SPERRY ✛ UNIVAC
DEFENSE SYSTEMS

product
information

INTRODUCTION

Where applicable a configuration listing and/or bootstrap listing is provided with the product description. These listings, in effect, show the available options that are fully documented and can be provided without additional design costs. It is recommended that a configuration be selected for the customer's application from these listings wherever possible.

1. Marketing Allocations (MSU1J16, ext. 4857) should be informed of prospective customer's configuration details as early in the procurement cycle as possible. If a configuration required by the customer is not listed, additional time is required for the new design and related documentation before the unit can be produced. When a customer's delivery date does not permit the normal production lead time, it is suggested that Marketing Allocations be contacted to determine availability of alternate configurations.

2. It is recommended that customer's selection of bootstrap be taken from the available bootstrap listing since others require new design, documentation and adequate ordering time. This added cycle takes at least eight weeks after Marketing Allocations receives the request with an authorized charge number.

3. Product Status Definitions used on "Existing Configuration" sheets are given the following interpretation:

   A = ACTIVE = Complete support; documentation updated currently
   I = INACTIVE = Engineering information only; documentation not up to date
   O = OBSOLETE = Dead; no longer being built
   (S) = SPECIAL PROJECT DESIGN = Special design built for one customer

PREFACE

This document is prepared by Market Communications and Graphics as a reference source for corporate personnel. It provides summary information on military products of Univac Defense Systems Division. All products being produced or planned for defense and other applications are not listed herein but the list will be augmented to include all major products. The document is presented in loose-leaf form so that descriptive sheets on additional products can be added and to provide easy modification when configuration variables (options) change.

A mailing list of recipients will be maintained by Marketing Communications (Training and Product Literature, L.P. Kadera, MSU1J14) so that your document can be updated as additions or modifications are generated. Please notify this office (AC612-456-4893) if your location changes.

UNIVAC EQUIPMENT MANUALS

Product	Name	Serial Number	PX #
	Digital Computer Fundamentals		4182-0-3
	UNIVAC Computer-To-Computer Communication		6609
1004	1004 Card Processor Maintenance Study Guide		4777-0-2
1212	642B Diagnostics, Volume I		3522-1-1
	642B Diagnostics, Volume II		3522-2-1
	642B Diagnostics, Volume III		3522-3-1
	642B Maintenance Study Guide		3793-0-2
	642B Programming Study Guide		3941-0-1
	642B Technical Manual, Volume I		4688-1-1
	642B Technical Manual, Volume II		4688-2-1
1218	1218 Diagnostics		3348-0-1
	1218 Diagnostics		3349-0-1
	1218 Computer, Volume I	1-114	3639-1-1
	1218 Computer, Volume II	1-114	3639-2-1
	1218 Computer, Volume I	115 & up	3639-1-2
	1218 Computer, Volume II	115 & up	3639-2-2
	1218 Programming Study Guide		3818-0-2
	1218 Maintenance Study Guide		3942-0-1
	1218 Diagnostics, Volume I		3929-1-1
	1218 Diagnostics, Volume II		3929-2-1
1219	1219A Computer, Volume I	10, 11 & 13	3316-1-3
	1219A Computer, Volume II	10, 11 & 13	3316-2-3
	1219 Diagnostics, Volume I	1-11 & 13	3520-1-2
	1219 Diagnostics, Volume II	1-11 & 13	3520-2-2
	1219 Maintenance Study Guide	1-11 & 13	3814-0-1
	1219 Programming Study Guide	1-11 & 13	3943-0-2
	1219 Programming Study Guide		3943-0-3
	1219B Computer, Volume I		4682-1-2
	1219B Computer, Volume II		3682-2-2
	1219B Maintenance Study Guide		5057-0-1
	1219B Diagnostics, Volume I		4637-1-1
	1219B Diagnostics, Volume II		4637-2-1
	1219B Diagnostics, Volume III		4637-3-1
1230	1230 Computer, Volume I		3762-1-3
	1230 Computer, Volume II		3762-2-3
	1230 Programming Study Guide		3944-0-2
	1230 Maintenance Study Guide		3992-0-1
	1230 Diagnostics, Volume I		4272-1-2
	1230 Diagnostics, Volume II		4272-2-2
	1230 Diagnostics, Volume III		4272-3-2
	1230 Diagnostics, Volume IV		4272-4-2
	1230 W/FP Diagnostics, Volume I		4418-1-1
	1230 W/FP Diagnostics, Volume II		4418-2-1
	1230 W/FP Diagnostics, Volume III		4418-3-1
	1230 W/FP Diagnostics, Volume IV		4418-4-1

Product	Name	Serial Number	PX #
1230 (Cont.)	1230 Technical Manual W/FP, Volume I		4692-1-1
	1230 Technical Manual W/FP, Volume II		4692-2-1
	1230 Technical Manual W/EMU, Volume I		4721-1-1
	1230 Technical Manual W/EMU, Volume II		4721-2-1
	1230 Diagnostics W/EMU, Volume I		4929-1-1
	1230 Diagnostics W/EMU, Volume II		4929-2-1
	1230 Diagnostics W/EMU, Volume III		4929-3-1
	1230 Diagnostics W/EMU, Volume IV		4929-4-1
1206 TTY	Teletypewriter		2729-0-2
	Teletype Bulletin 215B		3865-0-1
	Teletype Bulletin 1154B		3866-0-1
	Teletype Bulletin 281B, Volume I		3869-1-1
	Teletype Bulletin 281B, Volume II		3869-2-1
	Teletype Bulletin 270B, Volume I		3870-1-1
	Teletype Bulletin 270B, Volume II		3870-2-1
	Teletype Bulletin 270B, Volume III		3870-3-1
	Teletype Bulletin 1201B		4423-0-1
	Teletype Bulletin 295B		4424-0-1
1240	1240 Magnetic Tape Unit, Volume I	1-62	2810
	1240 Magnetic Tape Unit, Volume II	1-62	2810
	1240 18-Bit Maintenance Tests		3542-0-2
	1240 Magnetic Tape Unit, Volume I	63-120	3640-1-1
	1240 Magnetic Tape Unit, Volume II	63-120	3640-2-1
	1240 Magnetic Tape Unit, Volume I	121 & up	3640-1-2
	1240 Magnetic Tape Unit, Volume II	121 & up	3640-2-2
	1240 Maintenance Study Guide		3946-0-1
	1240 Diagnostics, Volume I		4420-1-2
	1240 Diagnostics, Volume II		4420-2-2
1243	1243 30-Bit Maintenance Test		4527-0-1
	1243 Magnetic Tape Unit, Volume I		4933-1-1
	1243 Magnetic Tape Unit, Volume II		4933-2-1
1259	1259 Teletypewriter		3379-0-2
	1257/1259 Typewriter		3379-0-3
	1259 30-Bit Maintenance Tests		3721-0-2
	1259 18-Bit Maintenance Tests		4271-0-1
1299	1299 Interconnection Panel		3123-0-2
1387	KATO Motor Generator Type 1387		3876-0-1
1392/1394	1392/1394 Motor Generator		3382-0-1
	Systems Monitoring Panel		4858-0-1

Product	Name	Serial Number	PX #
1469	1469 High-Speed Printer		2577-0-1
	1469 30-Bit Maintenance Test		4128-0-1
1538	1538 I/O Console Technical Manual		5005-0-2
	Digitronics Perforated Tape Reader, Model 2500		3871-0-1
	Teletype High-Speed Tape Punch		3865-0-1
	Teletype, Parts, High-Speed Tape Punch		3866-0-1
	Teletype Motor Units		4424-0-1
1540	1540/1541 Magnetic Tape Unit, Volume I		3334-1-4
	1540/1541 Magnetic Tape Unit, Volume II		3334-2-4
	1540 30-Bit Maintenance Tests		3645-0-2
	1540/1541 18-Bit Maintenance Tests		3644-0-1
1547	1547 Instruction Manual		6297-0-1
1549	1549 CRPI, Volume I		5007-1-1
	1549 CRPI, Volume II		5007-2-1
	SOROBAN Manual for RPI (Part for CRPI Manual)		
1551	1551 Alphanumeric Display Unit		4537-1-1
1560	1560 Magnetic Tape Unit, Volume I		4917-1-1
	1560 Magnetic Tape Unit, Volume II		4917-2-1
	Potter M906 II-1 Tape Transport (1240)	1-120	3872-0-1
	Potter M906-II-2 Tape Transport (1240)	121 & up	3872-0-2
	Potter MT-120A Tape Transport		3873-0-1
	Potter SC-1150(M) Tape Transport		3874-0-1
	Ampex TM-12R Tape Transport		3875-0-1
1569	1569 High-Speed Printer		5008-0-1
	Data Products Manual for 1569		
	Analex Series 4-1000A Printer		3877-0-1
	1569 Technical Manual (7036900-00)		3748-0-1
	1569 Technical Manual (7036800-01) Supplement		4085-0-2
	1569 Technical Manual (7036900-02) Supplement		4665-0-1
ARTS III	ARTS III Technical Manual, DPS Preliminary		5895-0-1
	ARTS III Technical Manual, IOP, Volume II		5896-2-2
	ARTS III Technical Manual, Memory Unit, Volume I		5897-1-2
	ARTS III Technical Manual, Memory Unit, Volume II		5897-2-2

Product	Name	Serial Number	PX #
ARTS III (Cont.)	ARTS III Technical Manual, DPS & PS		5898-0-2
	ARTS III Technical Manual, DPS & PAM		5899-1-2
	ARTS III Technical Manual, Central Processor		5900-2-1
AN/UYK-7	AN/UYK-7 Technical Manual	A36	6423-0-2
	AN/UYK-7 Technical Manual	A9,A11,A16	6131-0-2
	AN/UYK-7 Technical Manual	A30,A38,A54	6509-0-2
	2 Cabinet Supplement	A48,A81,A85	7810-0-1
	2 Cabinet Supplement	A86	7886-0-2
	2 Cabinet Supplement	A64	10030-0-2
	2 Cabinet Supplement	A109,A110,A114, A119,A123,A126	10132-0-2
	2 Cabinet Supplement	A98	10133-0-2
	2 Cabinet Supplement	A115,A117,A121	10199-0-2
	2 Cabinet Supplement	A113,A127	10317-0-1
	2 Cabinet Supplement	A56,A93,A128	10418-0-1
	2 Cabinet Supplement	A146,A147	10448-0-1
	2 Cabinet Supplement	A148	10449-0-1
	3 Cabinet Supplement	A54	6794-0-3
	3 Cabinet Supplement	A95,A96	10031-0-2
	3 Cabinet Supplement	A140,A144	10419-0-1
	4 Cabinet Supplement	A102,A103, A112,A170	10029-0-4
	4 Cabinet Supplement	A130	10198-0-2
	5 Cabinet Supplement	A52	6516-0-2
	Diagnostic Manual for Single Cabinet Set		7872-1-2
1616	1616 Technical Manual, Volume I		6483-1-1
	1616 Technical Manual, Volume II		6483-2-1
	1616 Technical Manual, 333 Memory		6728-0-2
1616/ UYK-15	1616 and AN/UYK-15 Technical Manual		6725-0-5
	1616 and AN/UYK-15 Maintenance Data		7845-0-4
	1616 and UYK-15 Study Guide		6736
	1616 and AN/UYK-15 Maintenance Data		7845-0-2
	1616 and AN/UYK-15 Diagnostic Manual		6475-0-3
AN/UYK-15	Technical Manual for 1616 Militarized Computer, Volume 1		6598-1-1
	Technical Manual for 1616 Militarized Computer, Volume 2		6598-2-1
UYK-15 (Mod)	UYK-15 (Mod) Technical Manual Supplement		10339-0-1
UYK-20	FDM Technical Manual		10082-2-1

UNIVAC EQUIPMENT MANUALS (Continued)

Product	Name	Serial Number	PX #
LAMPS MK III	Technical Manual, Spectrum Analyzer, MTC Test Set		10485-0-1
	Technical Manual, Spectrum Analyzer, FFT		10486-1-1
	Technical Manual, Spectrum Analyzer, Man. Entry Subsystem		10487-1-1
	Technical Manual, Spectrum Analyzer, Central Processor		10488-1-1
	Technical Manual, Spectrum Analyzer, IOP		10489-1-1
1816	MPC-16 Technical Manual, Volume 1		10022-1-1
	MPC-16 Technical Manual, Volume 2		10022-2-1
	HFFT Technical Manual (Supplement)		10236-0-1
1830	1830-03 Illustrated Parts Breakdown		6117-0-4
1840	1840 Magnetic Tape Set Technical Manual Volume I		6573-1-1
	1840 Magnetic Tape Set Technical Manual, Volume II		6573-2-1
	Technical Manual TIPI-II, 1840 Magnetic Tape Transport, Volume I		6347-1-1
	Technical Manual TIPI-II, 1840 Magnetic Tape Transport, Volume II		6347-2-1
	1840 Modular Magnetic Tape Transport, Volume I		8122-1-3
	1840 Modular Magnetic Tape Transport, Volume II		8122-2-3
1840 (Mod)	1840 (Mod) Magnetic Tape Transport and Power Supply Technical Manual		7984-0-3
MK-95 Mod 0	MK-95 (1870) I/O Console, Volume 1		8770-1
	MK-95 (1870) I/O Console, Volume 2		8770-2
LSM MK90	LSMC MK90 Mod 0 Technical Manual, Vol.1		10221-1-1
	LSMC MK90 Mod 0 Technical Manual, Vol.2		10221-2-1
	LSMC Simulator Technical Manual		10510
DEAC (OJ-172(V)/ UYK	OJ-172 Technical Manual, Volume I NAVSHIPS	0967-323-3010	6641-1-1
	OJ-172 Technical Manual, Volume II NAVSHIPS	0967-323-3020	6641-2-1

SOFTWARE DOCUMENTS

Computer	Name	PX #
1218	1218, Programmers Reference Manual	2910C
	1218, Programmers Study Guide	3818-0-2
1219	1219, Programmers Reference Manual	3288
	1219, Programmers Study Guide	3943-0-2
	The ULTRA/18-1 Assembler User's Manual and Programmers Reference Manual	4901
	1219B Programmers Reference Manual	4939
1218/1219	SYCOL for 1218/1219	4171
	FORTRAN for 1218/1219	4165
1206	The SYCOL Programming Language for 1206	3831
	The SYMON Monitor	3829
	The LIBIN Librarian and Corrector	3832
	The SYMON Monitor Operating Procedures	3838
1212	1212, Compiling System Manual	3893
	1212, Operating and Support Manual	3894
	1212, Programmers Reference Manual	3895
	The SYCOL Programming Language for 1212	4065
	The SYMON Monitor	3829
	The LIBIN Librarian and Corrector	3832
1212 (642B)	642B Programmers Study Guide	3941-0-1
1206/1212/ 1230	The SYCOL Programming Language	3830
	The FORTRAN Programming Language for SYMON	4733
1212/1230	SYCOL Flow Chart	4643
	The SYCOL 30-Bit Computer Programming Language	5613
1230	1230, Compiling Systems Manual	3890
	1230, Operating and Support Manual	3891
	1230, Programmers Reference Manual	3892
	The SYMON Monitor Operating Procedures with Expanded Memory	4546
	Programmers Study Guide	3944-0-1
	The SYMON Monitor	3829
	The LIBIN Librarian and Corrector	3832
	The SYMON Monitor Operating Procedures for the UNIVAC 1230	3838-1
	The SYCOL Programming Language for 1230 with Hardware Floating Point	4431
	The FORTRAN IV Programming Language	4741
M642B	The SYCOL Programming Language for M642B with Expanded Memory	4430

SOFTWARE DOCUMENTS (Continued)

Computer	Name	PX #
1230 MTC	Support Software User's Manual for TRS	4554
	Library of Functional Description for the	
	1230 MTC Baseline Support Software	5000
1830B	SYMON Monitor for 1830A Modified Computers	6107
	SYCOL Programming Language, 1830A Modified	6054
	Diagnostic Manual for 1830B, Volume I	6619-1-1
	Diagnostic Manual for 1830B, Volume II	6619-2-1
	SYMON Monitor Operating Procedures	
	1212 and 1230 Computers	4663
AN/UYK-7 and S-3A Data	ULTRA/32 Macro Assembly System User's Manual	5977
AN/UYK-7	ULTRA/32 Macro Assembly System	5449
	CMS-2 User's Reference Manual, Volume 1	6240
	CMS-2 User's Reference Manual, Volume 2	6240
	NAVSHIPS 0967-028-0060	
	CMS-2 Programmers' Manual	6555
	NAVSHIPS 0967-028-0070	
	CMS-2 Study Guide	5852-2-3
	CMS-2 Operating Procedures	6678-xx
	MUSE User's Reference Manual	10200
	JOVIAL, AN/UYK-7/1108 Prog. Ref. Manual	7726
	JOVIAL, AN/UYK-7 Programmer's Ref. Manual	7733
1616	1616 Level 1 Support Software Users Handbook	6626
	1616 Level 1 Support Software Design and	
	Maintenance Manual	6639
	1616 Level 2 Support Software Users Handbook	10028
	1616 & AN/UYK-20 Level 0 Software Users	
	Handbook	6331
	1616 Level 1 Support Software Users Handbook	6649
AN/UYK-20	UYK-20 Users Handbook, Assembler System	10456
1624	Programmers Reference Manual (1100 Host	
	Assembler)	10570
ARTS III	ARTS III Host Software Users Reference Manual	10568
	ARTS III Support Software SIR-CINOS, Volume 1	6194
	ULTRA Assembler, Volume 2	6194
	Emulation Package, Librarian, Loader Utility, Vol.3	6194
	ARTS III Support Software User's Manual	6196

PRODUCT INFORMATION

COMPUTER BOOTSTRAPS AND EQUIPMENT CONFIGURATIONS

Every stored program computer must be equipped with some facility to load into its memory those operating programs that are to be executed for any processing job. The philosophy of computer design dictates the method by which this is accomplished. During the evolution of computers throughout their history, methods varying from simple hardware initiation of a direct input to memory (of a load routine) from an outside source to sophisticated dynamic program construction initiated by a simple micro instruction, have been used. The Non-Destructive Read Out (NDRO) type of initial input routine has been adapted for UNIVAC® Military Computers in recent years. The term "BOOTSTRAP" has been applied to this NDRO initial input routine. The Bootstrap is used for initial program loading or for operating program reload in conjunction with the automatic recovery feature designed into the computers. Upon encountering a program fault this automatic recovery feature forces the computer into the wired initial input routine (Bootstrap) that reloads an operating program segment which, in turn, recovers and reinitiates the main program at a planned "restart" point.

The bootstrap loads a short "program load routine" into memory and then transfers computer control (by a jump instruction) to that program segment which then loads the balance of the program and checks the validity of the program load.

Instructions and constants are contained within a given Bootstrap memory in UNIVAC Military computers which feature NDRO Bootstrap. Certain UNIVAC computers feature two separate Bootstraps routines with selection determined by a switch position.

Design and Programming the NDRO Bootstrap memory is accomplished at the time of manufacture. The actual program is dependent on the type of input equipment the Bootstrap is intended to control, the mode of equipment operation and the computer channel to which the input device is connected. The format of the Bootstrap program affects not only the wiring of the Bootstrap assembly, but also dictates the format of the program load routine and diagnostic memory test.

In order to prevent delays in delivery of hardware and compatible software, timely definition of Bootstrap requirements and equipment configuration is necessary. A BOOTSTRAP ORDER-ING INFORMATION FORM for specific computer types and EQUIPMENT CONFIGURATION CHECK LISTS have been prepared for this purpose. In addition, a matrix listing Bootstrap assemblies that are currently available at no extra cost is prepared and will be updated periodically to include new Bootstrap assemblies. The ordering form and listing for UNIVAC computers are attached to each computer description.

