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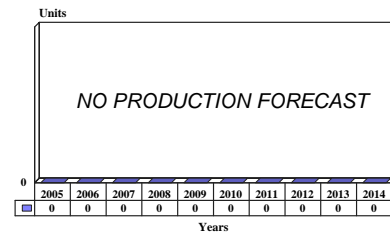
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UYK-44(V) - Archived 4/2005

Outlook

- Some U.S. Navy programs are removing UYK-44 for newer systems

10 Year Unit Production Forecast
2005 - 2014



Orientation

Description. General-purpose computer.

Sponsor

U.S. Navy

Naval Sea Systems Command

Washington, DC

USA

(Program lead for all DoD/FMS users)

Status. In limited production.

Total Produced. Through 2003, approximately 3,015 modules were produced.

Application. Mainly shipboard use, but also shore-based applications (such as the Ship Ground Station).

Price Range. Estimated at US\$50,000.

Contractors

Lockheed Martin Naval Electronics & Surveillance Systems-Syr, Electronics Park, PO Box 484, Syracuse, NY 13221-4840 United States, Tel: 1 (315) 456-0123, Fax: 1 (315) 456-0766, Prime Defunct

Technical Data

Design Specifications. The UYK-44(V) provides computer power for more than 60 different C³I and weapon systems. The basic building block is the Standard Electronic Module (SEM); the militarized UYK-44(V) was the first U.S. Navy standard computer to use these modules. The SEM design incorporates LSI and MSI leadless chip carriers on ceramic substrates, which results in low power consumption and thermal stress while allowing higher packaging density. Mean time between failures (MTBF) is rated at up to 8,000 hours. Built-in test and diagnostic electronics result in a mean time to repair (MTTR) of less than 15 minutes. Connector transition modules for the

UYK-44(V) are provided by GET Engineering Corporation, El Cajon, California.

The U.S. Navy's Standard Hardware Acquisition and Reliability Program (SHARP) expanded the scope of earlier modular programs to accommodate the growing complexity of computers and microprocessors. A major element of the SHARP program was the standardization in size of the component mounting area, which is organized into several uniform formats to facilitate repair and expansion of computer equipment. Format B, used in the UYK-44(V), uses a component mounting area of 6.9 square inches of usable space. MicroLithics Corporation, initially a second source for

production but now independently competitive, manufactures its Format B SEMs using copper thick-

film substrates for improved thermal conduction and advanced surface mounting.

Variants/Upgrades

MRP. The Militarized Reconfigurable Processor (MRP) is basically the UYK-44(V) SEM card set without the enclosure. The flexible MRP allows a wide range of applications. It can be added to a customer's own enclosure design, SEM back panel design, memory system, power source, and cooling system.

MRC. The Militarized Reconfigurable Computer (MRC) is a complete, self-contained computer designed with quick maintenance and easy access in mind. Inside the cabinet (MIL-E-16400-qualified) are the central processor, memory, input/output modules, control and maintenance panel, and power supplies.

MDS. The Microprocessor Development System (MDS) is a commercial version of the UYK-44(V), and consists of an enclosure that supports the MRP in any configuration. The primary applications for the MDS are software development and system test and operation.

CMP, DCP, NCP. Three additional processor variants are the Circuit Management Processor (CMP), Display Control Processor (DCP), and Network Control Processor (NCP). The CMP performs the data distribution, circuit management, and some of the performance

monitoring functions of the Real-Time EPLRS Program (RTEP). The DCP performs the startup, reporting, operator interface, and some of the performance monitoring functions of the RTEP.

Open Systems Architecture. The Open Systems Module (OSM) for the UYK-44(V) preserves existing CMS-2 software investments for users and provides open-system solutions with an economical evolutionary path. The enhancements, which can be performed in the field, involve replacing the 6 x 9 memory chassis in the rear of the UYK-44(V) MRC cabinet with an eight-slot, shock-isolated, size 6U Versatile Modular European (VME) chassis.

UniSEM. UYK-44(V) deliveries have incorporated the UniSEM universal hardware module. Developed by MicroLithics Corp, UniSEM replaces up to 26 SEM Format B modules in the UYK-44(V) by programming Field Programmable Gate Arrays. UniSEM was intended to enable the replacement of obsolete parts with up-to-date technology while retaining form/fit/function compatibility, thereby extending the computer's useful life.

Program Review

Background. In March 1983, Unisys (which later became Paramax, then Unisys again, before being acquired by Loral and finally Lockheed Martin) won the initial production contract for the UYK-44(V) over its primary competitor, IBM Federal Systems. This contract came just over two months before Paramax again was selected over IBM for the UYK-43(V) program. The UYK-44(V) contract amounted to a five-year purchasing agreement which totaled US\$324.2 million, with the potential of exceeding US\$500 million. These two contract awards firmly established Paramax's leading position in the U.S. Navy's shipboard computer program at that time. Approval for full-rate production was granted in October 1986.

Applications for the UYK-44(V) have been numerous, and have included the U.S. Navy's Extremely Low Frequency (ELF) communications program; the SLQ-50 Battle Group Passive Horizon Extension System surface terminal (four UYK-44(V)s); the Combat Control System (CCS) Mk 2; the SQQ-32 new-generation mine-hunting sonar (two used per sonar, but ultimately removed as part of an SQQ-32 product improvement program); and the Combatant Ship Integrated

Communications System (COSICS) modular frequency division multiplex bus.

