from the Tape Inventory File (TIF). All of the information within the tape record is available every time the tape is processed. Whenever a tape is read or written, STAR-1100 updates the TIF so that information for each tape in the library is always up-to-date.

STAR-1100 uses the individual tape record to determine whether a tape may be processed. When a user attempts to write on a tape, STAR-1100 requires that the volume be in scratch status, or that the user owns that volume and has re-write privileges. Because the TIF provides an expanded "label" for all tapes, unlabeled tapes are also protected.

Optionally, when users allocate a scratch volume, they can request that the volume be mounted from a specific scratch pool. To specify the pool they want, they enter a pool name known to the STAR configurations, in the CTL-pool field of the @ASG statement.

When the ownership expires, the tape becomes a candidate for scratching. An automated batch job returns expired tapes to scratch status, and, to their appropriate pool, when pools have been organized and specified.



Establishing Tape Retention and Ownership

The retention of a tape can be established several ways.

User Encoded Values in the @ASG Statement

Users can specify the retention of their ownership of the tape.

- They can enter an expiration value in the expiration sub-field of the @ASG statement. Values are coded in days, up to 4096 days.
- They can enter a Media Manager specification, which will express the retention in various ways. For example, the code “USEDxx” instructs STAR to retain the tape for xx days after last use.

STAR-1100 Operations Guide, Section 3 “Tape Retention and Ownership”

Using the Automatic Attribute Feature (AAF)

There are circumstances when there is no expiration value or Media Manager specification in the @ASG statement. One example is when a site is first installing STAR-1100. Another example is when the librarian is entering a number of new tapes into STAR. Tape assignments lacking an expiration code or Media Manager specification will be given a default retention code.

STAR-1100 Operations Guide, page 6-31

To eliminate the need for system-wide changes to ECL or extensive manual updates, FCI implemented a method for automatically updating the expiration/retention values in the TIF, for volumes with default values.

The tape librarian pre-defines a mapping of retention codes to various combinations of fields which can indicate retention. The periodic Scratch and Clean run triggers the application of AAF specified values.

Automatically Defining Tape Ownership

Site administrators pre-define the ownership code as a combination of runid, account number, user-id, or project-id of the creating run. Sub-strings of these fields are permitted. When a tape is written, STAR-1100 automatically updates the TIF with the proper ownership code.

Data Privacy

Only the owner of a tape can display data stored on the tape, and only those elements that have been authorized by the site can be modified by the user.

The user can specify that the owner is the only one permitted to read or write the tape.

Integrity in the Tape Labeling Process

If it becomes necessary to relabel a tape, the STAR-1100 utility LABEL prevents inadvertent labeling of the wrong tape by verifying both the tape number and that the tape is in a scratch status.

Crucial Role of the Tape Inventory File

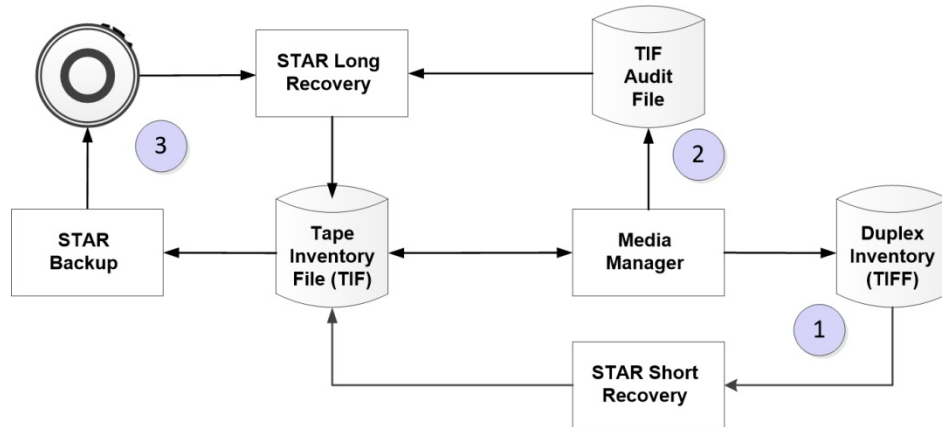
The Tape Inventory File (TIF) is maintained on-line. It contains a record for each tape controlled by STAR-1100, uniquely identified by its volume serial number. Data includes: permanent attributes of the tape, owner information, and information about tape use and its location.