Customers or UNIVAC personnel responsible for definition must be informed of the need to order a Bootstrap with a computer. The appropriate Bootstrap ordering information form and configuration check lists should be completed in detail by cognizant personnel and submitted to Marketing Services, Eagen Plant, where the information can be disseminated to departments concerned.

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

CABLE ASSEMBLIES

Cable Ass'y. No. With Connectors①	Cable Drawing	Connector "A" (Pins)	Connector "B"	Bandmarker Used (I/O)	Description I = Input, O = Output IC = Intercomputer
7051128-xx	7956691-01	90	90 pin	No	I, O, IC Light Land Use
7084166-xx	7956256-00	90	90 pin	No	I, O, IC Light Shipboard
7072811-xx	7956687-00	90	90 pin	No	I, O, IC Heavy Armor Shipboard
7075589-xx	7956691-01	90	120 pin	No	I, O, IC Light Land
7077524-xx	7956256-00	90	120 pin	No	I, O, IC Light Shipboard
7075582-xx	7956691-01	120	120 pin	No	I, O, IC Light Land
7077523-xx	7956256-00	120	120 pin	No	I, O, IC Light Shipboard
7077522-xx	7956785-00	120	120 pin	No	I, O, IC Light Shipboard
7085138-00	7956691-01	85 ②	90 pin	Yes	I, IC Light Land
-01	-01	85 ③	90 pin	Yes	O, IC Light Land
7216322-00,02, 04,06	7956256-00	85 ②	90 pin	Yes	I, IC Light Shipboard
-01, 03, 05, 07	-00	85 ③	90 pin	Yes	O, IC Light Shipboard
7085139-00, 01, 03	7956691-01	85 ②	85 pin③	Yes	O, I, IC Light Land
-02	-01	85 ④	85 pin②	Yes	Special for 1840 Interface
-04	-01	85 ②	85 pin③	Yes	O for 1840 Interface
-05	-01	85 ②	85 pin②	Yes	I, for 1840 Interface
7216323-00	7956256-00	85 ②	85 pin③	Yes	I, IC Light Shipboard
7216323-01	-00	85 ③	85 pin②	Yes	O, IC Light Shipboard
7600300-00, 02, 04		85	90 pin		O for 1840 Interface
-01, 03, 05		85	90 pin		I for 1840 Interface
7119076-00, 02, 04, 06, 08	7956256-00	85 ②	85 pin②	Yes	I for 1840 Interface
-01,03,05,07,09	-00	85 ③	85 pin③	Yes	O for 1840 Interface
7085462	7956691-00	120	2 cards	Yes	Special for ICCU Interface
7085461	7956691-00	90	2 cards	Yes	Special for ICCU Interface
7085463-00 thru 03	7956691-01	85 ②	2 cards	Yes	Special for ICCU Interface (30 bit)I
-04 thru 07	-01	85 ③	2 cards	Yes	Special for ICCU Interface (30 bit)O
7084162-00 thru 03	7956691-01	85 ②	2 cards	Yes	Special for ICCU Interface (I)
-04 thru 07	-01	85 ③	2 cards	Yes	Special for ICCU Interface (O)
7050256-00,02,04, 06	7956691-01	120	5 cards	No	Special for 1004 Interface (I)
-01, 03, 05, 07	-01	120	5 cards	No	Special for 1004 Interface (O)
7033448-00,02,04,06	7956691-01	90	5 cards	No	Special for 1004 Interface (I)
-01, 03, 05, 07	-01	90	5 cards	No	Special for 1004 Interface (O)
7122700	4956792-00	90	5 cards	Yes	Special for Uniservo VIII C (I)
7122701	4956792-00	90	5 cards	Yes	Special for Uniservo VIII C (O)
7122702	4956792-00	85 ②	5 cards	Yes	Special for Uniservo VIII C (I)
7122703	4956792-00	85 ③	5 cards	Yes	Special for Uniservo VIII C (O)
7122704	4956792-00	85 ②	5 cards	Yes	Special for FASTRAND (I)
7122705	4956792-00	85 ③	5 cards	Yes	Special for FASTRAND (O)

NOTES ① See drawing dash (–) number for cable length.

② Connector Keying –00 (Input)

③ Connector Keying –01 (Output)

④ Connector Keying –02

See Equipment O & D Drawing for Cable Connector Part Numbers.

PRODUCT INFORMATION

UNIVAC 1212 MILITARY COMPUTER
(CP-642B/USQ-20(V))

PX 3224

The UNIVAC 1212 (CP-642B) is a 1962 design advancement, over the 30-bit 1206 (CP-642A) Computer, that introduces the use of control memory (2/3 microsecond magnetic thin film) and a minus 3 volt (N3) I/O interface. These features increased transfer rates to 125 K words per channel. Two interface voltages and two types of I/O control chassis are offered as options. Any channel of a Type II Chassis can be used for intercomputer communication and peripherals whereas the Type I Chassis are used for peripherals only.
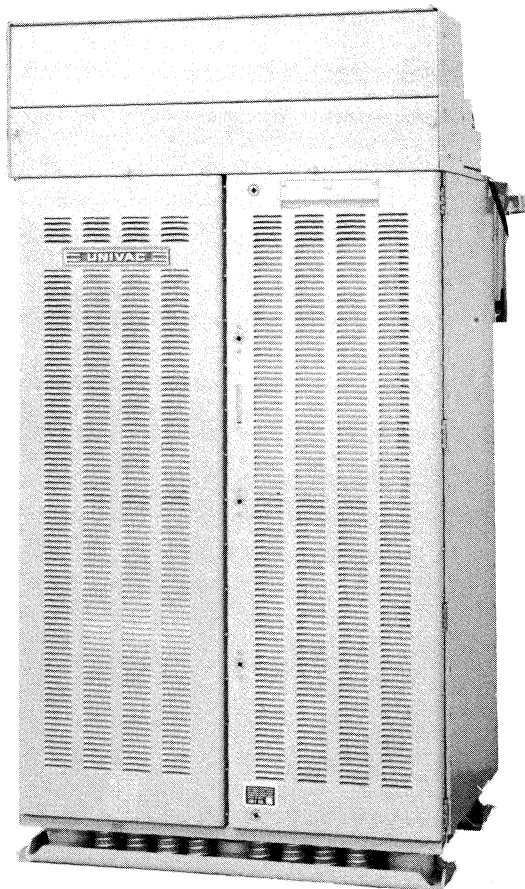
FUNCTIONAL CHARACTERISTICS

30-BIT WORD LENGTH
Half-Word Option

MEMORY
Magnetic Core Main Memory
16K, 32K Words
4-Microsecond Cycle Time
NDRO Memory (Bootstrap)
2 Programs (32 Words Each)
Magnetic Thin-Film Control Memory
64 Words
667-Nanoseconds Cycle Time

SEVEN INDEX REGISTERS (15 Bits)
Located in Control Memory

INSTRUCTIONS
62 Single Address Instructions
15 Logical
Square Root Instruction
Branching Possible on Most

ARITHMETIC
One's complement, subtractive

REPRESENTATIVE OPERAND LENGTH
15 or 30 Bits

FIXED POINT EXECUTION TIME

C = A + B, Store C	24 μsec
C = A B, Store C	56-72 μsec
C = A / B, Store C	80 μsec

REAL TIME CLOCK
(Time Increment of 1/1024 Second)

INPUT/OUTPUT CAPABILITIES (Buffered)
4, 8, 12 or 16 I/O Channels
Automatic Priority Determination

Transfer rate words/second	Interface	
	N3	N15
Single Channel	125K	41K
Multi Channel	250K	125K
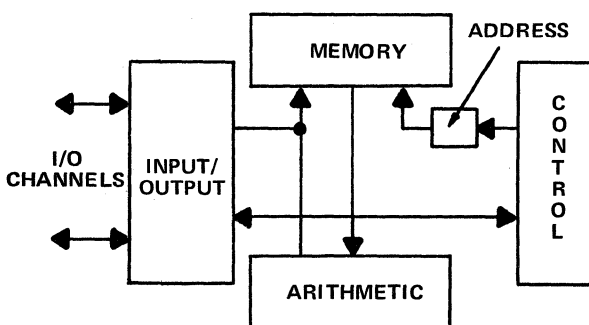
FUNCTIONAL DIAGRAM

PRODUCT INFORMATION

PHYSICAL CHARACTERISTICS

CONSTRUCTION

A solid welded aluminum main frame contains pull out drawer assemblies of printed circuit cards, memory stacks, and other discrete components that are all accessible from the front of the computer. Diode-transistor logic circuits are mounted on 15 pin circuit cards that are low cost throw away modules in case of malfunction.

The following specifications were used as a guide for the design and construction of the 1212 (CP-642B).

General Electronic Equipment MIL-E-16400D (3)
(Reliability, Simplicity, Material, Workmanship, Production and Central Inspection, Ease of Operation and Maintenance)

Enclosure MIL-STD-108D
Technical Manual MIL-M-16616 (1)
Drawings MIL-D-70327 (1)
Preparation for Delivery MIL-E-17555
Radio Interference MIL-I-16910A (2)
Vibration MIL-STD-167

Operating Temperature: 0° to 50°C

Cooling:
Water — 6.3 gallons/minute at $70^{\circ}\pm5^{\circ}$F
Air — approximately 650 cfm at 80°F max. input .
Water cooled, shock mounted:
　　 Size — 72"H x 38"W x 37"D
　　 Weight — 2400 pounds

Air cooled, solid mounted:
　　 Size — 71"H x 38"W x 38"D
　　 Weight — 2400 pounds

Power:
Water
115V, 3 phase, 400 Hz, 2.5 KW (Regulated)
115V, 3 phase, 400 Hz, 625 W (Unregulated)
Air
115V, 3 phase, 400 Hz, 2.5 KW (Regulated)
115V, 1 phase, 400 Hz, 300 W (Unregulated)

Reliability:
MTBF of 1500 Hours (Calculated)

Design Specification　　　　　　　DS 4654
Acceptance Specification　　　　　DS 4655
Technical Description　　　　　　　　3224A

Product Line Manuals (PX):

EQUIPMENT SERIAL NUMBER	TECHNICAL	DIAGNOSTIC	PROGRAMMING	MAINTENANCE
1 thru 4	3290 (4)			
5 thru 19	3290-X-1 (4)	3522-X-1 (3)	3941-0-1	3793-0-2
	3291-X-2 (2)			
20 and up	4688-X-1 (2)	3522-X-1 (3)	3941-0-1	3793-0-2

Outline and dimensional drawing:

AIR COOLED — 7025066
WATER COOLED — 4055104

PRODUCT INFORMATION

UNIVAC 1213 MILITARY COMPUTER (SPECIAL)
(CP-808(V) TYK)

PX 3224

The UNIVAC 1213 (CP-808) Computer is a physically modified 1212 (CP-642B) Computer to decrease its weight for installation in air transportable helihuts. Its functional characteristics are exactly the same as the 1212 but is limited to 12 I/O Channels (one I/O Chassis is not installed). Light weight doors and skins are used for the enclosure and the unit is air cooled only.
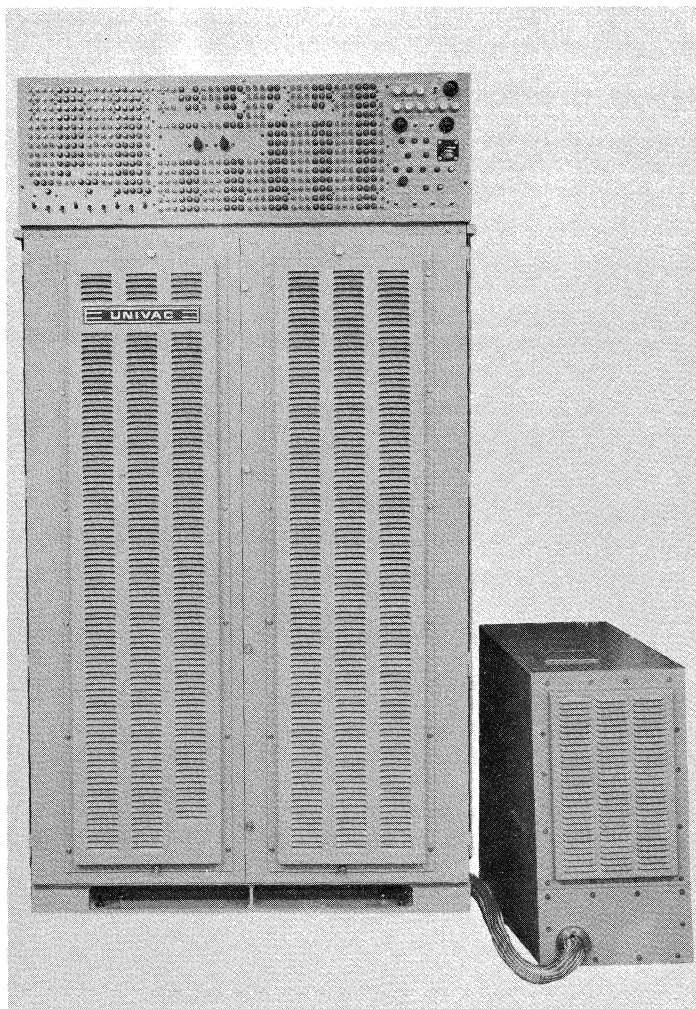
FUNCTIONAL CHARACTERISTICS

30-BIT WORD LENGTH
Half-Word Option

MEMORY
Magnetic Core Main Memory
32K Words
4-Microseconds Cycle Time
NDRO Memory
64 Words
Magnetic Thin-Film Control Memory
64 Words
667-Nanoseconds Cycle Time

SEVEN INDEX REGISTERS
Located in Control Memory

INSTRUCTIONS
62 Single Address Instructions
15 Logical
Square Root Instruction
Branching Possible on Most

REAL-TIME CLOCK
Internal at 1024 Hz, or
External up to 100 Khz Max, N15

INPUT/OUTPUT CAPABILITIES (Buffered)
12 I/O Channels (Maximum)
Automatic Priority Determination
Intercomputer on Any Channel

Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	125K	41K
Multi Channel	250K	125K

FUNCTIONAL DIAGRAM

Photo # 28299

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DEFENSE SYSTEMS DIVISION
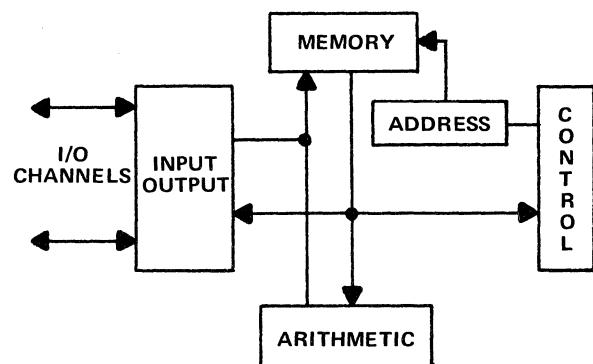
PHYSICAL CHARACTERISTICS

The main frame of the CP-808 is the same as that in the CP-642B Computer. One I/O chassis drawer position is vacant. Other design features contributing to the lighter weight computer are: light weight doors and skins, modified top covering and a different power supply (1214). The MTDS hut with equipment installed passed the:

Munson Road Test at Aberdeen, Maryland

Helicopter drop test

Temperature and Humidity test while operating

Sand and Dust test while operating

Size: 71"H x 38"W x 31"D
Weight: 1650 pounds
Power: 3000 watts, 208 ± 10% volts, 400 Hz

REFERENCES

Design Specification   DS 4781
Acceptance Specification   SB 10088

Outline and Dimension Drawing   7024955

Product Line Manuals (PX):

TECHNICAL	DIAGNOSTIC
4649-X-1 (2)	4678-X-1 (4)

UNIVAC 1214 (PP4892/TYA-20) EXTERNAL POWER SUPPLY

Size: 26"H x 13"W x 27"D
Weight: 230 pounds
Input Power: 500 watts, 208 volts, 400 Hz (Unregulated)
Final Assembly Number: 7046125-00
Outline and Dimension Drawing: 7046126

PHYSICAL CHARACTERISTICS (CONTINUED)

COOLING

Ambient air circulation at 300 cfm

INTERFACE

Word length (by switch selection):	18 or 30/32 bits
Signal voltage:	-3 volts or -15 volts
Computer — DEAC channels:	2 parallel input and output or
	2 serial input and output or
	1 serial input and output and
	1 parallel input and output

ENVIRONMENTAL CHARACTERISTICS

Except for inherent limitations of typewriter, paper tape, paper tape reader and punch mechanism and magnetic tape used, the following specifications were used as design goals:

Temperature:	MIL-E-16400 Class 4
Relative Humidity:	MIL-E-16400
Enclosure (Drip-Proof):	MIL-STD-108
Salt Spray:	FED-STD-151 Method 811
RFI:	MIL-I-16910
Shock:	MIL-S-901 Grade A Class II
Vibration:	MIL-STD-167 Type I
Inclination:	MIL-E-16400

REFERENCES: Design Specification SB10301
Design Specification SB10194

PRODUCT INFORMATION

UNIVAC 1218 MILITARY COMPUTER
(CP-789/UYK)

PX 3051

The UNIVAC 1218 Computer was designed in 1962 as a militarized version of the 18-bit Control Unit Tester (CUT) in parallel with the commercial version, Prodac 580, a process control computer built for Westinghouse. The philosophy of simplicity was introduced into Univac products and provides a low cost ruggedized computer using simple instructions and modest technological advancements.
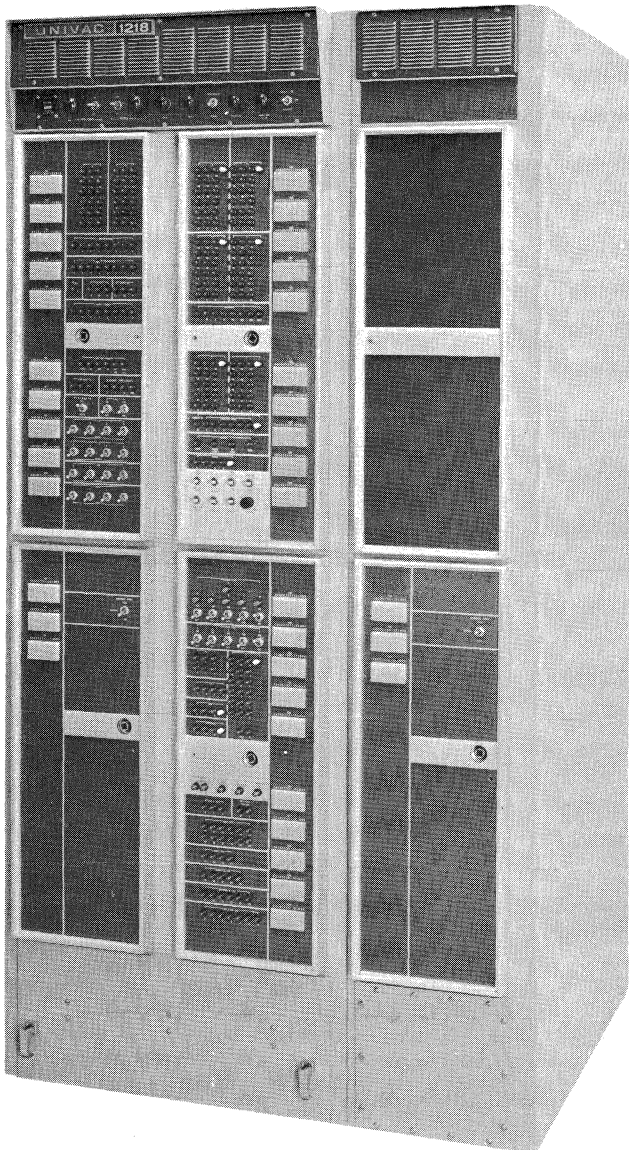
FUNCTIONAL CHARACTERISTICS

