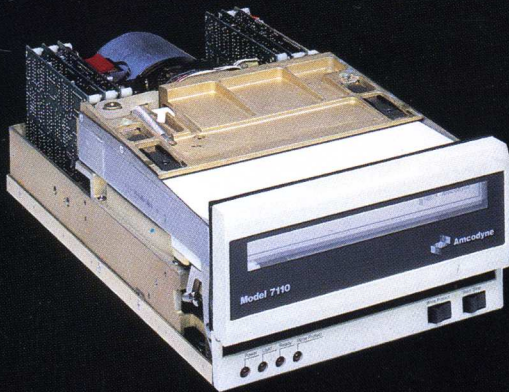
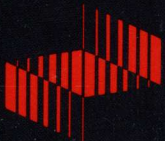


Arapahoe 7110/7110S

8-Inch Fixed/Removable Disk Drives

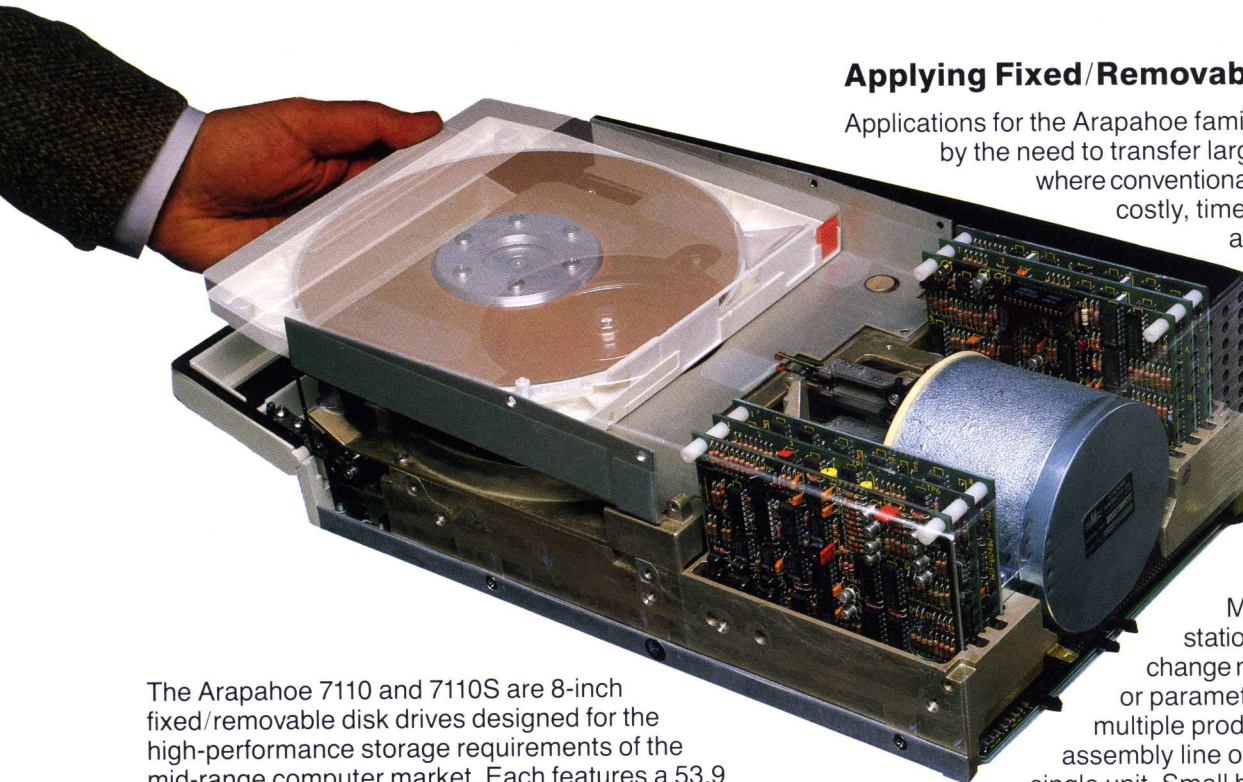


- Rigid but not fixed
- Dynamic head loading
- Compact 8-inch package
- Whitney suspension system
- SMD or SCSI



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The Arapahoe 7110/7110S



The Arapahoe 7110 and 7110S are 8-inch fixed/removable disk drives designed for the high-performance storage requirements of the mid-range computer market. Each features a 53.9 megabyte capacity divided equally between a fixed disk and a removable cartridge.