STAR-1100 utility programs enable authorized administrators to:

- add records into the TIF for new tapes,
- display information on individual tapes,
- display a list of tapes owned by an individual or organization
- update any data field (except for volser)
- reorganize, backup, and recover the TIF

Ensuring the Integrity of the Tape Inventory File

The Tape Inventory File is always assigned to the Media Manager. It can only be accessed by privileged programs, such as STAR's utilities.



The diagram above is a composite summary of several separate runs, each with numerous additional detailed steps. The TIF data is protected in three primary ways.

1. The data is maintained in a duplex file (TIFF) as an exact copy of the TIF. This supports short recovery, when necessary.
2. All updates to the TIF are logged in the TIF audit file.
3. The entire TIF file is periodically copied to tape. The back-up tape establishes a checkpoint for input to the long recovery process.

If the Media Manager detects an error while accessing the TIF and a TIFF is available, it will automatically switch to the TIFF, continue normal processing, and notify operations. Quick recovery restores the TIF as a copy of the duplex file (TIFF).

In the event of a catastrophic failure, the most recent TIF checkpoint is restored and subsequent updates are reapplied from the TIF audit file.

Multiple Partitions

Separate Instances of STAR and the TIF

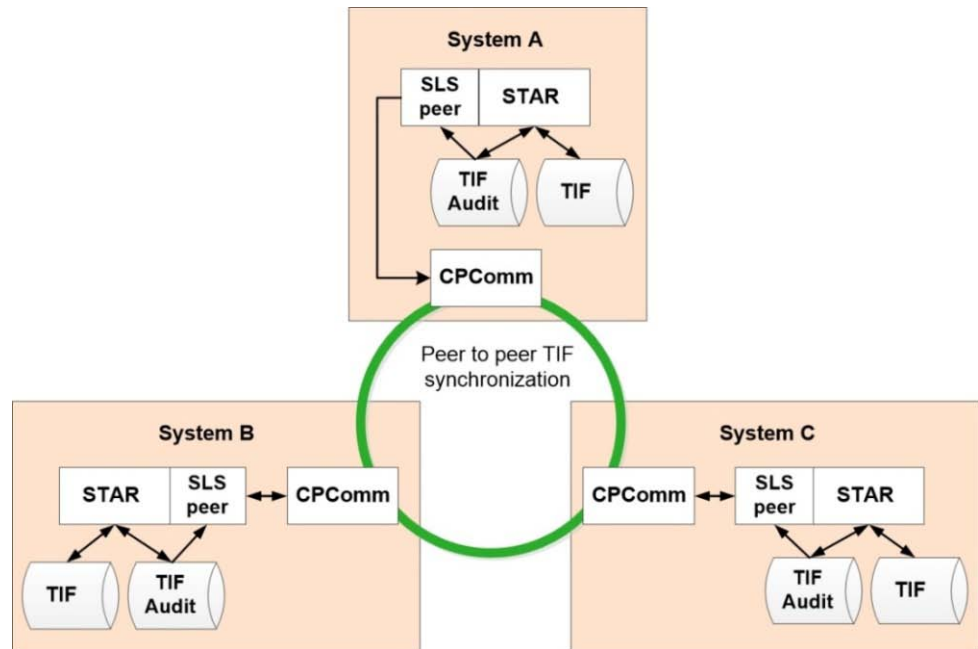
It is feasible to maintain tape library “islands” by deploying separate instances of STAR-1100, with their separate, independent copies of the TIF, on different partitions. Perhaps your organizational policies require this for certain departments. If tape use is truly independent, this can

work. However, in this arrangement, mounting tapes on systems other than where they were created must be done with extra caution.

Shared Library Subsystem

STAR-1100 Shared
Library Subsystem
User Guide

A better way to support multiple partitions is to use STAR's Shared Library Subsystem. SLS is a peer-to-peer network within STAR-1100. SLS supports two or more 2200s operating under independent copies of OS 2200. SLS allows a site to maintain one unitary logical tape library by automatically insuring that tape information on each SLS-enabled 2200 is identical to the information contained on any other SLS-configured 2200. Tapes created on one machine can be taken to any other machine and accessed under the full control and protection of STAR-1100.



