

AN/SQR-501 PASSIVE TOWED ARRAY SONAR SYSTEM



ASW ON A SOUND BASIS

The AN/SQR-501 sonar is designed for Navies that are serious about detecting, localizing, tracking and attacking submarines.

Now in production for the Canadian Navy.



COMPUTING DEVICES'

AN/SQR-501 is a low frequency, tactical passive towed array sonar system designed to perform with the USN AN/SQR-19 towed array. The sonar uses proven state-of-the-art digital technology to implement a system developed over a number of sea trials and design iterations. It is capable of detecting current surface and subsurface targets out to the second convergence zone and beyond.

The AN/SQR-501 features proven signal processing algorithms and a comprehensive operator interface developed with sonar operators under trials and in operational use. It can easily interface to any command and control system or be used in a stand-alone configuration. Processors, storage, and data busses have reserve capacity to provide for future growth.

KEY FEATURES

OPERATIONAL PERFORMANCE

- Consistently outperformed all international towed array systems during three years of trials and operational use.

TECHNICAL PERFORMANCE

- Signal processing is performed by the AN/UYS-501, a programmable, 64-bit complex floating point digital signal processor capable of sustaining a throughput of 320 MFLOPS.

HISTORY

- System specification and design developed over a sequence of experimental, advanced, and engineering models which have been subjected to sea trials and used operationally by the Canadian Navy.

FUTURE GROWTH AND ADAPTABILITY

- System programmability and modularity allows the AN/SQR-501 to be adapted to detect and track future threats.

QUALIFICATION

- Qualified to MIL-E-16400H.

MAINTENANCE

- On-line health monitoring and off-line diagnostics facilitate a Line Replaceable Unit (LRU) philosophy.
- Commonality and reuse of LRUs in the design reduces logistic support costs.

PASSIVE PROCESSING

- Signal processing is based on frequency domain algorithms developed by the Canadian Defence Research Establishment Atlantic (DREA) in experimental models.
- AN/UYS-501 simultaneously processes:
 - 43 beams of narrowband data
 - 43 beams of DEMON data
 - 43 beams for each of 4 verniers
 - 360 degree broadband data in 1/2 degree increments
 - 2 beams of audio data
 - noise mean estimate data
- Vernier frequencies and resolutions are individually selectable by the operator.
- Integration times for narrowband, broadband, and DEMON processing are independent and selectable by the operator.
- Actual values used are classified.

TRACKING

- Uses operator selectable values for Probability of Detection and Probability of False Alarm.
- Tracks up to 120 operator initiated tracks in bearing and frequency.
- Tracks up to 120 auto-detected tracks in bearing and frequency.
- Displays tracking data graphically in bearing/time format.

OPERATOR INTERFACE

- Up to three, dual-screen operator stations can be supported.
- A high definition monochrome monitor enhances the detection capability of the operator.
- Provides the following acoustic display outputs:
 - LOFAR data for beam and bearing stabilized modes.
 - DEMON data in frequency/time/intensity format for beam and bearing stabilized modes.
 - Broadband data in bearing/time/intensity format.
 - Ambient noise measurement for each of 43 beams used for range performance estimation.
- Provides cross-hair, comb, and harmonic cursors.
- Selectable system parameters allow the operator to configure the sonar for a wide variety of environmental and operational conditions.

MISCELLANEOUS

Record and Playback Capability

- High Density Digital Recorder (HDDR) stores unprocessed acoustic data and system parameters for:
 - post analysis
 - threat intelligence
 - training
- Replay Mode allows on-board playback of mission scenarios.

Power Failure Recovery

- Uninterruptible Power Supply (UPS) maintains processed spectral data history during power failure for a minimum of 30 minutes.

System Software

- Modular design, predominantly Ada.
- Developed to DOD-STD-2167A.

Modular and Flexible Design

- Multiple processors in an embedded configuration perform separate tracking, display, and control functions.
- Expansion slots are provided for additional processors.
- Can be fitted with one, two, or three single-screen or dual-screen operator stations.
- Operates with or without a Command and Control System (CCS).
- Optional support of colour monitors.

Signal Processor

- AN/UYS-501 high-speed, digital signal processor uses complex floating point words consisting of 32 bits real and 32 bits imaginary in ANSI/IEEE 754 STD format.
- This 320 MFLOP (sustained rate) processor can perform a 1024 complex Fast Fourier Transform (FFT) in 160 microseconds. It contains 32M of 64-bit memory.

Display

- A high bandwidth graphics processor drives a high definition, 1536x1152 pixel, fully militarized, monochrome monitor.
- Dual screens are mounted vertically in an operator station.