18-BIT WORD LENGTH
    Double-Word Option
        Arithmetic
        Input/Output Transfer

MEMORY
    Magnetic Core
        4K, 8K, 16K or 32K Words
            (2 Bay for 16K)
            (3 Bay for 32K)
        32 18-Bit Words NDRO (Bootstrap)
        4-Microsecond Cycle Time

EIGHT INDEX REGISTERS
    Located in Core Memory
        18 Bits Each

ARITHMETIC
    One's Complement Binary

98 SINGLE ADDRESS INSTRUCTIONS
    16 Logical (Bit Manipulation Type)
     4 Double Precision

REAL-TIME CLOCK
    Internal (Time Increment of 1/1024 Second)
    External (N15 100KHz Maximum)

INPUT/OUTPUT CAPABILITIES (Buffered)
    Four or Eight I/O Channels
    Forward or Backward
    Automatic Priority Determination
    Externally Specified Indexing
    Dual Channel Capability (36 Bits)
    Intercomputer on Any Channel

Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	41K	28K
Multi Channel	100K	83K
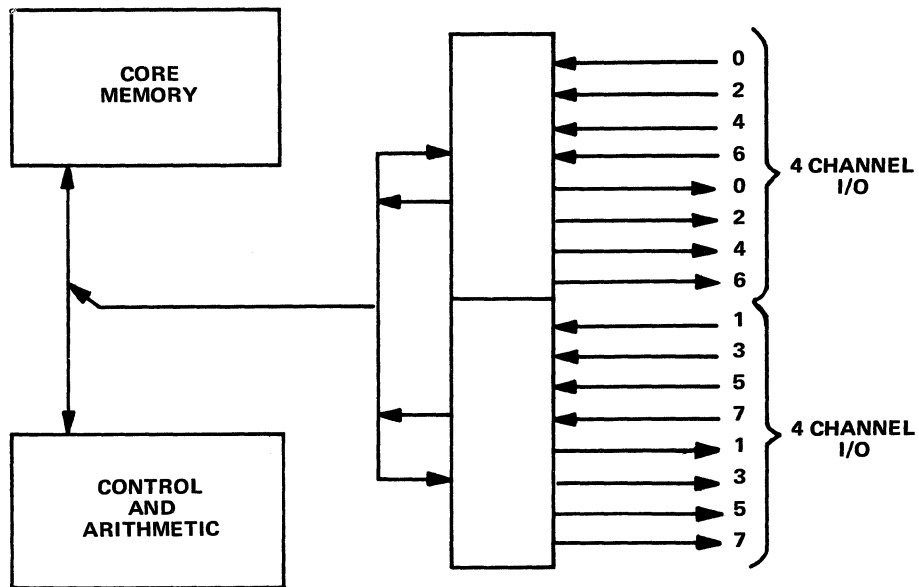
DEFENSE SYSTEMS DIVISION

```
                                              ┌ 0
                                              │ 2
                                              │ 4
                                              │ 6  ┐
CORE                                          │ 0  │ 4 CHANNEL
MEMORY                                        │ 2  │    I/O
                                              │ 4  │
                                              │ 6  ┘
                                              │ 1  ┐
                                              │ 3  │
                                              │ 5  │
CONTROL                                       │ 7  │ 4 CHANNEL
AND                                           │ 1  │    I/O
ARITHMETIC                                    │ 3  │
                                              │ 5  │
                                              └ 7  ┘
```

FUNCTIONAL DIAGRAM

PHYSICAL CHARACTERISTICS

MILITARIZED CONSTRUCTION
   The following specifications were used as a guide for the design and construction of the 1218 (CP-789).

   MIL-E-16400
   Pull-Out Drawer Modules
   Internal Blower Ambient Air Cooling

16K MEMORY — 2 BAY
   Size
      72"H x 26"W x 29"D (without stabilizer)
      73"H x 29"W x 39"D (with stabilizer)
   Weight
      830 Pounds
   Power Requirements
      1.0 KW, 115V, 400 Hz $\pm$10%, 3 phase
      0.2 KW, 115V, 60 Hz $\pm$10%, 1 phase

GREATER THAN 16K MEMORY — 3 BAY
   Size
      72"H x 39"W x 29"D (without stabilizer)
   Weight
      1080 Pounds
   Power Requirements
      1.25 KW, 115V, 400 Hz $\pm$10%, 3 phase
      0.25 KW, 115V, 60 Hz $\pm$5%, 1 phase

REFERENCES

Design Specification   SB 10106
Acceptance Specification   SB 10049
Outline and Dimension Drawing   7024756
Installation and Checkout Kit   LOG 7016
One Year Spares Kit   LOG 7509

Product Line Manuals (PX):

TECHNICAL	DIAGNOSTIC	PROGRAMMING	MAINTENANCE
3639-X-1(2)	3348-0-1	3818-0-2	3942-0-1
3639-X-2(2)	3349-0-1		
	3929-X-1(2)		

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PRODUCT INFORMATION

UNIVAC 1219B MILITARY COMPUTER
(CP-848/UYK)

PX 5010

The 1219 Computer is a second generation 18-bit computer. Primary technological advancement included: 1. increased memory speed to 2 μsec, 2. increased input/output capacity by using high-speed (500 nanosecond) core memory buffer control, 3. more compact circuit packaging that permits 65K word memory in a 26" wide cabinet (2 bay) and 16 input/output channels in a 38" wide cabinet (3 bay).

The "B" version of the 1219 is designed to resolve compatibility problems developed in word format variations and input/output timing differences that extend the UNIVAC 18-bit computer history by the requirements of various applications and customers. Three general input/output modes are provided: 1218 normal, 1218 NTDS compatible, and 1219B.
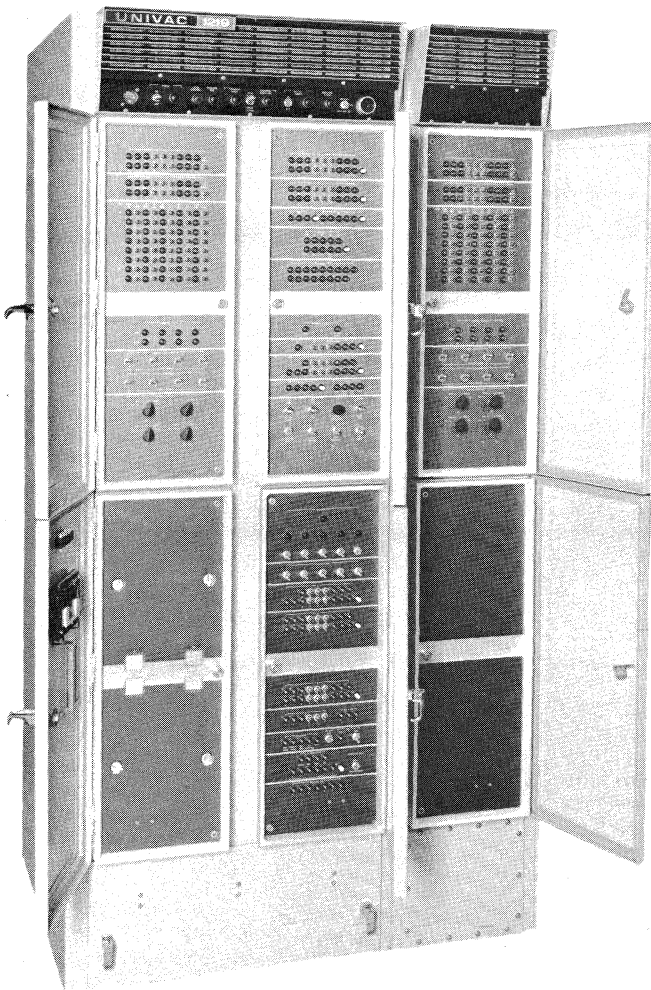
FUNCTIONAL CHARACTERISTICS

18-BIT WORD LENGTH
    Double-Word Option
        Arithmetic
        Input/Output Transfer

MEMORY
    Magnetic Core Main Memory
        2-Microsecond Cycle Time
        8K, 16K, 32K, or 65K Words
    Fast Core Control Memory
        500-Nanosecond Cycle Time
        128 18-Bit Words (8 I/O Channels)
        256 18-Bit Words (16 I/O Channels)
    Fixed Memory
        32 18-Bit Words (NDRO)
        Bootstrap and Fault Recovery Operations

EIGHT INDEX REGISTERS (18 Bits Each)
    Located in Control Memory

102 SINGLE ADDRESS INSTRUCTIONS
    16 Logical (Bit Manipulation Type)
    4 Double Precision

REAL-TIME CLOCK
    Internal (Time Increment of 1/1024 Second)
    External (N15 100KHz Maximum)

FUNCTIONAL DIAGRAM

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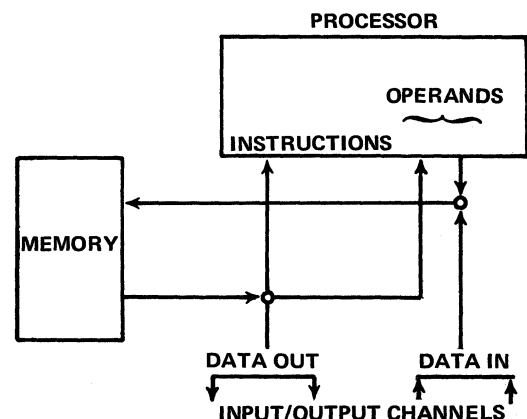
INPUT/OUTPUT CAPABILITIES (Buffered)
4, 8, 12 or 16 I/O Channels
Forward or Backward
Automatic Priority Determination
Continuous Data Mode
Externally Specified Indexing
Externally Specified Addressing
Dual Channel Capability (36 Bits)
Intercomputer on Any Channel

Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	167K	41K
Multi Channel	500K	167K

PHYSICAL CHARACTERISTICS

SIZE AND WEIGHT
2 Module, 8 I/O, 65K Memory

	WITHOUT STABILIZER	WITH STABILIZER
Height:	72 inches	72 inches
Width:	26 inches	27 inches
Depth:	29 inches	37 inches
Weight:	1000+ pounds	

3 Module, 12 or 16 I/O, 65K Memory

	WITHOUT STABILIZER	WITH STABILIZER
Height:	71 inches	72 inches
Width:	38 inches	39 inches
Depth:	29 inches	37 inches
Weight:	1400-1500 pounds	

POWER REQUIREMENTS
115-volt, 3-phase, 400 Hz $\pm$ 5%, 2510 watts maximum,
air cooled (for 16 I/O channels and 65K memory)

MILITARIZED CONSTRUCTION
The following specifications were used as a guide for the
design and construction of the 1219B (CP-848).

Front access, pull-out drawer modules
Single unit, welded framework cabinet
Military specifications and standards

General	MIL-E-16400E(4)
Enclosure	MIL-STD-108D
RFI	MIL-I-16910C(2)
Vibration	MIL-STD-167
Shock Test	MIL-S-901C Amendment 2

ENVIRONMENT
Operating Temperature Range:
0 degrees to 50 degrees C

Storage Temperature Range:
-62 degrees to +75 degrees C

Relative Humidity to 95 percent

REFERENCES

Design Specification	SB 10157
Acceptance Specification	SB 10163
Outline and Dimension Drawing	7053743

Product Line Manuals (PX):

EQUIPMENT TYPE	TECHNICAL	DIAGNOSTIC	PROGRAMMING	MAINTENANCE
1219	3316-X-3(2)	3520-X-2(2)	3943-0-2	3418-0-1
1219A	3316-X-3(2)	3520-X-2(2)	3943-0-2	3418-0-1
1219B	4682-X-2(2)	4637-X-1(2)	3943-0-3	5057-0-1

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PRODUCT INFORMATION

UNIVAC 1230 MILITARY COMPUTER
(CP-855/UYK)

PX 3600

The UNIVAC 1230 (CP-855/UYK) Computer is a second generation 30-bit military type computer designed for memory sharing (overlap) of 16K word modules of 2-microsecond core. Two memory banks, operating in parallel, allow two simultaneous references for input/output, instruction extraction or operand processing during one cycle. Further advancement over the predecessor included memory addressing (via special registers) beyond 32K word capacity (to 131K) for use with the 1503 Expanded Memory Unit (EMU) and the hardware Floating Point Option. One type of chassis is used for all optional input/output features. The instruction repertoire was extended to the requirements of new features.
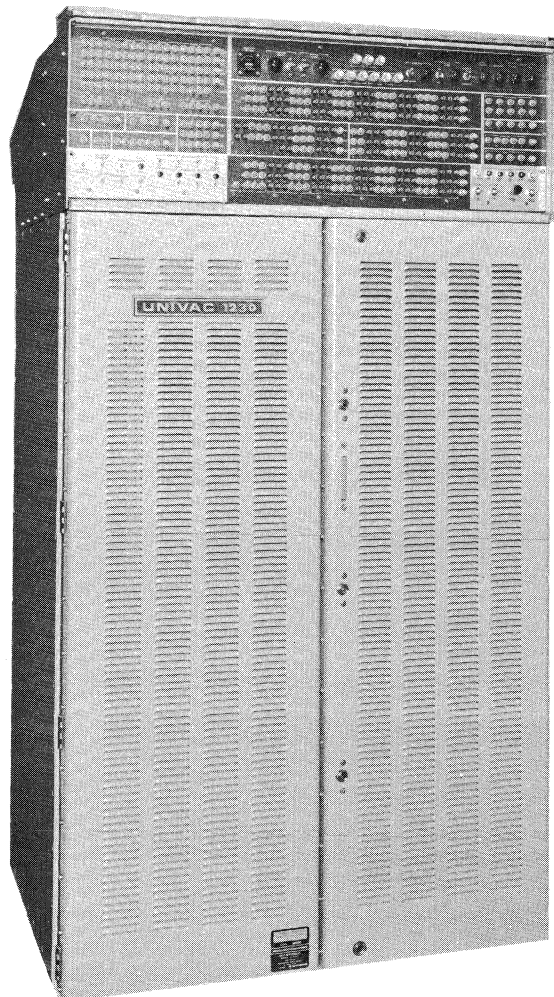
FUNCTIONAL CHARACTERISTICS

30-BIT WORD LENGTH
Half-Word Option

MODES OF OPERATION (Switch Selectable)
15-Bit Addressing Mode
17-Bit Addressing Mode

MEMORY
Magnetic Core Main Memory
32K Words
Expandable in 16K Banks
2-Microsecond Cycle Time for Each Bank
Overlap Feature Produces Effective 1-Microsecond Cycle Time
Nondestructive Readout Memory
64 30-Bit Words
Magnetic Thin-Film Control Memory
128 30-Bit Words
400-Nanosecond Cycle Time

SEVEN INDEX REGISTERS
Located in Control Memory
15-Bit (Normal Mode)
17-Bit (Expanded Mode)

INSTRUCTIONS
78 Single Address Instructions (Basic)
15 Logical
Square Root Instruction
Branching Possible on Most

REAL-TIME CLOCK
Internal (Time Increment of 1/1024 Second)
External (N15 100KHz Maximum)

INPUT/OUTPUT CAPABILITIES (Buffered)
16 I/O Channels
Automatic Priority Determination
Continuous Data Mode
Externally Specified Indexing
Externally Specified Addressing
Intercomputer on Any Channel

Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	167K	41K
Multi Channel	500K	333K

PHOTO #26166

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```
                    ┌──────────┐
              ┌────▶│   16K    │◀──┐      ┌──────────┐
              │     │  MEMORY  │   ├─────▶│  MEMORY  │
              │     ├──────────┤   │      │  SELECT  │
              │  ┌─▶│   16K    │◀──┘      └────┬─────┘
              │  │  │  MEMORY  │               │          ┌───┐
              │  │  └──────────┘               │      ┌──▶│ 4 │
              │  │                             │      │   ├───┤
              │  │                             │      ├──▶│ 4 │   OUTPUT
              │  │  ┌──────────┐               │      │   ├───┤   CHANNELS
              ●──┼─▶│ CONTROL  │───────────────┘      ├──▶│ 4 │
              │  │  └──────────┘                      │   ├───┤
              │  ●                                    ├──▶│ 4 │
              │  │                                        └───┘
              │  │                                   ┌───┐
              │  │                                   │ 4 │
              │  │                                   ├───┤
              │  │                                   │ 4 │   INPUT
              ●──┼───────────────────────────────────┤ 4 │   CHANNELS
              │  │                                   ├───┤
              │  │                                   │ 4 │
           ┌──┴──┴─────┐                             └───┘
           │ ARITHMETIC │
           └───────────┘
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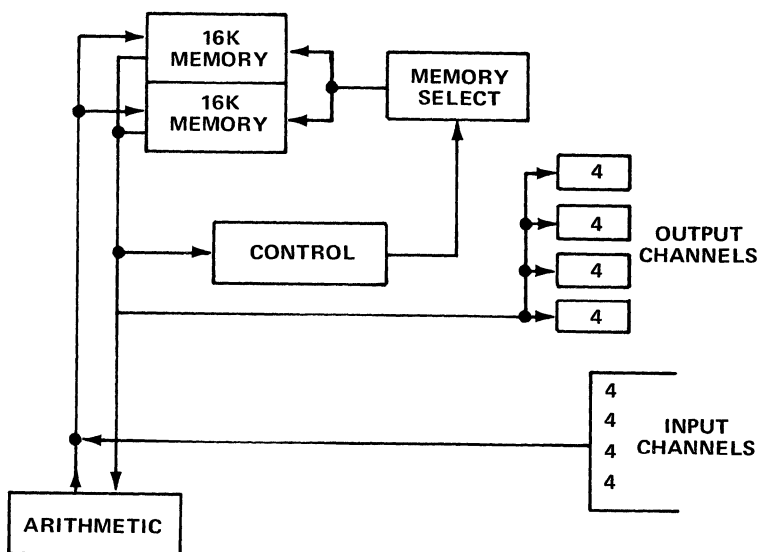
FUNCTIONAL DIAGRAM

PHYSICAL CHARACTERISTICS

COOLING
Water: 5.5 gallons-minute at 70° ±5°F
Air: Approximately 850 cfm at 80°F maximum input

COMPACT
Size: 72"H x 38"W x 37"D
      EMU Modified (72"H x 42"W x 37"D)
Weight: 2200 Pounds

RELIABILITY
MTBF of 1500 Hours (Calculated)

POWER
115V, 3 phase, 400 Hz, 3.1 KW (Regulated)

115V, 1 phase, 60 Hz, 500 W (Unregulated) — Air Cooled Blowers

115V, 3 phase, 400 Hz, 1455 W (Unregulated) — Water Cooled Blowers

MILITARIZED CONSTRUCTION
Front access, pull-out drawers
Single welded framework cabinet
Internal blowers for air circulation

The following specifications were used as a guide for the design and construction of the 1230 (CP-855).