Library Management Functions

Managing Scratch Pools

Populating Scratch Pools

There is a batch run tape librarians use to populate scratch pools when first installing STAR-1100, or when inserting new tapes into your library.

Replenishing Scratch Pools

STAR-1100 has a facility, “Scratch and Clean,” which handles several housekeeping tasks. This run scans the Tape Inventory File to find volumes whose in-use status has expired. Scratch and Clean returns expired tapes to “scratch” status and places the volumes in the appropriate scratch pools.

Round reels required periodic cleaning to ensure error-free service. When a tape was returned to scratch status, STAR created a list of candidates for cleaning. Cleaning is no longer important at most sites, but the relevant STAR batch run is still called “Scratch and Clean.”

Reports

A set of pre-defined standard reports are available: Volume List, File List, Out-of-Area List, Owner List, Statistics Report, and TIF Audit Report.

Ad hoc reports can be generated by using the STAR-1100 MAPPER interface or the optional QLP-1100 Report Subsystem.

Librarians Maintain Tape Information

In addition to reviewing STAR’s standard reports, tape librarians can access and display the metadata for any individual volume. Or, they can generate brief reports with the LIST command.

The librarian can change any tape attribute except the VOLSER number. For example, the librarian may wish to extend the expiration period or set the out-of-area code to indicate the tape is off-site.

Coordinating Off-Site Storage

The Vault Management Subsystem (VMS) manages the transfer of tapes to and from separate vaults or storage locations. VMS:

- generates picking and distribution reports,
- automatically produces commands to eject volumes from automated tape libraries,
- automatically assigns slot numbers for efficient vault storage, and
- automates the return of tapes to the central site.

Off-site storage information in the TIF can be displayed at any time.

VMS helps in managing cycled tape files. You can maintain most current version(s) of a file on-site and automatically schedule other generations for archival.

External Libraries

FCI works with the major vendors of automated tape systems to bring the volumes in these systems under the umbrella of STAR's protection, via:

- synchronization of the TIF and robotic databases (scratch pools),
- automatic tape EJECT (primarily used for off-site vaulting of physical volumes), and
- specifying named scratch pools for scratch tape assignment. (Certain automated systems have some restrictions. The most complete integration is achieved with the DSI products.)

STAR's Automated Library Subsystem (ALS) helps you optimize the operation of your automated robotic tape libraries.

Managing Scratch Tapes in the DSI Libraries

STAR-1100 interacts with the DSI library products through FCI's product STAR Library Manager, to protect in-use tapes.

Also, STAR-1100 and Library Manager have interrelated and cooperating configuration schemes for defining scratch pool names. By making scratch pools known to both STAR-1100 and Library Manager, system administrators extend the convenience of scratch pools to the DSI virtual and physical tape libraries. When Library Manager detects a request for a scratch tape in a DSI library, it calls the STAR Scratch Pool Selector Server. If there are tapes in the pool requested, the Scratch Pool Selector Server returns a valid volume serial number to Library Manager. If the requested

pool is empty or can't be found in STAR's configuration, exception handling is followed.

Scratch Pool Selector Server

Users, whether in a DEMAND session or a batch job, may initiate the mount of a scratch tape, requesting a tape from a specific scratch pool.

FCI externalized this function so that an authorized calling program could also request from STAR a scratch tape from a specific pool. This externalized function is called the Scratch Pool Selector Server. FCI's product, Library Manager, is an example of a calling program which may request a scratch tape from a specific pool.

Product Documentation

- *STAR-1100 Installation Guide, FP-102 R14*
- *STAR-1100 Shared Library Subsystem User Guide, FP-098 R8*
- *STAR-1100 Programmer's Guide, FP-104 R12*
- *STAR-1100 Operations Guide, FP-103-R14*
- *STAR-1100 Expert Library Manager Subsystem User Guide, FP-166-R3*
- *STAR-1100 Utilities Subsystem User Guide, FP-167-R4*
- *STAR-1100 Conversion Utilities User Guide, FP-168-R2*
- *STAR-1100 Virtual Tape Implementation Guide, FP-169-R1*

If your site has a DSI Virtual Tape Library and is using STAR Library Manager, you will find the following document helpful:

- *STAR Library Manager Installation and Administrator Guide, FP-161-1R2.*