AN/SQR-501 PASSIVE SONAR

POWER REQUIREMENTS

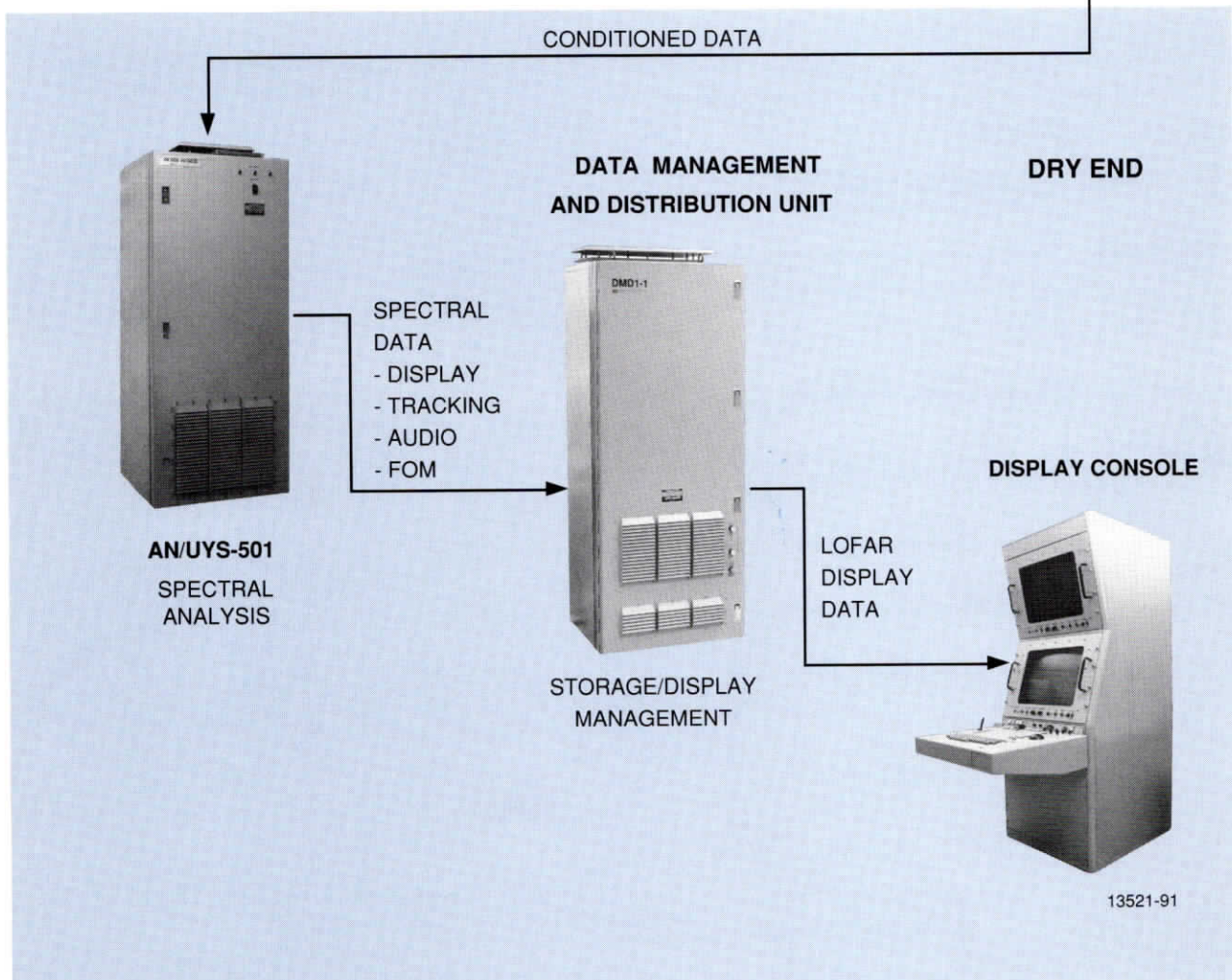
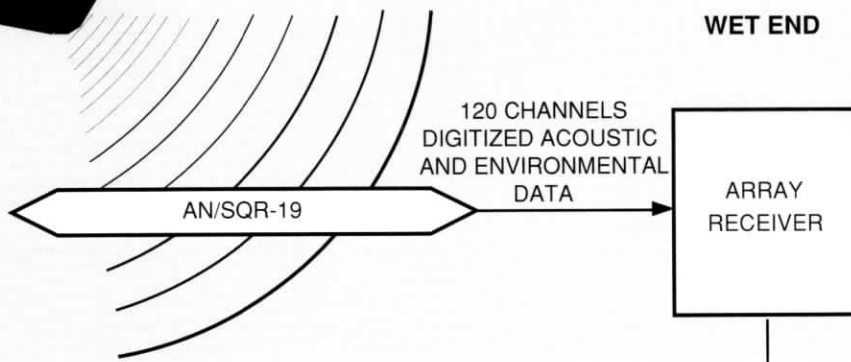
ARRAY RECEIVER	115 V	60 Hz	1 PHASE	3 kVA
HANDLING GEAR	440 V	60 Hz	3 PHASE	50 kVA
DRY END	115 V	60 Hz	1 PHASE	14.5 kVA