General	MIL-E-16400
RFI	MIL-I-16910A
Enclosure	MIL-STD-108D
	(Drip proof)
Salt Spray	FED-STD-151
	(Method 811)

ENVIRONMENT
Temperature   MIL-F-18870B and
               MIL-E-16400E (Class 4)
               0° to 50°C
Relative Humidity to 95%

REFERENCES

Design Specification
1230	DS 4836
1230 with Floating Point	SB 10092
1230 Modified for EMU	SB 10099

Acceptance Specification
1230	DS 4837
1230 with Floating Point	SB 10094

Outline and Dimension Drawing   7025024

Product Line Manuals (PX):

EQUIPMENT	TECHNICAL	DIAGNOSTIC	PROGRAMMING	MAINTENANCE
1230	3762-X-3(2)	4272-X-2(4)	3944-0-2	3992-0-1
1230 with Floating Point	4692-X-1(2)	4418-X-1(4)		
1230 EMU Modified	4721-X-1(2)	4929-X-1(4)		

COMPUTER A	1230 EMU	COMPUTER B

| | CONTROL PANEL (A) | CONTROL PANEL (B) | |

1230 COMPUTER

(RIGHT HAND MODIFIED)

(COMPUTER A)

0, 16K OR 32K OF MAIN MEMORY (BANK 3 & 4)
0 OR 32 WORDS OF CONTROL MEMORY
0 OR 4 I/O CHAN (0 THRU 3)

(COMPUTER B)

0, 16K OR 32K OF MAIN MEMORY (BANK 3 & 4)
0 OR 32 WORDS OF CONTROL MEMORY
0 OR 4 I/O CHAN (0 THRU 3)

1230 COMPUTER

(LEFT HAND MODIFIED)

CABLES 51-54

CABLES 47-50
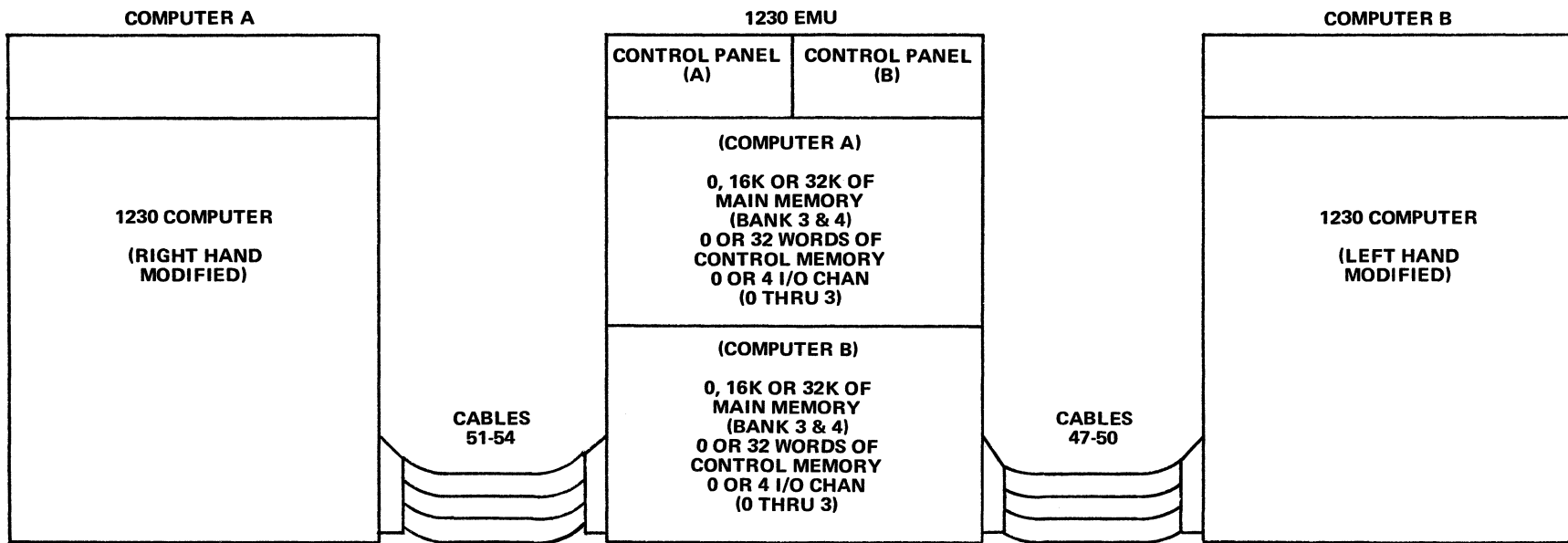
NOTES:

1)   When utilizing the 1230 EMU with a single computer, the B section (bottom) should be used to keep the center of gravity low.

2)   The length of cables between the EMU and computer is limited to 18 inches.

TYPICAL 1230 EXPANDED MEMORY UNIT (1503) INTERCONNECTION (FRONT VIEW)

PRODUCT INFORMATION

UNIVAC CP-890/UYK MILITARY COMPUTER (C-3)

PX 4292A

In 1967, Univac designed and built the CP-890/UYK Computer to satisfy the navigation requirements of the U.S. Navy's Polaris submarines. It is built to pass through a 25-inch diameter hatch without dismantling; weight and power were minimized while still providing general-purpose capability and applications. The physical configuration consists of three hinged chassis containing printed circuit logic cards and core memory array stacks. A display panel includes approximately 400 indicator light switches, a keyboard, and a keyset. The power supply is housed at the lower rear of the cabinet. Such standard features as hardware floating point, power failure detection, and protection, executive mode of operation and the necessary logic and wiring to permit memory expansion (external) to 262K words in 16K asynchronous modules are included in the design.
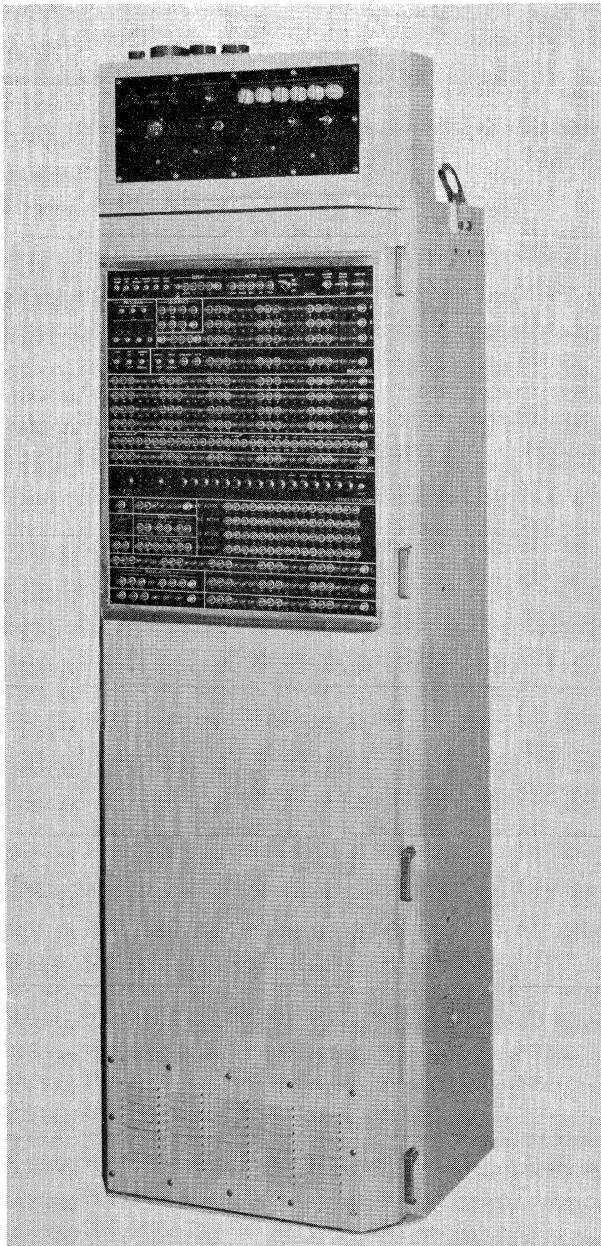
FUNCTIONAL CHARACTERISTICS

MAIN MEMORY (Internal)
32K 32-bit (30 data, 2 parity) words in 2 16K word banks

1.8-microsecond magnetic core
Interface
6 access ports served in priority order
Asynchronous timing
Half or full word operand access
Integral power supply
Power tolerance interrupt

PROCESSOR
One's complement, integer binary
Fixed and floating point arithmetic
Basic Instructions
105 total
27 executive
Addressing Range
15-bit address mode to 32,768 words (normal)
18-bit address mode to 262,144 words (expanded)
Index Registers — 2 groups of 7 each
Both groups for executive
One group for worker
15 bits in normal mode
18 bits in expanded mode
Processor Status Register
Base memory bank selection
Executive mode control
Direct and indirect addressing
Index register group selection
Keyboard, keyset inserts, local or remote
Real-Time Clock
Internal at 1024 cycles per second, or
External up to 50,000 cycles per second
Memory read and/or write lockout option (2,048 word blocks)

Breakpoint
NDRO Memory — 128 words (bootstrap)
Hardware interrupt analysis routine
Automatic recovery and initial input routine

Photo #3381

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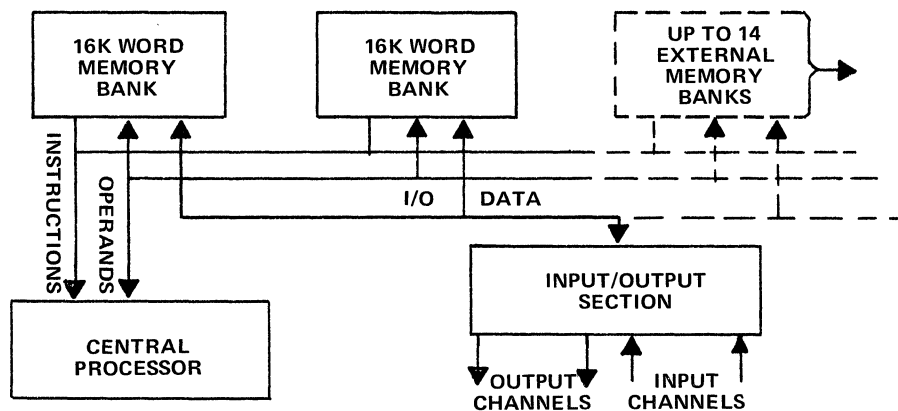
FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS (Continued)

INPUT/OUTPUT SECTION
Channels
 12 or 16 30-bit parallel
 N3 or N15 voltage levels

Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	176K	41K
Multi Channel	500K	125K

I/O Priority Order
 Fixed function
 Optional channel order
Control Memory (integrated circuit)
 48 buffer control words
 Interrupt assignment and status register
Memory Addressability
 1 to 16 memory banks
Asynchronous memory access
Operating Modes
 Normal buffer
 Intercomputer
 Externally Specified Index (ESI)
 Externally Specified Address (ESA)
 Continuous Data Mode (CDM)

REFERENCES

Design Specification	2802713
Acceptance Specification	2802715
Outline and Dimension Drawing	2804000

SB 10 159

PHYSICAL CHARACTERISTICS

MILITARIZED CONSTRUCTION
Single welded framework cabinet is air cooled (Ships Air or Internal).

Replaceable integrated circuit cards and parts are accessible from front via open door.

Packaging is designed to suppress radiated and conducted audio frequencies.

Shock mounts and sway brace.

SPECIFICATIONS USED FOR DESIGN GUIDES
General	MIL-E-16400
Basic Design Requirements	MIL-I-983C (Ships)
RFI	MIL-I-16910(C)
Enclosure	MIL-STD-108(D) Chg 1
Vibration	MIL-STD-167 (Type 1)

ENVIRONMENT
Operating Temperature Range:
40 degrees to 122 degrees F

Storage Temperature Range:
-65 degrees to 165 degrees F

Relative Humidity to 95 percent

COMPACT
Size
 74"H x 22"W x 18"D
Weight
 580 pounds maximum (32K memory 12 I/O channels)

RELIABILITY
MTBF of 2000 hours (calculated)

POWER REQUIREMENTS
2.15 KW, 115-volt, 400 Hz, 3-phase (for 32K memory and 12 I/O channel configuration)

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PRODUCT INFORMATION

UNIVAC 1503 EXPANDED MEMORY UNIT (EMU)   PX 5440

The UNIVAC Expanded Memory Unit (EMU) is a high-speed militarized, auxiliary memory device for use with two UNIVAC 1230 Computers (EMU modified). It expands each of the internal program memory sections of the two computers, increasing the storage capacity of each computer to 65,536 30-bit words. Two identical memory systems, each consisting of a maximum of 32,768 words, can be contained within the cabinet of the EMU. Each memory system is functionally independent and is connected by cables to the computer with which it operates. The modified UNIVAC 1230 Computer has direct access to its own internal program memory and all locations of the expanded memory section assigned to it. Through an intercomputer input/output channel, one 1230 Computer may communicate with the other 1230 Computer, and thereby with the other section of expanded memory.
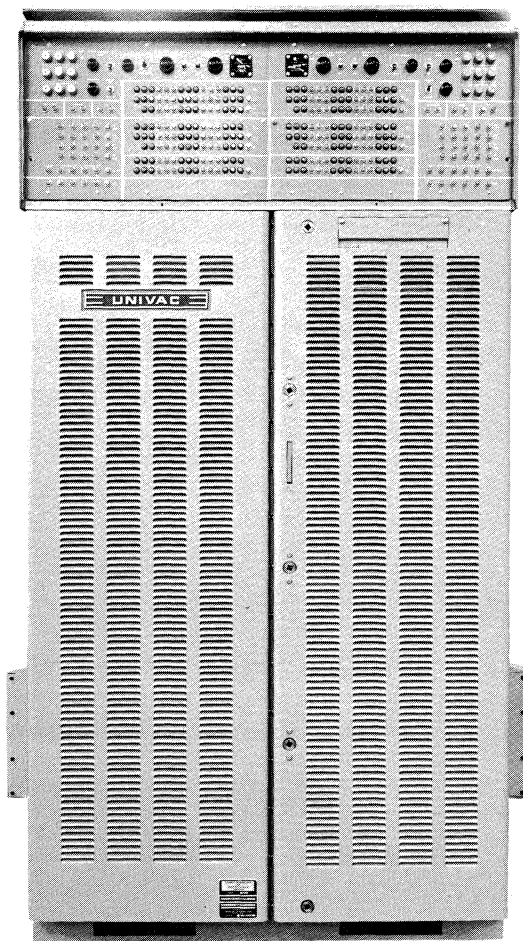
FUNCTIONAL CHARACTERISTICS (Each System)

Memory (Main Storage)

Magnetic core

2 overlapped banks

2.0 microsecond read-write cycle time (effectively 1 microsecond with overlap)

30-bit word length, parallel transfers

32,732 directly addressable, half- or full-word operands

Octal addresses, 100040-177777

Operand (data) or instruction storage

Memory (Control)

Integrated circuit chips

32 30-bit words

Octal addresses, 100000-100037

Buffer Control Words

Continuous data mode reload storage

Cycles independently and in parallel with main storage

Input/Output

Four input channels; four output channels

Buffer mode

Externally Specified Address mode

Continuous data mode, program controlled

Signal levels: N3 volt or N15 volt

Data transfer rates:

166,667 words/second per channel, maximum or

333,000 words/second (each 4 channel group)

Priority of Events

First order by channel

Second order by function

Computer/EMU Interface (via four cables)

Data and instruction transfers

Command and timing control

Memory address and bank selection

Interrupt communication

EMU input/output control

8.69

Photo No. 29104

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

1503 EXPANDED MEMORY UNIT WITH 4 INPUT/OUTPUT CHANNELS (1 SYSTEM)

1230 MODIFIED FOR EMU
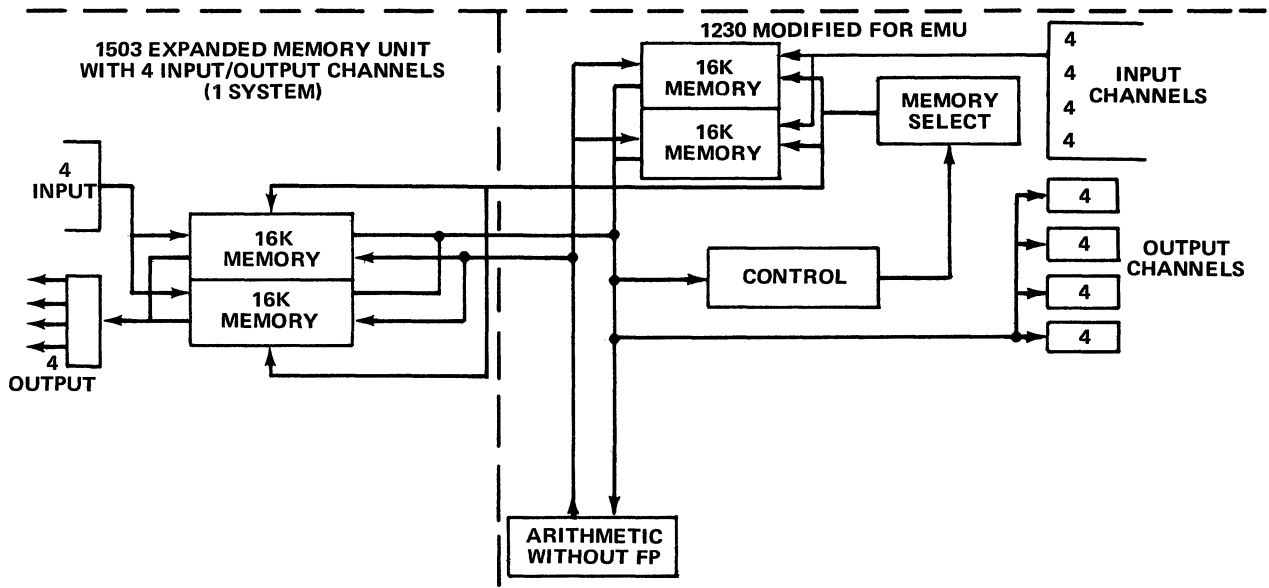
FUNCTIONAL DIAGRAM

UNIVAC 1503 EXPANDED MEMORY UNIT

PHYSICAL CHARACTERISTICS

Military Construction

The cabinet for the EMU is the same as that used for the 1230 Computer.

Size (in inches)

Height
Shock mounted	72
Solid base	70-3/4
Width	47
Depth	37

Weight (in pounds)
65K memory and EMU with 8 I/O channels	2100

Power Requirements for a complete EMU (2 32K with 4 I/O Channels each)

Logic

Voltage	Frequency	Phase	Wattage
115 ±5%	400 Hz ±5%	3 (3 wire)	3000

Blowers (Cooling) Forced Ambient Air at 800 cfm

Voltage	Frequency	Phase	Wattage
115 ±10%	60 Hz ±5%	1	500

Unregulated

Blowers — Water Cooled

Voltage	Frequency	Phase	Wattage
115 ±10%	400 Hz ±5%	1	825

REFERENCES

Design Specification	DS 4821
Acceptance Specification	SB 10102
Outline and Dimension Drawing	7046501

Product Line Manuals (PX):

TECHNICAL	DIAGNOSTIC
4721-X-1 (2)	4929-X-1 (4)
4722-X-1 (2)	

ENVIRONMENTAL CHARACTERISTICS

The UNIVAC 1503 EMU is designed with the following specifications and standards as goals:

General Requirements	MIL-E-16400E
Temperature Operating	0°C to +50°C (MIL-E-16400 and MIL-F-18870 Class 4)
Nonoperating	-62°C to +75°C
Relative Humidity	to 95%
Shock	(MIL-S-901B, Class I)
Vibration	(MIL-STD-167, Type I)
Electro Magnetic Interference	MIL-I-16910C
Salt Spray	200 Hrs. (frame)
	28 Hrs. (components) FED Test Method STD No. 151

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POWER SUPPLY SEC A
PS-2
(BEHIND CONTROL
PANEL A)

I/O CONNECTORS
(BEHIND CONTROL
PANEL B)

CONTROL PANEL SECTION A	CONTROL PANEL SECTION B

A1		BK3 LOWER
A2	CORE MEMORY SECTION A	BK3 UPPER
A3		BK4 LOWER
A4		BK4 UPPER
A5	I/O SECTION A	
A6	CONTROL LOGIC & CONTROL MEMORY SECTION A	
A7	NOT USED (BAFFLE)	
A8	CONTROL LOGIC & CONTROL MEMORY SECTION B	
A9	I/O SECTION B	
A10		BK3 LOWER
A11	CORE MEMORY SECTION B	BK3 UPPER
A12		BK4 LOWER
A13		BK4 UPPER
POWER SUPPLY SEC B PS-1		

1230 COMPUTER
CP-M642B/CP-855

RIGHT HAND MODIFIED

1230 COMPUTER
CP-M642B/CP-855

LEFT HAND MODIFIED

SIDE CONNECTOR
ASSEMBLY SEC A
(J51-J54)

SIDE CONNECTOR
ASSEMBLY SEC B
(J47-J50)

COMPUTER A

EMU

COMPUTER B

1230 – EMU CONFIGURATION (FRONT VIEW)

PRODUCT INFORMATION

UNIVAC 1530 (1230 MTC) COMPUTER   PX 4771A

The UNIVAC 1530 (single or dual processor) is a third generation computer designed with monolithic integrated circuits in modular assemblies that are packaged in a ruggedized cabinet. A maintenance panel in a separate console can be connected to each processor with four cables, 50 feet or less in length, for both operation and maintenance purposes. However, computer operation can be controlled from an optional remote control panel (SOCII) that contains minimal, but necessary, indicators and switches. Modular construction and asynchronous module operation permits a variety of computer configuration and capabilities.