Problems were experienced, however, with integration of the UYK-44(V) into the SQQ-89(V) ASW suite. Apparently the original version of the UYK-44(V) provided in FY87 did not meet the performance requirements of the SQQ-89(V). The enhanced version then provided by Unisys was designed around the Ada computer language and thus experienced problems working with the old ALSN software. The version of the SQQ-89(V) most directly affected was the (V)10.

UYK-43/44(V) Upgrade. Although the U.S. Navy received the go-ahead to upgrade the UYK-43/44 family in 1988, in a program estimated to be worth US\$40 million, it soon became fraught with controversy. Critics claimed that such upgrades would render superfluous the U.S. Navy's Next-Generation Computer Resources (NGCR) program, which was meant to develop the follow-on to the UYK-43/44 computer family. Congress, in an effort to keep from duplicating work performed in the NGCR program, refused to grant approval of the UYK-43/44 upgrade, issuing instead two years of funding bans.

The NGCR program, however, encountered serious delays, and funding was zeroed out in FY97. Funding for UYK-43/44(V) improvements was then transferred to Project S2265, Naval Warfare Tactical Data Base. FY98 U.S. Navy PEDS, however, made no mention of these improvements.

MRC Contracts to First and Second Source. In January 1991, the U.S. Navy awarded a US\$57 million contract to Paramax (now Lockheed Martin) for an undisclosed number of UYK-44(V) MRCs for all U.S. Department of Defense (DoD) and Foreign Military Sales (FMS) requirements through December 1994. Later in January 1991, the U.S. Navy selected MicroLithics to second-source the MRP. The US\$25.4 million, two-year contract called for a quantity not to exceed 781 MRPs to combine requirements for the DoD and FMS as they may arise.

Paramax (now Lockheed Martin) was awarded a firm fixed-price contract in 1993 to provide 70 percent of FY93/94 requirements for UYK-44(V) MRP SEMs.

These units were utilized by the U.S. Navy (95 percent), as well as Japan, Germany, and Taiwan (a total of 5 percent) under the FMS program.

Unisys (now Lockheed Martin) won a US\$27.1 million award in 1994 for the production of UYK-44 MRCs, plus ancillaries, through 1999. In July 1995, MicroLithics won a winner-take-all US\$20.3 million contract to provide continued production of MRPs over a three-year period.

During the late 1990s, few contracts were made public. Funding for the program under Project K1447 of the AEGIS Combat System program (PE#0604307N), however, remained steady during this period. According to U.S. Navy RDT&E budget documents, the program received US\$227 million in FY00.

Throughout 2001, the UYK-44 was part of the ongoing modernization efforts of the U.S. Navy CG-65 through CG-73 class guided missile cruisers as well as DDG-51 class destroyers. It is believed that by the end of 2002, this effort was complete.

Funding

Funding as part of the AEGIS Combat System Engineering (PE#0604307N), Surface Combatants Combat Systems Improvement program for UYK-44(V) apparently ended in FY2002 with the completion of the CG-65-73 modernization effort.

Recent Contracts

No recent contracts have been identified.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1981	Design concept initiated
Mar	1983	Unisys wins initial production contract; low-rate production begun
	FY83	Ada language support study initiated
Oct	1986	Approval for full production granted
	1988	UYK-20(V) production ended; Congress gives approval for upgrade of UYK-44(V)
	FY91	Ada Language System production capability for UYK-44(V)
Jan	1991	MicroLithics selected as second source for MRP
Oct	1992	Paramax successfully tests open systems architecture cards
	1993	Open Systems Module (OSM) design completed
Sep	1994	Developmental Test I for OSM
	1995	Open Systems Module certification achieved
Jul	1998	Production under MicroLithics contract completed
Sep	1999	Production under Lockheed Martin contract completed
	2000-2002	Work continues on U.S. Navy CG-65 through CG-73 modernization effort
	2004-2013	Possible limited production

Worldwide Distribution

In addition to the U.S. Navy, confirmed FMS users of the UYK-44(V) are **Germany, Greece, Japan, and Taiwan.**

Forecast Rationale

The U.S. Navy's UYK-44 16-bit general purpose shipboard computer operates at .775 millions of instructions per second and has benefited from its high adaptability. With over 3,000 systems built to date, Lockheed Martin claims that the program is still under a U.S. government contract. However, since no information has been made public regarding new production of the UYK-44, it would seem that any new activity for both U.S. and non-U.S. customers would be limited to spares and replacements.

Modernization of the U.S. Navy CG-65 through CG-73 class cruisers is expected to last through the next several

years, so there may still be prospects for the UYK-44 as replacements on these platforms. Other Navy activities regarding the UYK-44 may be more indicative of the system's true fate; under one submarine upgrade program, work entails the removal of the UYK-44 for replacement by other systems.

With the U.S. Navy increasingly incorporating more open-architecture, commercial off-the-shelf (COTS) equipment, prospects for the older systems like the UYK-44 are further diminished.

Ten-Year Outlook

No further production is forecast.