WEIGHTS AND DIMENSIONS

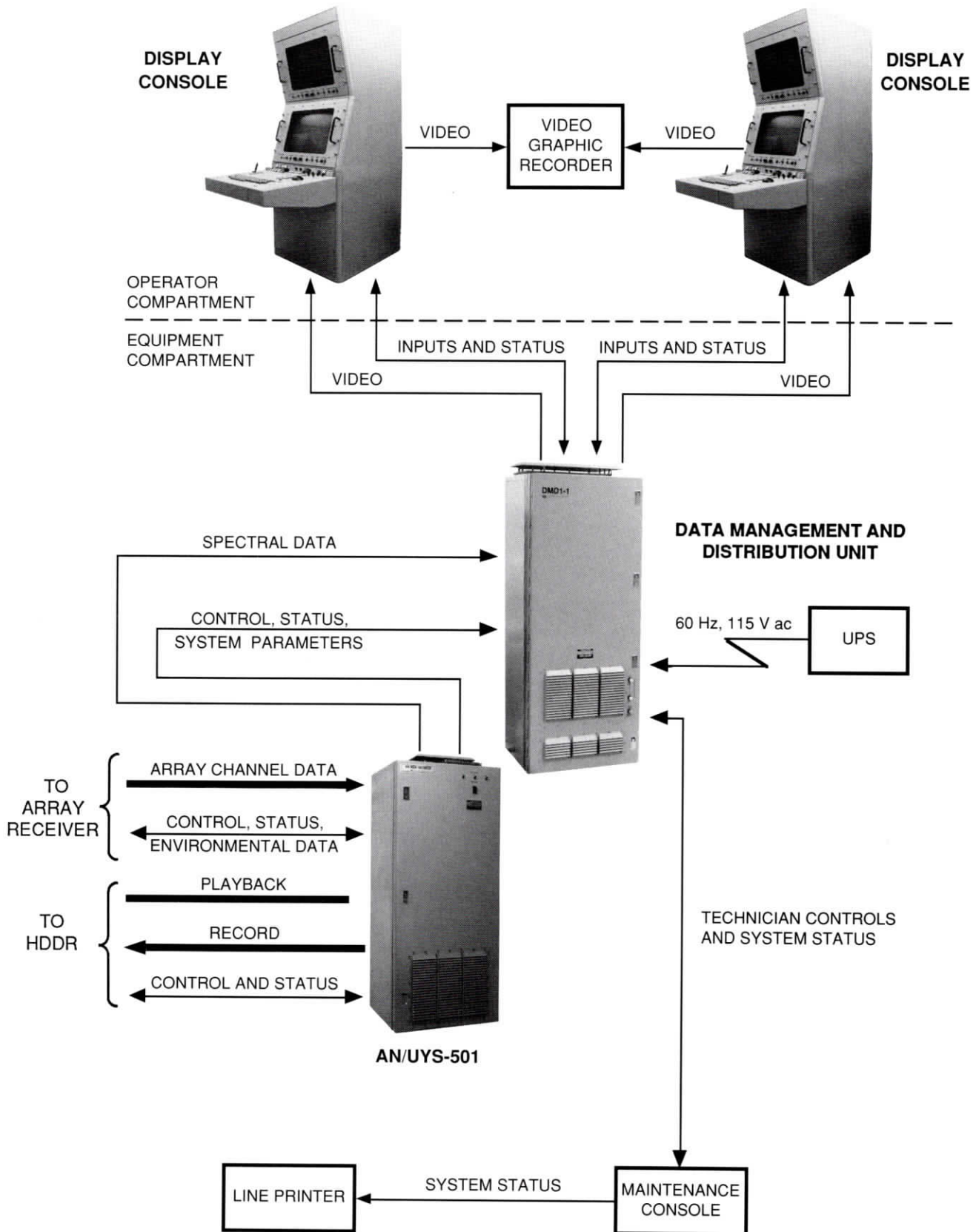
	WEIGHT (kg)	WIDTH (cm)	HEIGHT (cm)	DEPTH (cm)
Data Management and Distribution Unit	182	67.3	165.1	68.8
AN/UYS-501	240	67.3	165.1	68.8
Display Console	195	67.3	169.5	125.7
High Density Digital Recorder (Electronics)	45	48.3	27.9	55.9
High Density Digital Recorder (Drive)	45	48.3	27.9	55.9
Maintenance Console	5	48.3	17.8	55.9
Uninterruptible Power Supply	68	48.3	27.9	55.9
Array Receiver	380	61	153.7	61
OK-410 Handling Gear	8753	305	274	671