GENERAL FUNCTIONAL CHARACTERISTICS

Modular functional architecture
Asynchronous intermodule communication
Multiprogramming and dual processing capability
Dynamic error and status registers
Memory addressing to 262,144 words (16 banks)
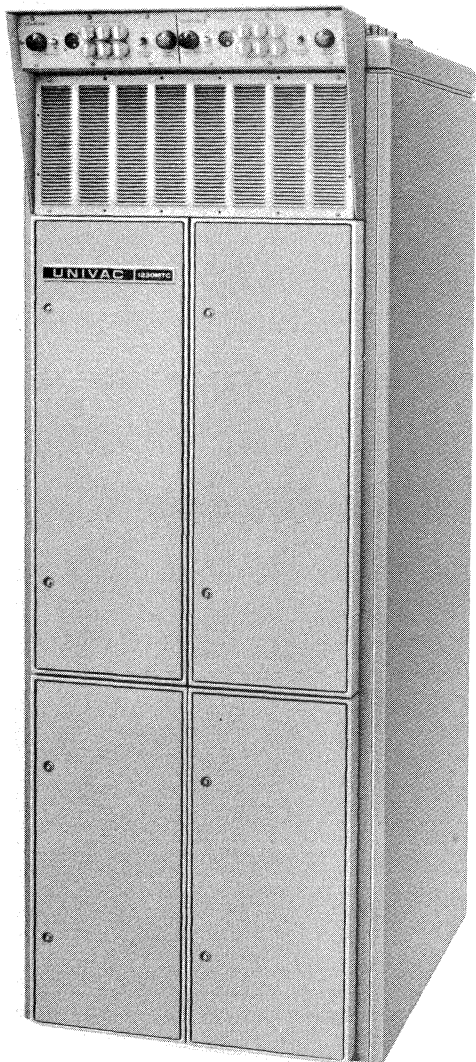
PHOTO #3636

FUNCTIONAL DIAGRAM

8.69

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION
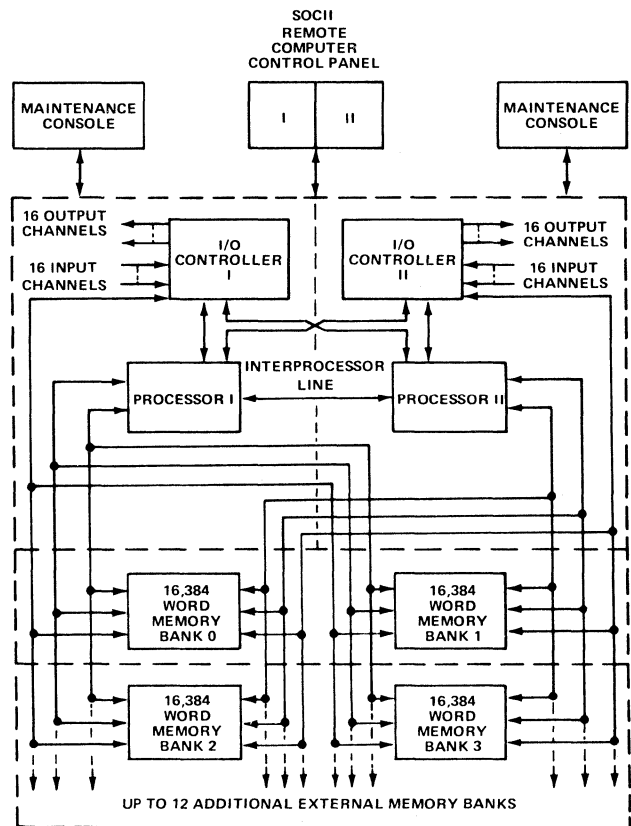
FUNCTIONAL CHARACTERISTICS

MAIN MEMORY MODULE
    2 16K word banks
    32K 32-bit (30 data, 2 parity) words
    1.8-microsecond magnetic core
    Interface
        6 access ports
        Asynchronous timing
        Access priority network
    Half or full word operand access
    Integral power supply
    Power tolerance interrupt

PROCESSOR
    One's complement, integer binary
    Fixed and floating point arithmetic
    Basic Instructions
        106 total
            27 executive
                1 interprocessor interrupt
    Addressing Range
        15-bit address mode to 32,768 words (normal)
        18-bit address mode to 262,144 words (expanded)
    Overlapped Operation
        2 or more memory banks
    Index Registers — 2 groups of 7 each
        Both groups for executive
        One group for worker
        15 bits in normal mode
        18 bits in expanded mode
    Processor Status Register
        Base memory bank selection
        Executive mode control
        Direct and indirect addressing
        Index register group selection
        One or two input/output controllers
    Real-Time Clock
        Internal at 1024 cycles per second, or
        External up to 50,000 cycles per second
    Memory read and/or write lockout (2,048 word blocks)
    Breakpoint
    NDRO Memory — 128 words (bootstrap)
        Hardware interrupt analysis routine
        Automatic recovery and initial input routine
    Integral power supply

INPUT/OUTPUT CONTROLLER
    Channels
        4, 8, 12 or 16 30-bit parallel
        N3 or N15 voltage levels

    Transfer Rates — Words/Second

Interface	N3	N15
Single Channel	167K	41K
Multi Channel	555K	333K

    I/O Priority Order
        Fixed function
        Optional channel order
    Control Memory (integrated circuit)
        Real-time clock update and monitor
        48 buffer control words
    Interrupt assignment and status register
    Operating Modes
        Normal buffer
        Intercomputer
        Externally Specified Index (ESI)
        Externally Specified Address (ESA)
        Continuous Data Mode (CDM)
    Real-Time Clock
        Internal at 1024 cycles per second, or
        External up to 100,000 cycles per second
    Processor Control
        Simplex or duplex
    Integral power supply

PHYSICAL CHARACTERISTICS

Modular functional sections are assembled in pull-out drawer sections as follows: One Central Processor and one Input/Output Controller with associated power supplies occupy one upper drawer. Two 16K memory banks with associated power supplies occupy one lower drawer. Input/output connectors, power connectors, power control panel (2 for dual computer) and cooling air intake occupy the top section of the welded, aluminum frame cabinet. In a single computer configuration one computer control panel replaces one power control panel.

POWER SOURCE
    115 volt, 400 Hz + 5%, 3 phase

CABINET SIZE
    72"H x 26"W x 30"D
    Volume — 30 cubic feet

	2-Processor 2-IOC 65K Memory*	1-Processor 1-4 Chan. IOC 32K Memory
Approx. Weight	1150 pounds	750 pounds
Power Consumption	4.8 KW	2.4 KW

*Full Cabinet Configuration

MAINTENANCE PANEL SIZE
    22"H x 21"W x 18"D
    Power Consumption — 0.2 KW

SOCII PANEL SIZE
    5"H x 10"W x 5"D
    Power supplied by computer

SPECIFICATIONS AND STANDARDS USED AS DESIGN GOALS

General	MIL-E-16400F (Amendment 2)
Enclosure	MIL-STD-108D (Change 1)
Salt Spray	Test Method 811 of Fed. STD No. 151

ENVIRONMENTAL

Operating Temperature	$0^{\circ}C$ to $+50^{\circ}C$
Nonoperating Temperature	$-62^{\circ}C$ to $-75^{\circ}C$
Relative Humidity	to 95%
Operating Altitude	to approx. 10,000 feet
Nonoperating Altitude	to approx. 40,000 feet

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REFERENCES

	DESIGN SPECIFICATION	ACCEPTANCE SPECIFICATION	OUTLINE AND DIMENSION DRAWING
Computer, Digital Data Dual Processor/LOC (RTS/ADS)	SB10133	SB10134	7078100
Computer Control Panel 1230 MTC (SOCII)	SB10135	None	
Computer Maintenance Consoles (1230 MTC)	SB10136	SB10134	7078080 (with 1232)
1530-01 Computer, Digital Data Single Processor with Processor Control (SOCII in Power Control Panel)	SB10200	SB10230	7077553

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FUNCTIONAL CHARACTERISTICS (CONTINUED)

KEYBOARD-PRINTER

Line Width:	72 Characters
Character Spacing:	10 per Inch
Line Spacing:	6 per Inch Single-Space
	3 per Inch Double-Space
Tape Font:	Open Gothic
Paper Width:	8-1/2"
Paper Feed:	Friction, 5" dia Roll
Keyboard:	4-Row ASCII
Print Code:	ASCII
Signal Transmission:	11-Unit Start-Stop
Signal Rate:	100 WPM (10 Characters per Second)

TELETYPE OUTPUT

Transmission rate:	100 words per minute
Voltage source:	External, 50 to 100 VDC
Output Circuits:	20 ma or 60 ma
Transmission type:	Neutral, 7.00 Unit Start-Stop cycle
Logical "one"	current
Logical "zero"	no current

MAGNETIC TAPE TRANSPORT

Tape Drive:	Single Capstan Friction
Tape Speed:	
Read/Write:	75 ips Fwd/Rev
Rewind:	150 ips Maximum
No. of Tracks:	7
Recording Method:	NRZI
Inter-Block Gap:	0.75 Inch
Tape Buffer:	Vacuum Chamber
Reel Size and Wind:	10-1/2 inch, A-Wind, RD-294 Compatible
Tape Sensors:	Load Point, End-of-Tape Reflective
Head Arrangement:	Dual Gap Read/Write, Full Width DC Erase
Recording Densities:	200/556/800
Read Function:	Forward and Backward
Write Function:	Forward
Write File Protect:	Write Enable Ring in Master
Tape Width:	1/2 Inch
Tape Length:	2400 Feet (1.5 mil)

PHYSICAL CHARACTERISTICS

CONSTRUCTION

All functional modules are removable from the heavy gauge welded aluminum cabinet that can be disassembled in sections small enough to pass through a 25-inch diameter opening or a 20 x 30 inch doorway. On top of the ruggedized cabinet are located the keyboard/printer and the control panel. The power supply and control logic occupy the lower left section and the paper tape reader and punch occupy the upper left position. Two right drawer positions are used for two magnetic tape transports or one magnetic tape transport and one configuration A integrated circuit Keyset Central Multiplexer.

MODULE	SIZE INCHES	WEIGHT POUNDS	POWER (NOMINAL)	
			WATTS	TYPE
PAPER TAPE PUNCH TELETYPE BRPE-11	12H x 8W x 170	25.0	220	115V, 60HZ, 1ϕ
PAPER TAPE READER DIGITRONICS MODEL 2540	5.3H x 10W x 10.8D	7.5	180	115V, 60HZ, 1ϕ
KEYBOARD PRINTER TELETYPE MODEL 35	14H x 20W x 25D	100.0	225	115V, 60HZ, 1ϕ
MAGNETIC TAPE TRANSPORT UNIVAC 1840 MODULE	24.5H x 19W x 9.5D	125.0	600	115V, 400HZ, 3ϕ
ICKCMX UNIVAC CONFIGURATION A	22.5H x 22.5W x 11.25D	120.0		Taken from controller power
DEAC CABINET AND LOGIC (INCLUDING K/P)	48.25H x 29W x 28.5D 65H	700.0	1700 470	115V, 400HZ, 3ϕ 115V, 60HZ, 1ϕ

PRODUCT INFORMATION

UNIVAC 1616 COMPUTER

The UNIVAC 1616 is a 1970-71 development of a two's complement, 16-bit, industrial grade, computer with MSI (medium scale integration) devices for the logic. A new type of instruction repertoire, that consists of simple operations defined in one- or two-word formats, is utilized. The computer features a set of integrated circuit general registers, a single bus data exchange path, and a processor controlled, byte-oriented input/output channel. Functional expansion is accomplished by adding one or more printed circuit cards, according to the magnitude of the feature involved, and the necessary chassis. The computer is packaged in a cabinet that accommodates 2, 3, 4, or 5 drawer-type chassis as required.
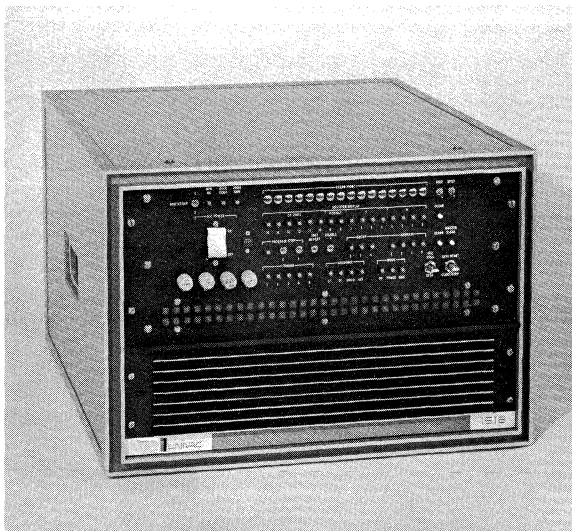
Photo No. 4914

FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS

CENTRAL PROCESSOR
Real-time capability
Two's complement arithmetic
8-bit byte, 16-bit and 32-bit operands
16 high-speed general purpose registers
Program status register
Single bus functional interface
Direct addressing capability to 65K words or 131K bytes
4-Level interrupt processing (hardware serviced)
16-bit and 32-bit instructions — in any mix
Basic instructions — 4 formats

Add	750 nanoseconds
Multiply	3.75 microseconds
Divide	3.75 microseconds

Indexing via general registers
Load and store multiple registers
Processor — peripheral channel
    Up to 16 input/output controllers (multiplexed)

MAIN STORAGE
Expandable — 8K to 65K words in 8K increments
16-bit words
Independently accessible memory banks
Read/restore cycle time — 750 nanoseconds is optimal
Asynchronous timing — request and acknowledge signals

INPUT-OUTPUT CONTROLLER (1 to 4 OPTIONAL)
Asynchronous operation
Processor-initiated program chain
10 instructions, format same as for CP
IC buffer control memory (64 words)
4 input and output channel groups (1 to 4 groups)
Parallel 16-bit channel interface
    8-bit byte, 16-bit word, or 32-bit dual-channel transfer
Interface voltage levels — 4 channel groups
    -3.0 volt, 3.5 volt or -15.0 volts
Power supplied by Central Processor (100 watts maximum)
I/O Channel operation priority
    First level by channel
    Second level by function

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DEFENSE SYSTEMS DIVISION   8.72

WORD TRANSFER RATES (Thousand words per second)

Interface & Voltage (Type)		Number of Channels				
		1	2-4	5-8	9-12	13-16
-15V	IN	41.6	41.6	83.3	124.4	166.6
(NTDS)	OUT	41.6	41.6	83.3	124.4	166.6
+3.5 (A NEW) and	IN	190.	250.	500.	750. *	1,000. *
-3.0 (NTDS)	OUT	190.	250.	500.	750. *	1,000. *
-3.0	IN	667.	1,300. *	1,300. *	1,300. *	1,300. *
(1108)	OUT	667.	1,300. *	1,300. *	1,300. *	1,300. *

* Maximum total is 1,300K words per second

PHYSICAL CHARACTERISTICS

CONSTRUCTION

The central processor, control panel, input/output controller, power supply and space for related features are contained in one chassis (CP-IOC chassis), memory stacks, associated electronics, power supply and space for optional multiple access parts (priority multiplexer) are contained in a second chassis. The fast fourier transform feature and its power supply require another chassis. Each chassis has its own cooling blowers. Interconnecting wiring is provided through connectors on the rear wall of each chassis. These connectors mate with the interchassis wiring harness and the input/output connectors.

Physically and functionally modular and expandable
MSI (medium scale integration) elements
Integral cooling blowers and power supplies
Size: 14.25" H x 21" W x 25" D

POWER SUPPLY
115V, 1 phase, 47 Hz to 500 Hz input
Regulated dc output to CP and IOC

ENHANCEMENTS

Features of the 1616 computer provide functional adaptability for many application requirements. Some of the available features increase its capacity, some enhance its flexibility, and others provide functions required by certain applications. The computer is designed to accommodate the following features:

Central Processor Features
Status register #2
Breakpoint
Additional general register sets
Real-time clock and interrupt clock
Power protection and recovery
    Automatic master clear
    Automatic restart
NDRO memory (read only memory)
Processor-peripheral input/output channel
One to four input/output controllers
Unary instructions
    Square root
    Reverse register
    Count ones
    Scale Factor shift
CORDIC (coordinate rotation digital computer) arithmetic
Processor-memory parity checking

Main Memory Features
Multi-port priority multiplexer
Parity

Input/Output Controller Features
Parallel channels
Serial channels per MIL-STD-188C
Serial channels per EIA-STD-RS232C
Intercomputer channels
Peripheral input channel
Independent memory interface

Power Supply Features
400-Hz, 3-phase 115V input power
Power fault sensors (for power protection and recovery)

The UNIVAC ® 1819 Avionics Computer is designed for general purpose data processing in aerospace and avionics application. It is software compatible with the 1218/1219 computers. Design concepts and packaging evolve from predecessor 1830 and 1818 computers. An integral power supply provides regulated dc voltages from 400 Hz input power that meets the requirements of MIL-STD-704A. Automatic program start-up is accomplished by applying primary power to the computer.
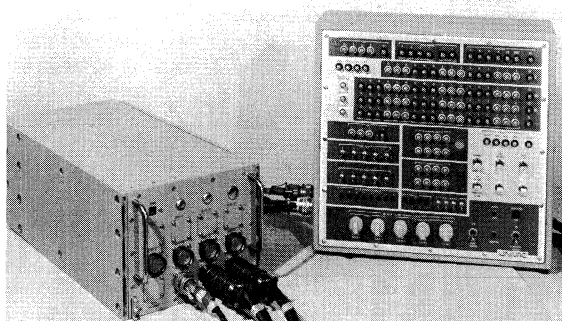
Photo No. 1669-5

Functional Diagram

FUNCTIONAL CHARACTERISTICS

General purpose 18-bit computer
Expansion options

MEMORY

> Magnetic core main memory
>> 2 microsecond cycle time
>> 4096-word stacks
>> Expandable in 4096-word increments
>
> NDRO core rope memory
>> 48-word or 1024-word plug in modules
>> Expandable in 1024-word increments
>
> Capacity: 32,768 words in any mix of DRO
>> stacks or NDRO modules

CONTROL

> 97 single address instructions
> One's complement arithmetic
> Single and double length add and subtract
> 8 index registers — main memory
> Real time clock: 1028 counts per second

INPUT/OUTPUT CAPABILITIES

> 4 channels input, 4 channels output
> Expandable to 8 each
> Single channel transfers, 18-bit
> Dual channel transfers, 36-bit
> Buffer control words — main memory
> Transfer rate: 125000 words per sec. max.
> Priorities: Function detection and order selection
>> Channel detection and order selection
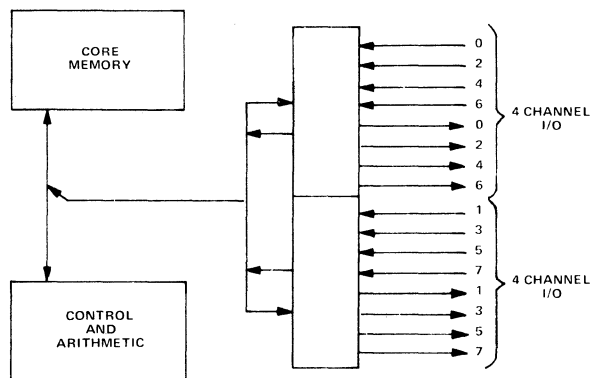
INTERRUPTS

> Real time clock
> 1 external per channel
> 3 internal per channel (monitors)
> Power shutdown

PRODUCT INFORMATION

PHYSICAL CHARACTERISTICS 1819

High density microelectronic or discrete components are assembled on 3-layer printed circuit boards that plug into mating receptacles that are part of the wire wrapped, interconnecting back panel. Up to 12,288 words of memory, power supply, control, arithmetic, and I/O circuitry are packaged in an all welded case that is closed with RFI sealed cover plates.