The Arapahoe 7110 is a fast-access device combining data storage, backup and archiving capabilities with the benefits of file transportability. Through application of advanced disk drive technologies and proprietary techniques, Amcodyne has built a fixed/removable-media drive unsurpassed in reliability which can easily be integrated into a wide variety of computer systems via a standard SMD interface. Average seek time is 35 milliseconds.

The Arapahoe 7110S offers the Small Computer Systems Interface (SCSI) built into the 7110 drive enclosure and includes 41.1 megabytes (formatted) of storage capacity. Average seek time is 29 milliseconds.

The Arapahoe family features company-developed dynamic loading of heads, an embedded servo system and a proprietary clean-air system. It was the first to successfully introduce the Whitney suspension/low-mass slider and 2-of-7 run-length limited code (RLLC) to OEMs.

Applying Fixed/Removable Technology

Applications for the Arapahoe family are characterized by the need to transfer large amounts of data where conventional methods become too costly, time-consuming, unreliable or inconvenient.

Features of removable media include on-line data storage, security, software transportability, data base distribution, quick data recovery, flexibility and off-line storage.

Manufacturing test stations can efficiently interchange media to log test results or parametric test data for multiple products on a common assembly line or multiple tests on a single unit. Small business systems are able to maintain reliable data back-up in a convenient form to guarantee record recovery. Engineering workstations often need fast access to more data than can typically be kept on-line.

Advanced Head-Disk Interface

Designed around the Whitney head suspension developed by IBM, the Arapahoe family has advanced the technology with a lower mass and streamlined geometry for the most stable read-write platform in the industry. As a result, Amcodyne has successfully implemented a proprietary dynamic head-loading technique.

Dynamic head loading enhances the reliability of both the 7110 and 7110S by completely eliminating head-disk contact. The heads are loaded onto an established air bearing after the spindle is rotating at operating speed, achieving flight stability 1,000 times faster than traditional Winchester technology.

At power-down, whether normal or unexpected, the heads automatically retract and lock. **During shipping and handling, the heads are locked in their retracted position to prevent media damage or head-disk chattering.**



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Superior Clean Air Design

A proprietary clean-air system is another reliability feature of both the 7110 and 7110S. When the cartridge disk is removed, the fixed-disk chamber is protected by an active hub seal around the spindle.

During installation of a cartridge, the HDA chamber is purged to a clean-air environment, and a recirculating air filter **maintains the air quality with a particle absorption capacity of up to 20 times greater than typical Winchester drives.**

The plenum chamber is positively pressurized to ensure any leaks are from the inside out, rather than drawing outside air into the chamber. The HDA in the Arapahoe family has consistently test-registered a Class 50 or better cleanliness level.

Absolute Tracking Accuracy

Track positioning on both the 7110 and 7110S is controlled by an embedded servo system implemented in 32 servo sectors, each 28 bytes wide. A tri-bit encoded position field in each servo sector directs final head positioning over the center of the track.

Full interchangeability of cartridges is assured through a proprietary cartridge calibration process.

Cartridges are automatically calibrated through an on-board microprocessor after each cartridge insertion.

Comprehensive SCSI Implementation

The Arapahoe 7110S has essentially the same packaging, features and benefits of the 7110, with the addition of a disk controller implementing an extensive SCSI command set built into the drive envelope. The 7110S provides 41.1 megabytes of formatted (SCSI-defined) storage capacity divided between the fixed and removable media.

SCSI is an intelligent, host-level interface that relieves the host of many tasks and allows peripheral independence. It simplifies system integration while reducing the cost and improving performance.

In addition to standard features of implied seek and automatic seek verification, Amcodyne's advanced SCSI improves system throughput via a full-track FIFO buffer. Due to its enhanced intelligence, the special interface features an 11-bit correction function for errors and

retries, as well as a self-contained diagnostic system and internal defect management transparent to the user. Amcodyne's SCSI also provides complete disk-to-disk copy in less than 2 minutes, with verification. The 7110S SCSI offers multi-block transfer over physical boundaries with selectable block size.

Leading Edge, Manufacturable Technology

Amcodyne was founded in 1981 to bring high-performance, leading-edge manufacturable disk technology to the mid-range computer market.