	WEIGHT (kg)	LENGTH (m)	DIAMETER (cm)
AN/SQR-19 Array	1415	264	8.6
Tow Cable	3559	1707	2.7

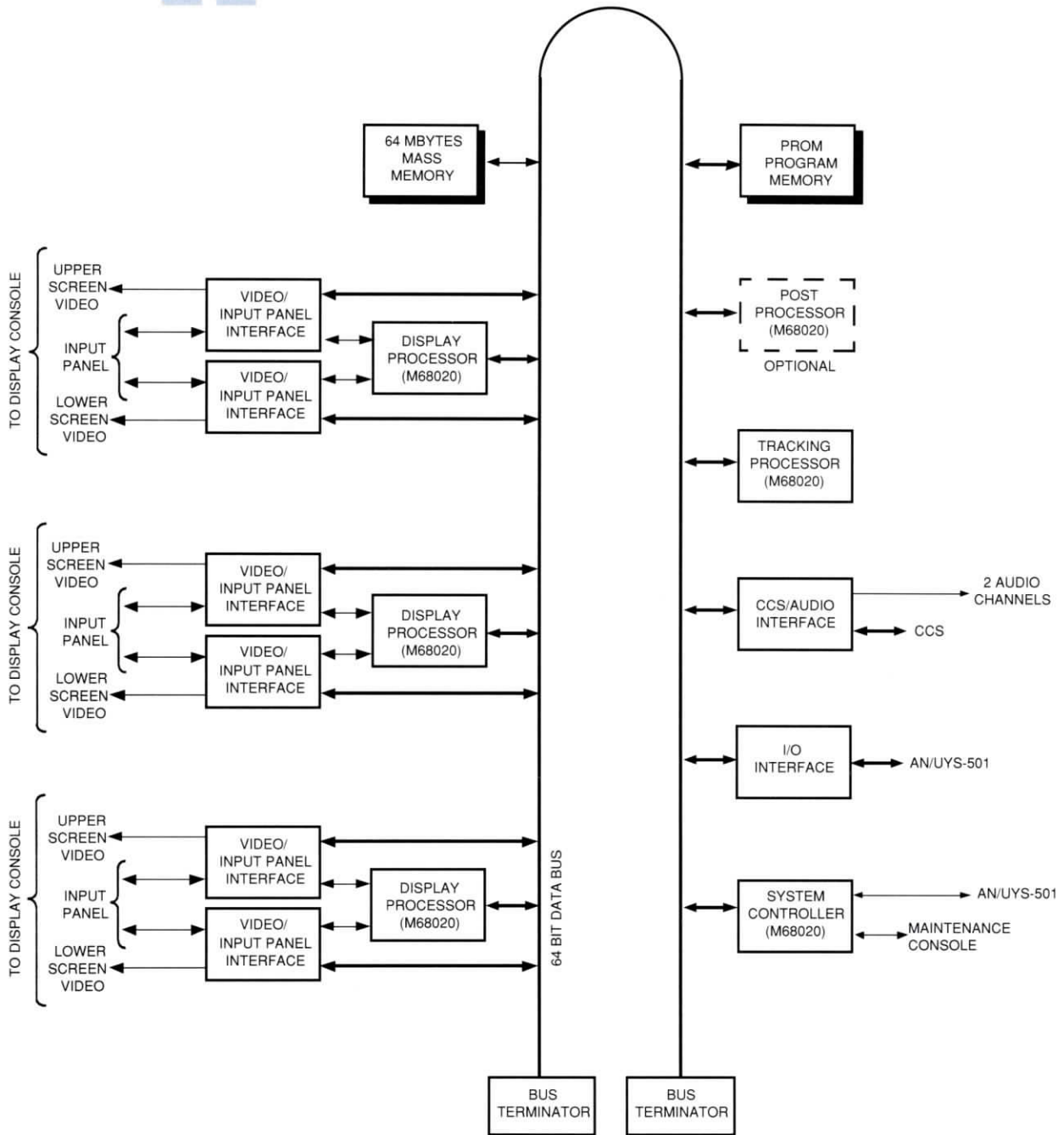
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DATA MANAGEMENT AND DISTRIBUTION UNIT BLOCK DIAGRAM

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Computing Devices' ASW division specializes in supplying anti-submarine warfare acoustic signal processing systems for fixed and rotary wing aircraft, shipborne and shore-based systems.

Occupying a site of 425,000 square feet, located on the outskirts of Ottawa, the Company's operations include dedicated research and development laboratories and comprehensive manufacturing facilities.

Founded in 1948 and employing some 1200 people, Computing Devices' other divisions include Ground Systems, Display Systems, Communications Systems and Contract Manufacturing.



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