Size: 9.93" x 7.63" x 20.52"
        (with up to 12,288 word memory)
Weight: 49 pounds*
Power consumption: 280 watts*
        200 volts line to line or
        115 volts line to neutral
        400 Hz, 3 phase, 4 wire
*for computer with 9,216 word memory

SPECIFICATION USED FOR DESIGN GOALS
        MIL-E-5400
        MIL-I-6181

ENVIRONMENTAL CHARACTERISTICS

Operating temperature:	-54° to 71°C
Non-operating temperature:	-62° to 85°C
Relative humidity:	0 to 100%
Altitude:	to 70,000 feet

REFERENCES

Product specification	SB-12283
1830A I/O characteristics	PX-4478
Control console	SB-12297

PRODUCT INFORMATION

AN/UYK-15 MILITARIZED COMPUTER

The AN/UYK-15 is a functional equivalent and militarized version (MIL-E-16400) of the UNIVAC 1616. Circuit components and memory meet more stringent specifications in order to withstand the environmental requirements of shipboard, mobile, and other installations that may be exposed to adverse conditions. The computer is packaged in a shock-mounted militarized cabinet of the size that accommodates 2, 3, 4, or 5 drawer-type chassis as required. (See C-9-1)
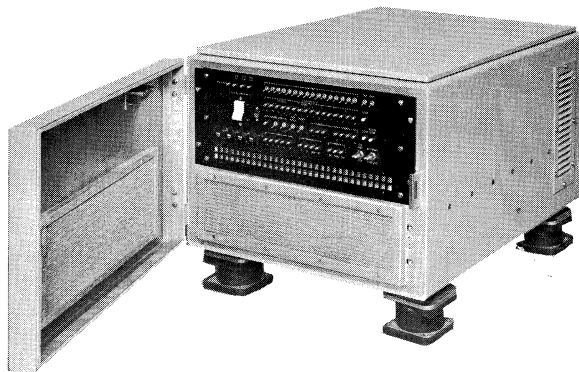
Photo 4753-1 or 4752-1

FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS

CENTRAL PROCESSOR
Real-time capability
Two's complement arithmetic
8-bit byte, 16-bit and 32-bit operands
16 high-speed general purpose registers
Program status register
Single bus functional interface
Direct addressing capability to 65K words or 131K bytes
4-Level interrupt processing (hardware serviced)
16-bit and 32-bit instructions — in any mix
Basic instructions — 4 formats

Add	750 nanoseconds
Multiply	3.75 microseconds
Divide	3.75 microseconds

Indexing via general registers
Load and store multiple registers
Processor — peripheral channel
    Up to 16 input/output devices (multiplexed)

MAIN STORAGE
Expandable — 8K to 65K words in 8K increments
16-bit words
Independently accessible memory banks
Read/restore cycle time — 750 nanoseconds is optimal
Asynchronous timing — request and acknowledge signals

INPUT-OUTPUT CONTROLLER (1 to 4 OPTIONAL)
Asynchronous operation
Processor-initiated program chain
10 instructions, format same as for CP
IC buffer control memory (64 words)
4 input and output channel groups (1 to 4 groups)
Parallel 16-bit channel interface
    8-bit byte, 16-bit word or 32-bit dual-channel transfer
Interface voltage levels — 4 channel groups
    -3.0 volt, 3.5 volt or -15.0 volts
Power supplied by Central Processor (100 watts maximum)
I/O Channel operation priority
    First level by channel
    Second level by function

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DEFENSE SYSTEMS DIVISION

INPUT-OUTPUT CONTROLLER (1 to 4 OPTIONAL)   (AN/UYK-15)

WORD TRANSFER RATES (Thousand words per second)

Interface & Voltage (Type)		Number of Channels				
		1	2-4	5-8	9-12	13-16
-15V	IN	41.6	41.6	83.3	124.4	166.6
(NTDS)	OUT	41.6	41.6	83.3	124.4	166.6
+3.5 (A NEW) and	IN	190.	250.	500.	750. *	1,000. *
-3.0 (NTDS)	OUT	190.	250.	500.	750. *	1,000. *
-3.0	IN	667.	1,300. *	1,300. *	1,300. *	1,300. *
(1108)	OUT	667.	1,300. *	1,300. *	1,300. *	1,300. *

* Maximum total is 1,300K words per second

CONSTRUCTION

The central processor, control panel, input/output controller, power supply and space for related features are contained in one chassis (CP-IOC chassis), memory stacks, associated electronics, power supply and space for optional multiple access parts (priority multiplexer) are contained in a second chassis. The fast fourier transform feature and its power supply require another chassis. Each chassis has its own cooling blowers. Interconnecting wiring is provided through connectors on the rear wall of each chassis. These connectors mate with the interchassis wiring harness and the input/output connectors.

PHYSICAL

Militarized Construction
Ship/shore environment: MIL-E-16400F
Temperature Range
    Operating: 0°C to 50°C
    Storage: -62°C to +75°C
Relative Humidity: to 95%
Size (inches)
    Height: 14.4 plus 3.5" shock mounts
    Width: 20.75
    Depth: 25.75

Weight: Approximately 170 pounds
Physically and functionally modular and expandable
MSI (medium scale integration) elements
Integral cooling blowers and power supplies

POWER SUPPLY

115V, 1 phase, 47 Hz to 500 Hz input
Regulated dc output to CP, IOC, Memory and blowers

ENHANCEMENTS

Features of the AN/UYK-15 computer provide functional adaptability for many application requirements. Some of the available features increase its capacity, some enhance its flexibility, and others provide functions required by certain applications. The computer is designed to accommodate the following features:

Central Processor Features
Status register #2
Breakpoint
Additional general register sets
Real-time clock and interrupt clock
Power protection and recovery
    Automatic master clear
    Automatic restart
NDRO memory (read only memory)
Processor-peripheral input/output channel
One to four input/output controllers
Unary instructions
    Square root
    Reverse register
    Count ones
    Scale Factor shift
CORDIC (coordinate rotation digital computer) arithmetic
Processor-memory parity checking

Main Memory Features
Multi-port priority multiplexer
Parity

Input/Output Controller Features
Parallel channels
Serial channels per MIL-STD-188C
Serial channels per EIA-STD-RS232C
Intercomputer channels
Peripheral input channel
Independent memory interface

Power Supply Features
400-Hz, 3-phase 115V input power
Power fault sensors (for power protection and recovery)

PRODUCT INFORMATION

UNIVAC AN/UYK-7(V) COMPUTER

PX 4758B

A successor to the CP-642A (1206) and the CP-642B (1213) Computers, the AN/UYK-7 features high density, microelectronic circuits packaged in ruggedized, functional modules, which are in turn assembled in a militarized cabinet. Expanding the AN/UYK-7 system to meet additional requirements is accomplished by adding only those modules bearing the characteristics of functions desired. Limits of expansion are determined by the amount of intermodule communication required and the addressing capability of each module.

The AN/UYK-7 Computer is configured from the following modules as required:

Central Processor
Input/Output Controller
Input/Output Adapter (4, 8, 12 or 16 channels)
16,384 word memory
Power supply
Remote operator's and maintenance panel
Cabinet with blowers and operating panel
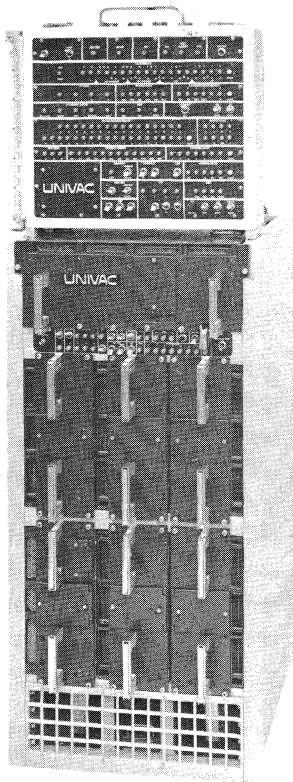
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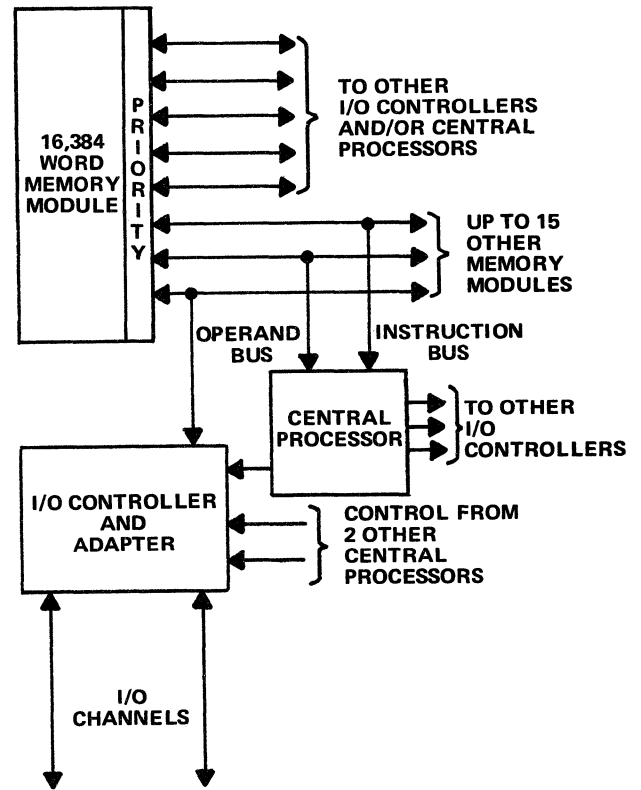
FUNCTIONAL DIAGRAM

GENERAL FUNCTIONAL CHARACTERISTICS

Modular functional arthitecture

Asynchronous intermodule communication

Multiprogramming and multiprocessing capability

Dynamic error and status registers

Memory addressing range to 262,144 memory words (16 modules)

8.69

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UNIVAC

DEFENSE SYSTEMS DIVISION

MODULE FUNCTIONAL CHARACTERISTICS

MEMORY MODULE

Temperature stable coincident current core

Capacity: 16,384 32-bit words

Eight access ports per module with priority net selection

1.5 microsecond read-write cycle time

Optional interleaved addressing between two modules

CENTRAL PROCESSOR MODULE

Overlapped operation, two or more memory modules

130 basic whole and half word instructions

    Direct or indirect addressing

    Variable length character addressing

    Privileged instruction set

Task and interrupt operating states

    Two sets of seven index and eight base registers

    Two sets of eight addressable accumulators

Decrementing monitor clock @ 1024/second

Sixteen memory lockout registers — 2048 word blocks

Interface capability

    16 memory modules maximum

    4 I/O controllers maximum

NDRO memory   512 words

    Initial load programs

    Fault analyses and recovery

    Hardware diagnostics

Arithmetic

    32-bit parallel, one's complement, binary

    Fixed and floating point hardware

    8, 16, 32 or 64-bit operands

INPUT/OUTPUT CONTROLLER

Direct access data transfers, to and from, up to 16 memory modules

Controlled by 1, 2, or 3 central processors

Programmed operations with command chaining capability

Repertoire of 15 basic instructions

Integrated circuit control memory

    Buffer control words

    Command address pointers (function control words)

    Clock storage

Internal or External Real Time Clock

Operating modes

    Normal buffer

    Externally specified index

    Externally specified address

    Command chaining

        Continuous data mode

        Pack and unpack 8, 16 or 32-bit bytes

    Intercomputer communication

Interface adapter

    4, 8, 12 or 16 full duplex input and output channels

    32-bit parallel or optional bit serial channels

Optional Electrical Interface			
Interface Voltage Levels in 4 Channel Groups	N15	N3	P3
Maximum Data Transfer Rate per Second per Channel	33,000	167,000	167,000

Bit serial channel rate: 10 megabits per second

POWER SUPPLY MODULE

Capacity:

    Power to 6 computer modules, remote operator's panel and maintenance console

Module Protection:

    Overload, shorts or over temperature

Power Failure Detection:

    Interrupts central processor

Energy Storage:

    For 250 microseconds after input power loss

OPERATOR'S AND MAINTENANCE PANEL

Maintenance controls, switches and indicators

Up to 15 feet of interconnecting cable

Separate cabinet

8.69

PHYSICAL CHARACTERISTICS

Militarized construction, welded aluminum cabinet with operating panel and running time meter

Thermal conductive heat removal to air cooled heat exchangers

Maintainability preserved in modular design

Throw away printed circuit cards

Convenient expansion and configuration modification

Single to multiprocessor expansion

Shared memory configuration changes

Increase input/output channel capacity

Intermix main memory modules of different speeds

Basic computer configuration:

Consists of a power supply, central processor, I/O controller, I/O interface adapter (16 channels) and 3 memory modules (49,152 words) in a single cabinet

	Computer	Maintenance Panel/Console
Size:	41"H x 20"W x 22"D	18"H x 19"W x 6"D
Volume:	10.4 cubic feet	1.2 cubic feet
Weight:	500 pounds	50 pounds
Power consumption:	2500 watts, 115V, 3 phase, 400 Hz, per MIL-STD-761A	

SPECIFICATIONS AND STANDARDS USED FOR DESIGN OBJECTIVES

General Construction:

MIL-E-16400

(Enclosure, Inclination)

Radio Frequency Interference:

MIL-I-16910

Shock:

MIL-S-901 Class I Medium Weight

Vibration:

MIL-STD-167 Type I

Salt Spray:

FED-STD-151 Method 811

Environmental Characteristics:

Temperature Range:

-54°C to +65°C (Operating)

-62°C to +75°C (Storage)

Relative Humidity to 95%

REFERENCES

Design Specification, Computer	SB 12292
Design Specification, Maintenance Console	SB 12403
Serial Input/Output Specification	SB 12407
Outline & Dimension Drawing	7073251

8.69

PRODUCT INFORMATION

AEROSPACE COMPUTER UNIVAC 1824   PX 4620

The UNIVAC 1824 Aerospace Computer family represents a variety of packaging configurations and special purpose adaptations of a basic general purpose processor. Since the inherent nature of missile systems are cyclic and mission limited, critical operating programs are stored in a non-destructive read-out (NDRO) portion of memory. Input/output is adapted and limited to the system instruments and equipment characteristics. Many variations therefore appear in packaging, characteristics and quantities of I/O Channels and of fixed (NDRO) and scratch pad (DRO) memories. Support equipment in the form of UNIVAC 1824 Aerospace Ground Equipment is required to maintain the hardware and/or change programs in the computer.
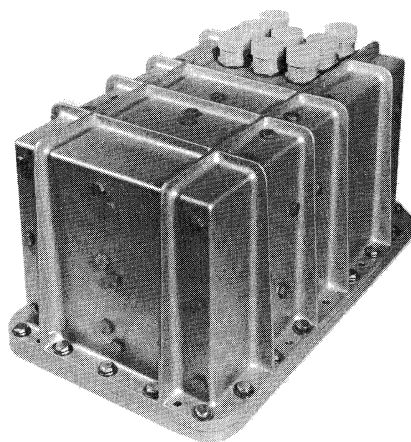
Basic Computer Case

Size: 9-1/2x15-1/4x8-1/2"
Weight: Approximately 11.8 pounds
Cooling: Achieved by conductive heating to base plate
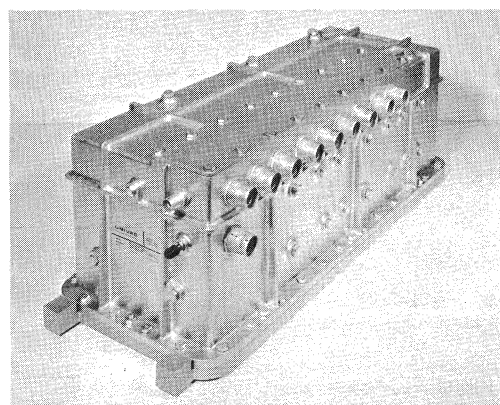
Expanded Memory
Computer Case

Size: 9-3/8x7-3/4x23-1/4"
Weight: Approximately 13.3 pounds
Cooling: Conduction to base plate
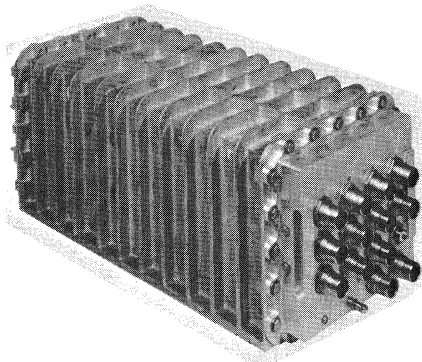
Computer and Expanded

Size: 9-1/4x9-1/2x24-1/2"
Weight: Approximately 19 pounds
Cooling: Achieved through the use of liquid Freon flowing through base plate
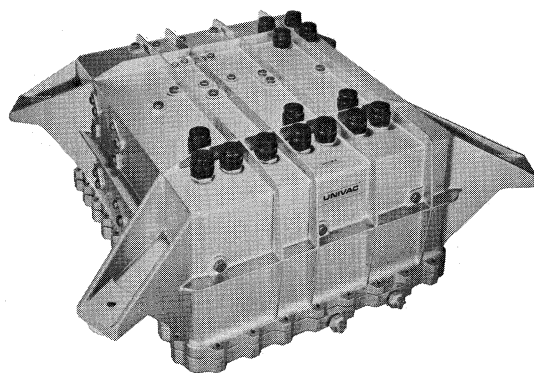
Expanded Input/Output
Computer Case

Size: 18-3/4x18-1/2x9-1/4"
Weight: Approximately 25.2 pounds
Cooling: Liquid flowing through the base plate

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

FUNCTIONAL CHARACTERISTICS
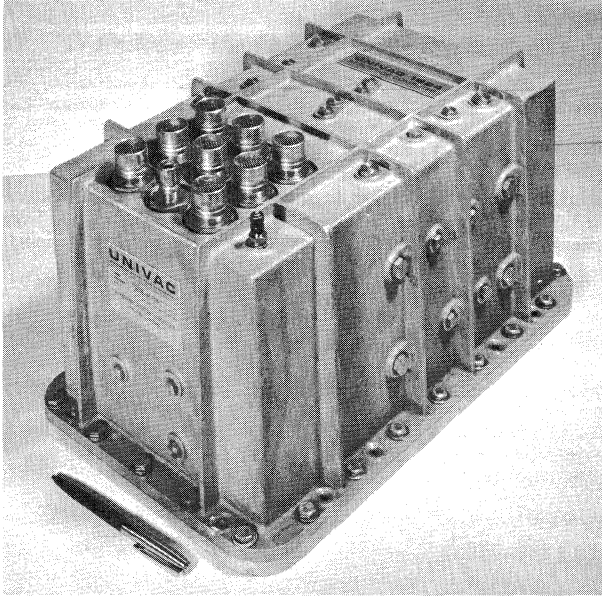
For 4096-Word 48-Bit NDRO, 512-Word 24-Bit DRO Memory Configuration