The Arapahoe 7110 is Amcodyne's original product around which advanced manufacturing processes have been developed. In volume production since early 1983, the 7110 has been selected by major computer system manufacturers, disk storage subsystem manufacturers and a large variety of system integrators and software houses. They have all benefited from the 7110's manufacturability and design margins.

The Arapahoe 7110 and 7110S are members of an established product family of 8-inch rigid disk drives which also includes the Comanche 8160 and 8220—high-capacity, fixed-only drives ranging from 165.9 megabytes to 224.7 megabytes of unformatted capacity.





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Arapahoe 7110/7110S

8-Inch Fixed/Removable Disk Drives

Summary Specifications

Model 7110

Model 7110S

Capacity (unformatted)		Model 7110	Model 7110S
per drive		53.9 Mbytes	53.9 Mbytes/41.1 Mbytes formatted
fixed disk		26.9 Mbytes	26.9 Mbytes/20.5 Mbytes formatted
cartridge		26.9 Mbytes	26.9 Mbytes/20.5 Mbytes formatted
per track		20,928 bytes	20,928 bytes
Configuration		Model 7110	Model 7110S
disks		1 fixed/1 removable	1 fixed/1 removable
data surfaces		2 fixed/2 removable	2 fixed/2 removable
data heads		4	4
servo		embedded	embedded
tracks per surface		644	628 and 16 spares
tracks per drive		1288 fixed/1288 removable	1288 fixed/1288 removable
recording method		2 of 7 RLLC	2 of 7 RLLC
recording density		10,986 bpi	10,986 bpi
flux density		7,324 frpi	7,324 frpi
track density		555 tpi	555 tpi
Performance		Model 7110	Model 7110S
rotation speed		3522.9 rpm	3522.9 rpm
average latency		8.5 msec	8.5 msec
access time		10 msec single track	10 msec single track
		35 msec average	29 msec average
		60 msec maximum	55 msec maximum
data transfer rate		1.229 Mbytes/sec	1.229 Mbytes/sec
Reliability and Maintainability		Model 7110	Model 7110S
Error Rate		1 in 10 ¹⁰ bits recoverable 1 in 10 ¹² bits non-recoverable 1 in 10 ⁶ seeks	1 in 10 ¹⁰ bits recoverable 1 in 10 ¹² bits non-recoverable 1 in 10 ⁶ seeks
MTBF		8000 hours	8000 hours
MTTR		30 minutes	30 minutes
PM		none	none
Service Life		5 years	5 years
Power Requirements (typical)		Model 7110	Model 7110S
AC		none	none
DC		+ 24 Vdc - 12 Vdc + 5 Vdc - 5 Vdc	+ 24 Vdc - 12 Vdc + 5 Vdc - 5 Vdc
Power Dissipation		78 watts (read/write) 110 watts (seek)	98 watts (read/write) 135 watts (seek)
Environmental		Model 7110	Model 7110S
Temperature		50°F to 104°F operating (10°C to 40°C) - 40°F to 140°F storage (- 40°C to 60°C)	50°F to 104°F operating (10°C to 40°C) - 40°F to 140°F storage (- 40°C to 60°C)
Humidity		20% to 80% RH operating (non-condensing) 5% to 95% RH storage (non-condensing)	20% to 80% RH operating (non-condensing) 5% to 95% RH storage (non-condensing)
Altitude		to 10,000 feet (3,048 m) operating to 40,000 feet (12,192 m) storage	to 10,000 feet (3,048 m) operating to 40,000 feet (12,192 m) storage
Physical		Model 7110	Model 7110S
Interface		SMD	SCSI
Drive	Height	4.63 in. (117.6 mm)	4.63 in. (117.6 mm)
	Width	8.55 in. (217.1 mm)	8.55 in. (217.1 mm)
	Depth	14.0 in. (355.6 mm)	14.0 in. (355.6 mm)
Cartridge	Weight	23 lbs. (10.5 kg)	23 lbs. (10.5 kg)
	Height	1.0 in. (25 mm)	1.0 in. (25 mm)
	Width	8.2 in. (208 mm)	8.2 in. (208 mm)
	Depth	8.3 in. (211 mm)	8.3 in. (211 mm)
	Weight	1.5 lbs. (0.7 kg)	1.5 lbs. (0.7 kg)

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