16-Bit Instruction Word
24-Bit Data Word
Memory — Magnetic Thin Film,
random access
    4 microsecond cycle time
    NDRO — Modular in 512 48-bit word groups to
    maximum of 8192 words
    DRO — Modular in 256 24-bit word groups to
    maximum of 2048 words
    3 Index Registers
Arithmetic — Two's complement, fractional, binary
Instructions — 45 single address

DEVELOPED INPUT/OUTPUT INTERFACE CIRCUIT CHARACTERISTICS

1. D to A Converters (8 bits)
2. A to D Converters (10 bits)
3. Incremental Processors (up, down, both)
4. Staticizer
5. Serializer
6. I/O Instructions — direct, indirect and up-date incremental input
7. Parallel Data Registers
8. Discrete (Pulse or DC)
9. Automatic Data Entry (Interrupt Controlled)
10. Long Cable Operation

POWER REQUIREMENTS
85 watts   28 volts dc ± 4.5 volts

MILITARIZED CONSTRUCTION
Designed for Aerospace Environment
(MIL-STD-810); FED-STD-151;
    Classified Document for Nuclear
    Radiation; Meets Severe Re-Entry
    Environment)

RELIABILITY
MTBF of 10,000 Hours (Calculated)

MILITARIZED CONSTRUCTION
Microelectronic Integrated Circuits
Flat Pack circuit assembly
Ribbed, sealed, aluminum case enclosure
Designed for Aerospace environment
Specifications used for design guides
    MIL-STD-810
    FED-STD-151

COMPACT*
Size: 9.1"Hx9.4"Wx15.3"D
Weight: 44.6 Pounds

ENVIRONMENTAL TESTS

Vibration	20 g's 5-2000 Hz (0.4 inch DA) 0.6 g^2/Hz random vibration
Shock	100 g's, 6.5 milli-seconds duration
Thermal Shock	-40°F. to +160°F.
Hi-Low Temp.	-65°F. to +160°F.
Leakage (Helium)	2.0 micron ft.^{3}/hr
Humidity	95% at +160°F.
Magnetic Field	3 Gauss D.C.
Nuclear Radiation	Classified
RFI	USAF BSD 62-87
Operating Life Test	600 hr.
Centrifuge	100 g's, 3 min/axis

UNIVAC 1824 PHYSICAL OPTIONS

SECTIONS	SIZE*(Cu. In.)	WT.*(Lbs.)	POWER*(Watts)
Median Version (System I Input/Output)			
Processor and Basic Input/Output	37	3.0	14.9
Memory — 196,608 bits NDRO, 12,288 bits DRO	278	18.4	22.6
Clock and Miscellaneous	33	1.25	8.0
Power Supply at 69% EFF	49	3.75	20.5
Case (includes space for three additional			
Input/Output Modules)	1300	11.75	—
Miscellaneous	—	4.2	—
TOTALS		42.35	66.0
Memory Options			
Memory			
Minimum Memory — 24,576 bits NDRO,			
6,144 bits DRO	145 ①	10.3	20.5
Maximum Memory — 393,216 bits NDRO,			
49,152 DRO	486 ②	30.8	27.2
Core Memory — 131,072 bits DRO	278 ①	9.2	45.6
Core Rope — 98,304 bits NDRO, 24,576 DRO (Film)	189 ①	11.6	45.0
Input/Output Optional Additions			
Systems III, IV, VI three Input/Output Modules	+18 ①	+2.25	+13.1
(Inertial Guidance)			
System VII Guidance and Flight Control	+1900 ③	+52.2	+95.0
System V Advanced Inertial Guidance	+340 ①	+9.4	+40.0
System II Special Inertial Guidance	+770 ④	+15.3	+10.0

NOTE: CASES

① Fit in basic case   1300   11.75

② Fit in Expanded Memory Case   1640   11.3

③ Fit in Expanded Input/Output Case No. 1   2070   19.0

④ Fit in Expanded Input/Output Case No. 2   3200   25.2

* Size, Weight, and Power can be reduced depending on the nature of environmental characteristics.

1824 SUPPORT EQUIPMENT
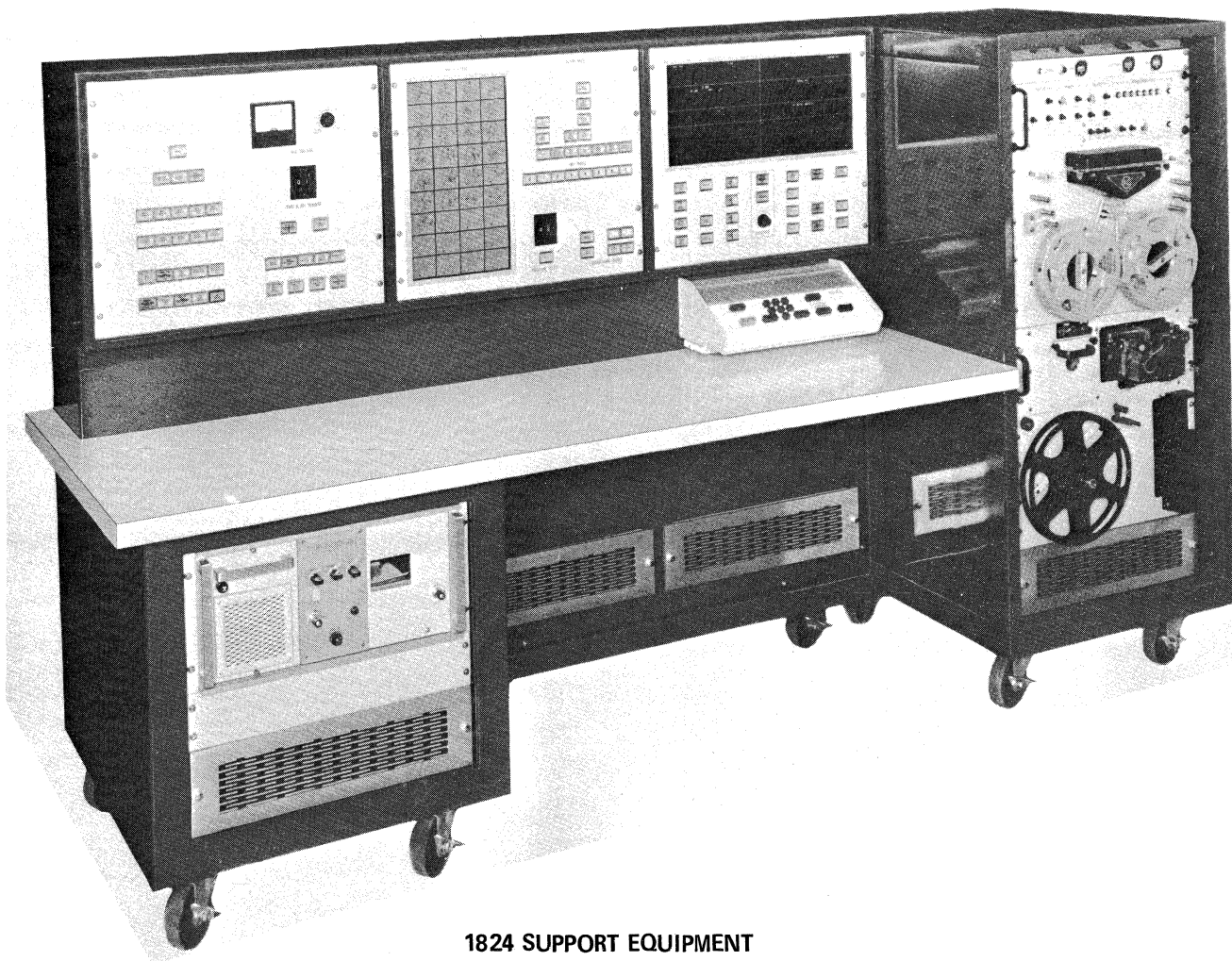
1824 SUPPORT EQUIPMENT

    Aerospace Ground Equipment (AGE)

Maintenance and operational control are performed entirely by using the AGE which is designed in a configuration that meets the particular 1824 systems requirements. The nominal set of facilities built into the AGE include:

    Keyset Panel
    Display Panel
    Operator's Panel
    Maintenance Panel
    Simulator Panel
    Paper Tape Reader
    Paper Tape Punch
    Printer

Loading and modifying programs in the electricity alterable NDRO memory and all operational tests, simulations, debugging and maintenance are done with the computer attached to the AGE. One version of this equipment is pictured.

PRODUCT INFORMATION

UNIVAC 1830A AVIONICS COMPUTER CP-901/(V)/ASQ-114(V)   PX 4118F

The UNIVAC 1830A is a modularized and more capable version of the 1830 (CP-823V) computer designed in 1967 for airborne applications with high processing requirements. Its basic instruction repertoire corresponds to that of the 1206 and 1212 family with additional instructions for the advanced features of page addressing. The page mode and the normal addressing mode can be used for operation within the first 32K word memory. Memories larger than 32K words require the page addressing mode.

Microelectronic circuitry packaged in functional modules permits assembly of a variety of configurations. The modules in a computer consist of:

A. I/O Section
B. Central Processor
C. 16K Memory Module (1 to 8)

D. Power Supply
E. Console (Optional)
F. Frame
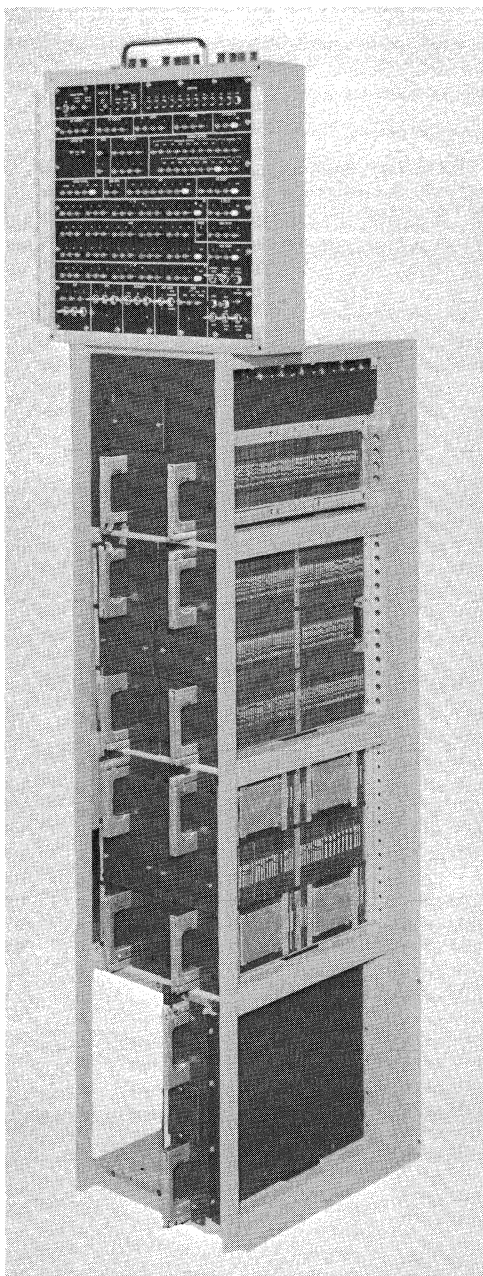
FUNCTIONAL CHARACTERISTICS

30-BIT WORD LENGTH
    Single Word
    Arithmetic
    Input/Output Transfer

MEMORY
    Magnetic Core
        4K to 65K Words (Expandable to 131K)
        512 Words NDRO (Core Rope Bootstrap)
            2 Microseconds Cycle Time without Overlap
            1 Microsecond (Effective) Cycle Time with Overlap

SEVEN INDEX REGISTERS
    Hardware Index Registers (15 Bits)

70 SINGLE ADDRESS INSTRUCTIONS
    7 Branch Designator
    7 Operand Interpretation Designators

TIMING DEVICES
    (Time Increment of 1/1024 Second)

INPUT/OUTPUT CAPABILITIES (Buffered)
    16 I/O Channels (Maximum)
    Automatic Priority Determination
    ESA and ESI (Optional)

INTERRUPTS
    4 Internal
    5 I/O (Unique Types)

INTERCOMPUTER
    On Any Channel

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION
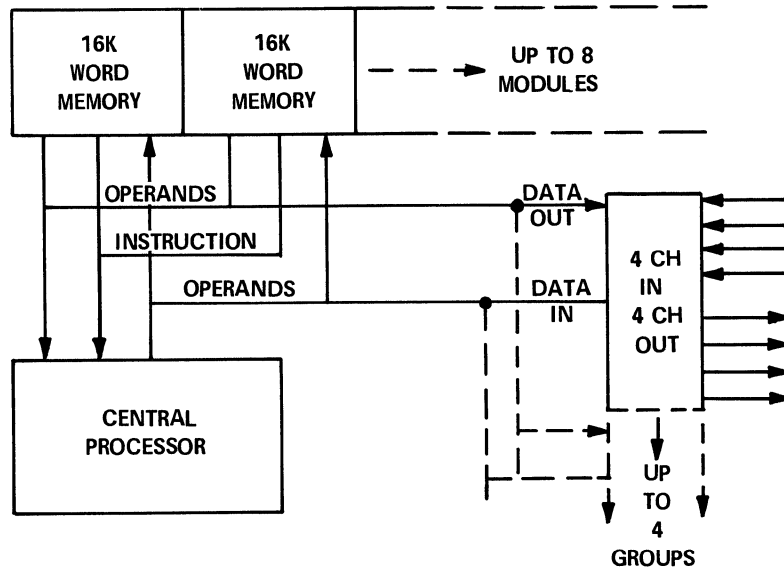
PHYSICAL CHARACTERISTICS

MILITARIZED CONSTRUCTION
(MIL-E-5400)

RELIABILITY
MTBF of 2000 Hours (Calculated)

Cooling: Heat conduction via cold plates to heat exchanger. Cooling fan is a part of the computer or externally located.

Unit Size	Number of Units Required	Weight/Unit (lbs)	Weight/Total No. of Units (lbs)			
			16K Memory	32K Memory	48K Memory	65K Memory
Central Processor 14.4" x 5.5" x 12.6"	1	33.3	33.3	33.3	33.3	33.3
Memory 14.4" x 5.5" x 12.6"	1-4	32.7	32.7	65.4	98.1	130.8
Input/Output 11.0" x 10.6" x 16.5"	1	28.4	28.4	28.4	28.4	28.4
Power Supply 14.4" x 3.9" x 12.6"	1	30	30	30	30	30
Console 5.5" x 16.8" x 17.5"	1	36.3	36.3	36.3	36.3	36.3
Frame (65K capacity) 17.68" x 13.43" x 50.97"	1	51	51	51	51	51
Cable Assembly	4	3	12	12	12	12
Fan Assembly & Tools		15	15	15	15	15
TOTAL COMPUTER WEIGHT		**229.7**	**238.7**	**271.4**	**304.1**	**336.8**

115V, 400 Hz, 3 PHASE	POWER (NOMINAL)			
UNIT ASSEMBLY	POWER REQUIRED (WATTS)			
	16K Memory	32K Memory	48K Memory	65K Memory
Central Processor	190	190	190	190
Memory	100	200	300	400
Input/Output	80	80	80	80
Power Supply	165	208	250	291
Console	15	15	15	15
TOTAL POWER REQUIRED/COMPUTER	**550**	**693**	**835**	**976**

MIL-C-81332A (AS)

PRODUCT INFORMATION

UNIVAC 1830-B MILITARY COMPUTER

Product Description   PX 6177

The 1830B is a ruggedized version, and shipboard counterpart of the 1830A Avionics Computer. Its functional modules are packaged in a cabinet that is ruggedized for installation and operation where heavy shock and other adverse environmental conditions are expected. A lower center of gravity is achieved in the 3 x 3 module arrangement. This 1970 development included some enhancements in functional capability — e.g., increased power supply capability, optional control memory, non-bussed output channels, etc. The modules of the computer consist of:

A.   Central processor and I/O
B.   16K Word Memory Module
C.   Power Supply No. 1

D.   Power Supply No. 2
E.   Maintenance Console
F.   Cabinet and I/O Module
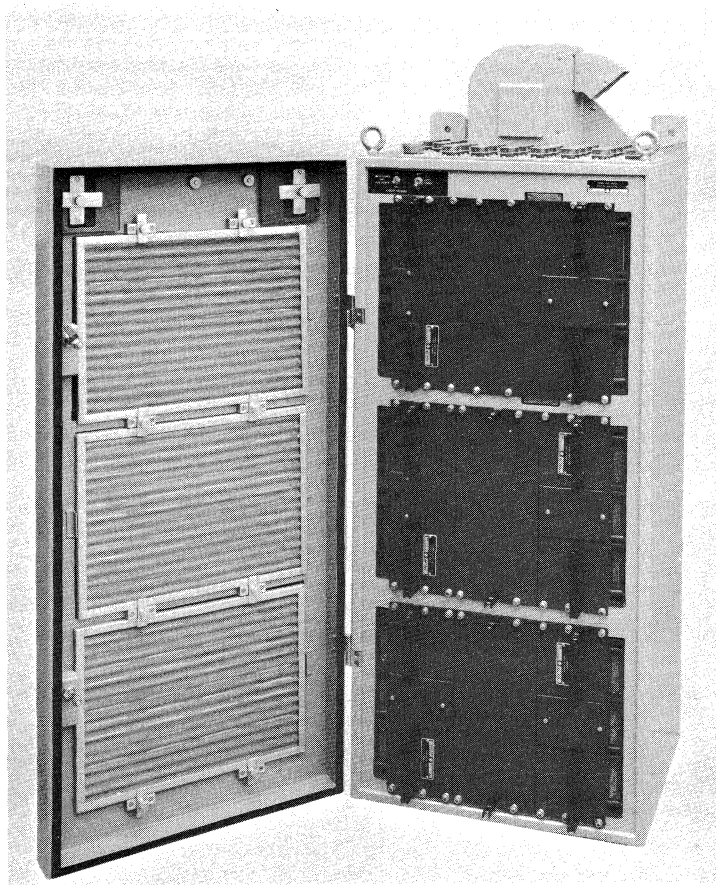
PHOTO NO. 4193

1830-B COMPUTER
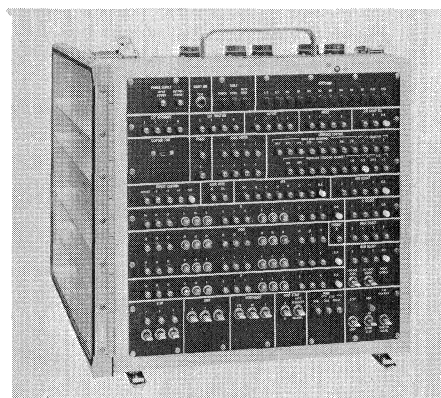
PHOTO NO. 4194

MAINTENANCE PANEL

FUNCTIONAL DIAGRAM

6.71

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION
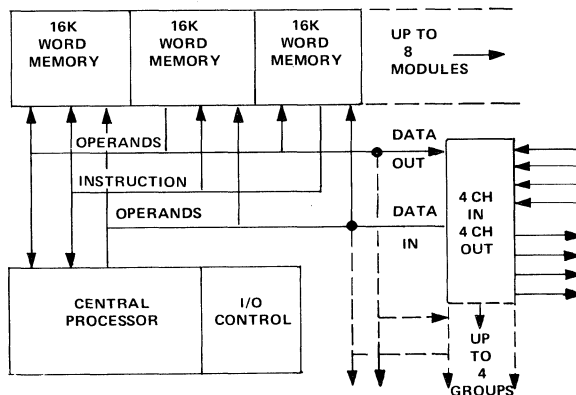
FUNCTIONAL CHARACTERISTICS

30-BIT WORD LENGTH
Half word operand option

MEMORY — DRO CORE
4096-Word Stacks in 16K Word Modules
Expandable in 16K Banks
2 Microsecond Cycle Time
Power Loss Protection

MEMORY — NDRO CORE ROPE
512 30-bit Words
Bootstrap
Load Failure Analysis

I/O CONTROL MEMORY OPTION
48 words in I/O Module
Integrated Circuit Elements

CONTROL
Memory Overlap — 2 or more Modules
Memory Write Lockout — Page Mode
7 IC Index Registers
Real-Time Clock 102.4K counts/sec.
Count Down Clock Interrupt
Power Failure, Power On Interrupts
Program Fault Interrupt
External Clock Option to 102.4KHz
76 Basic Instructions
Addressing Capability
  Direct Addressing Mode — 32K words
  Page Addressing Mode — 131K words

INPUT/OUTPUT

4, 8, 12 or 16 I/O Channels
30-bit Parallel Interface
32K word Memory Addressability
131K word Addressability with Optional
  Control Memory
5 Interrupts per Channel
Operating Modes
  Normal Buffer
  ESI — Optional
  ESA — Optional
  Intercomputer — Optional
Automatic Priority Determination
Transfer Rates — words per second

Interface Option	Single Channel	Multi-Channel
- 3 volt	167,000	500,000
+3.5 volt	167,000	500,000
-15 volt	38,400	500,000

PHYSICAL CHARACTERISTICS

Computer modules are contained in a welded aluminum frame cabinet that incorporates a slide out I/O module in the upper right position and the I/O connectors and cooling air exhaust on top. Each computer module slides in from the front and makes electrical contact with rear cabinet receptacles when inserted. Printed circuit cards and other subassemblies in modules transfer heat by thermal conduction to cold plate heat exchangers that form one cover for the module. Cabinet cooling fans circulate air through the ribbed heat exchangers.

Specifications and standards used as design guides:

General: MIL-E-16400
RFI: MIL-I-16910
Shock: MIL-S-901 Class I Medium Weight
Vibration: MIL-STD-167 Type I
Waterproofing: MIL-STD-108
Salt Spray: MIL-STD-151 Method 811
Environmental Characteristics:
  Operating Temp.   -10°C to +54°C
  Storage Temp.   -55°C to +75°C
  Relative Humidity to 95%
Power: MIL-STD-761B
  115 Volt or 115/208 Volt
  400 Hz, 3 Phase
MTBF: Calculated for 32K Memory
Computer: 1350 hours
MTTR: 30 minutes

6.71

Module/Dimensions depth x width x height inches/(cm)	Number of Modules Required	Weight per Unit-Pound (kg)	Weight Total Number of Modules Pounds/(kg)			
			16K	32K	49K	65K*
Central Processor 14.4 x 5.5 x 11.4 (36.6 x 14.0 x 29.0)	1	34 (15.4)	34 (15.4)	34 (15.4)	34 (15.4)	34 (15.4)
Memory 14.4 x 5.5 x 11.4 (36.6 x 14.0 x 29.0)	1-4	34.5 (15.6)	34.5 (15.6)	69 (31.3)	103.5 (46.9)	138 (62.6)
Power Supply No. 1 14.4 x 5.5 x 11.4 (36.6 x 14.0 x 29.0)	1	33 (15.0)	33 (15.0)	33 (15.0)	33 (15.0)	33 (15.0)
Power Supply No. 2 14.4 x 5.5 x 11.4 (36.6 x 14.0 x 29.0)	1	45 (20.4)	45 (20.4)	45 (20.4)	45 (20.4)	45 (20.4)
**Maintenance Panel 5.5 x 17.4 x 16.7 (14.0 x 44.2 x 42.5)	1	44** (20.0)	44 (20.0)	44 (20.0)	44 (20.0)	44 (20.0)
***Cabinet with Door 21.5 x 20.0 x 43.1 (54.6 x 50.8 x 109.5)	1	187*** (84.8)	187 (84.8)	187 (84.8)	187 (84.8)	187 (84.8)
TOTAL COMPUTER WEIGHT — POUNDS (kg)			377.5 (171.2)	412 (186.9)	446.5 (202.5)	481 (218.2)
POWER CONSUMPTION — NOMINAL WATTS			950	1100	1250	1350
— MAXIMUM			1130	1360	1590	1700
115 Volt, 400 Hz, 3 phase or 115/208 Volt, 400 Hz, 3 phase						
Add 70/90 watts for optional control memory Add 50/65 watts for each optional -15 volt 4 channel group Nominal power factor 0.9; minimum power factor 0.8						

*Maximum for the cabinet
**With four 4.5 foot cables
***With fan assembly and input/output module

REFERENCES

Design Specification	SB 10247
Acceptance Specification	SB 10612
Technical Manual	PX 5981
	PX 6117
Maintenance Diagnostic (-00,-01)	PX 6204
Bootstrap Program	PX 5949
Block Diagram Drawing	7216241
Outline Dimension Drawing	7216129
External Wiring Diagram	7216249
NDRO Assembly	7074003

6.71

PRODUCT INFORMATION

UNIVAC 1832 AVIONICS COMPUTER   PX 5627
AN/AYK-10(V)

The UNIVAC ® 1832 computer is a dual processor designed to meet the high data processing requirements of systems aboard military aircraft. Its central processor is a functional equivalent of the AN/UYK-7 central processor. High density microelectronic circuits are packaged in physical and functional modules which in turn are assembled in a cabinet that is fitted to an aircraft installation. Modules are logically interconnected and powered to permit a "degraded mode" of operation for added reliability. Input/output communication provides parallel, serial, and special purpose transfer capabilities.

The 1832 computer is configured from the following three functional modules as required:

- Central Processor, Input/Output Controller and Input/Output Interface

- 32K Word Memory Unit

- Power Supply Unit with Two Power Supplies
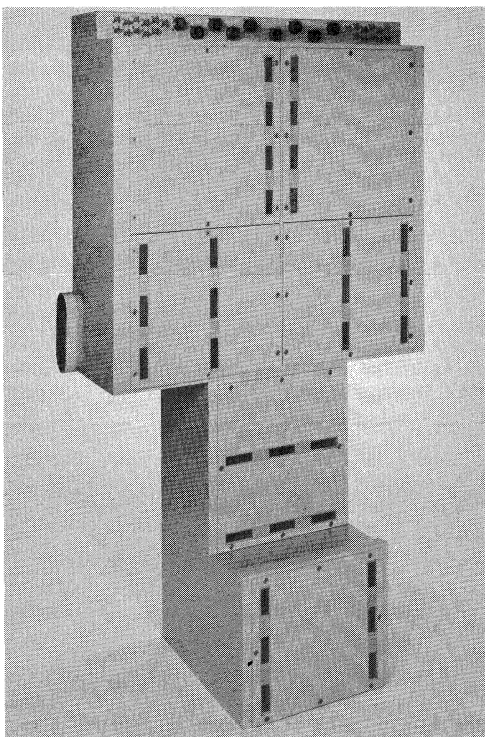
Photo No. 1932-4
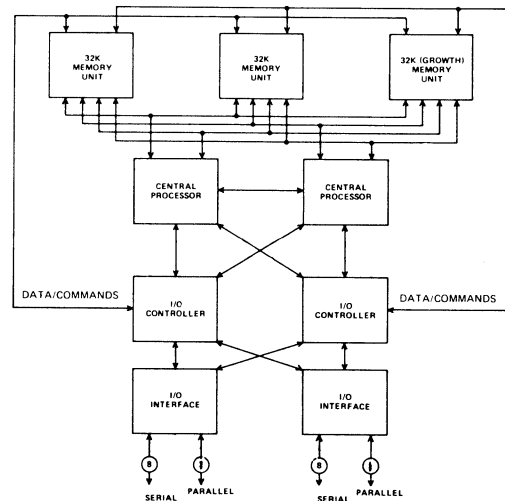
Functional Diagram

GENERAL FUNCTIONAL CHARACTERISTICS

Modular functional architecture

Asynchronous intermodule communication

Multiprogramming and dual processor capability

Overlapped operation, two or more 32K memory modules

Dynamic error and status registers

Memory addressing to 262,144 words

Built-in-test equipment (BITE)

Degraded performance operating mode

C-16-1

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

Built-in-test equipment monitors
   Processor-memory references
   Main clock timing
   Illegal function codes
   Memory parity
   Memory timing
   I/O parity
   PS output voltages

MEMORY MODULE

Mated film storage elements
32,768 words per module
16,384 word operation (degraded mode)
Six access ports per 16K bank with priority
net selection
750 nanosecond read-write cycle time
36 bit words — 32 data, 4 parity bits
Quarter and half word packing (operand)

CENTRAL PROCESSOR

133 basis whole and half word instructions
   Direct or indirect addressing
   Variable length character addressing
   Privileged instruction set
Task and interrupt operating states
   Interrupt mode monitor clock
   2 sets of 7-index and 8 base registers
   2 sets of 8-addressable accumulators
Decrementing monitor clock at 1024 counts/sec
Memory lockout registers — variable blocks
Interface capability
   8 memory modules maximum
   2 I/O controllers maximum
NDRO memory 512 words
   Initial load program
   Fault analysis and recovery
   Hardware diagnostics
Arithmetic
   32-bit paralled, one's complement binary
   Fixed and floating point hardware
   8-, 16-, 32- or 64-bit operands

INPUT/OUTPUT CONTROLLER

Controlled by two central processors
Controls two interface adapters
Direct access data transfers
Programmed operations with command chaining
capability
Repertoire of 25 basic instructions
Integral control memory
   Buffer control words
   Command address pointers (function control
   words)
   Clock storage (2)
   Chain base address storage (16)
Internal RTC — 1024 counts per second
Operating modes
   Normal buffer
   Continuous transfers via command chaining
   External specified index
Input/Output interface adapter
   Serial-paralled conversion (vice-versa)
   Asynchronous transfers with channels
   Transfer capacity: 667K words per second per
   controller
   Redundant power from 2 PS
Channels
   1 or 2 bidirectional parallel 167K words/
   second transfers
   Up to 10 bidirectional serial special purpose
   types
   6 million bits/second transfers
   0 to +3.9 volt signal levels

POWER SUPPLY

2 ac to regulated dc converters in 1 unit
dc-dc converters in functional modules
Overload protection
Abnormal power detection
   Interrupt central processor
Automatic computer start and restart
Energy storage:
   For 250 microseconds after input power loss

Logic cards, memory stacks and power converter are assembled in drawer modules with the inter-connecting harness an integral part of the main frame structure. Integrated circuit and discrete components are mounted on 6" x 6" printed circuit cards that terminate in 112 pin connectors. Cooling is accomplished by thermal conduction to coldplate heat exchangers that are cooled by an external air supply.

MODULE DATA

Item	Part Number	Weight (Pounds)
Main Frame (Cabinet)	7131850-00	103.3
Power Supply	7131700-00*	32.5
Power Supply	7131700-01	32.5
Central Processor		
I/O Controller		
I/O Interface	7131000-00	44.1
32K Memory	7131500-00	44.4
Dc-dc Converter (CP)	7511300-00	6.9
Dc-dc Converter (I/O)	7511200-00	6.9
Dc-dc Converter (Memory)	7131775-00	4.5

*Has space for an additional switching regulator

POWER REQUIREMENTS:

115/208 volt, 3 phase, 400 Hz per MIL-STD-704

Power consumption (watts)	Average	Peak	P.F.
for 65,536 word memory computer	2100	2300	0.8
for 98,304 word memory computer	2300	2550	0.8

Warm-up time from -20°C	2 minutes
Warm-up time from -54°C	15 minutes

Cooling air supply — 6 pounds/min/kw of 60°F to 80°F air

MTTR using Diagnostics $\cong$ 16 minutes
MTTR using Manual Procedures $\cong$ 32 minutes
Max TTR using Diagnostics $\cong$ 42 Minutes
Max TTR using Manual Procedures $\cong$ 60 minutes

Basic configuration consists of a cabinet with:
- 2 — CP, IOC, IOA modules
- 2 — 32K word memory modules
- 1 — power supply module

SPECIFICATIONS AND STANDARDS
USED FOR DESIGN OBJECTIVES

General construction: MIL-E-5400K
Electromagnetic interference: MIL-STD-461
WR-101 Part I
Amendment I
Environmental: Class I(X) MIL-E-5400
MTBF per 5.1.9.1 of MIL-STD-785: 350 hours
MTBF per test method MIL-STD-781:
225 hours

REFERENCES
Design Specification	SB-12414
Outline and Dimension Drawing	7131833G

Configurations and modular arrangements other than that defined by Univac drawing 7131833G can be provided.

PRODUCT INFORMATION

UNIVAC 1240 MAGNETIC TAPE UNIT
(RD-270(V)/UYK)

PX 3221

Standard industry compatible magnetic tape reels and read/write formats were introduced into a UNIVAC-sponsored, military type, magnetic tape peripheral development in 1963. Although not fully militarized, the 1240 Magnetic Tape Units supply a military market with compatibility, versatility and a great amount of capability. Two to sixteen tape transports can operate from one control unit, in the base cabinet, that occupies one computer channel. Two computer operation (duplexing) is not provided. Two instruction words are required to initiate an operation: one addresses the unit and the second specifies the function. The 1240 is available in two-transport and four-transport, air cooled, cabinet configurations.

FUNCTIONAL CHARACTERISTICS

TAPE

Width: ½ inch
Length: 2400 feet, 1-½ mil
Wind: "A" wind, oxide surface in
Reels: 10-½ inch, compatible hub, payout reel above

TAPE SPEED

Read/write forward: 112.5 ips
Backspace: 112.5 ips
Rewind: 225 ips

RECORDING TECHNIQUES

Method: NRZI Post — write read for parity
No. of tracks: 7 (6 data, 1 parity)
200, 556 bpi (program controlled)
Format: Odd or even lateral parity
(Program controlled): Bioctal or redundant octal frame Modulus 3, 4, 5 or 6
Block length: Variable (by word)
Interblock gap (IBG): ¾ inch (industry compatible)
Head arrangement: Dual gap read/write
Full width DC erase

FUNCTIONAL DIAGRAM

TRANSPORT CHARACTERISTICS

Tape drive: Dual capstan, pinch rollers
Tape reservoir: Tension arms (servo controlled)
Tape sensors: BOT, EOT, Low Tape
File protect: Absence of write enable ring on Master Reel

CONTROL UNIT CHARACTERISTICS

Read function: Forward only
Read start delay: IBG — 2.0 ms
               BOT — 15.0 ms
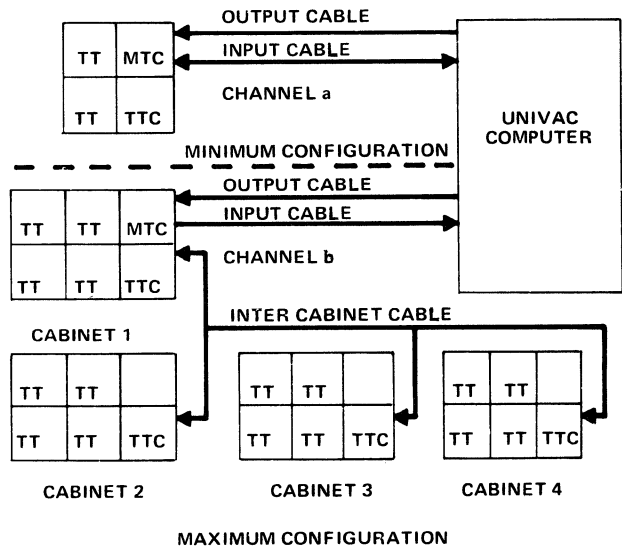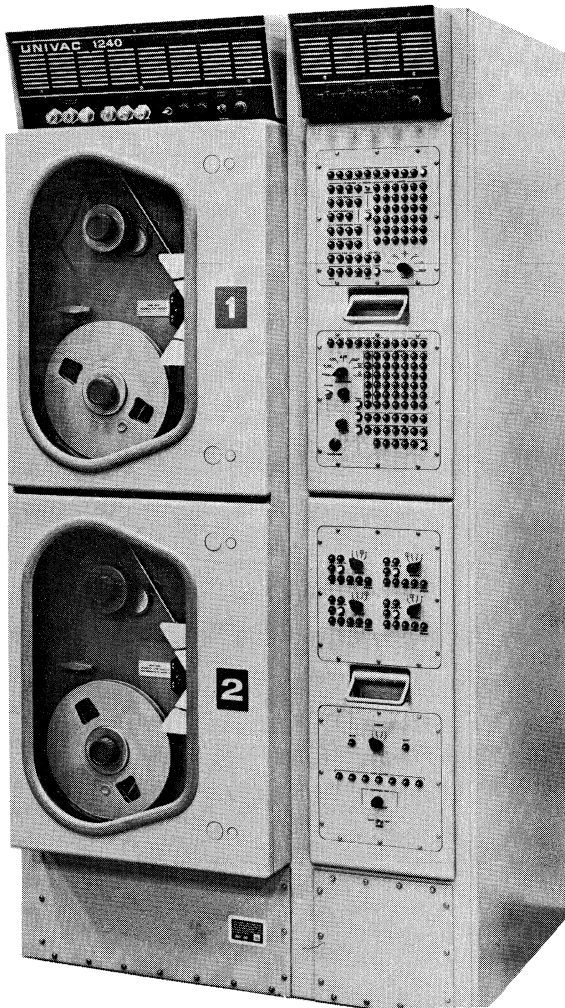
Write function: Forward only
Write start delay: IBG — 3.75 ms
              BOT — 27.0 ms
Search function: Forward and backward
"Find" on bit-on-bit equality or on greater-than-or-equal-to
Interface word length: 18, 24, 30, or 36 bits (one only)
Interface signal voltage: N3 or N15 (one only)
Frame transfer rate: 200 bpi density — 22,500
(frames per second): 556 bpi density — 62,500
Words per second: 3,750 to 20,800
Transports per control: 2 to 16

PHYSICAL CHARACTERISTICS

The requirements of MIL-E-16400 were used as a design goal for the 1240 Magnetic Tape Unit. A ruggedized welded aluminum main frame houses the tape transports and assemblies of MIL-approved CP642B type circuit modules that make up the Control Unit and Interface Logic. Front access is provided via the pullout drawer type, wire wrapped chassis. Cabinets contain 2 or 4 tape transports.

	2 Transport	4 Transport
Size (inches)	72Hx37Wx30D	72Hx60Wx30D
Weight (pounds)	1150	1900
Cooling air (CFM)	800	1400
Input Power (KW)		
115 vac, 400 Hz, 3 ph	0.6	0.6
115 vac, 60 Hz, 1 ph	2.8	5.5
200 vac, 400 Hz, 3 ph	(1240C, PRD only)	

REFERENCES

DS 4661   Design Specification

MANUALS

PX 3524-0-2   1240 18-Bit Maintenance Test
PX 3640-1-2   1240 Magnetic Tape Unit, Vol. I
PX 3640-2-2   1240 Magneitc Tape Unit, Vol. II
PX 4420-1-2   1240 Diagnostics, Vol. I
PX 4420-2-2   1240 Diagnostics, Vol. II
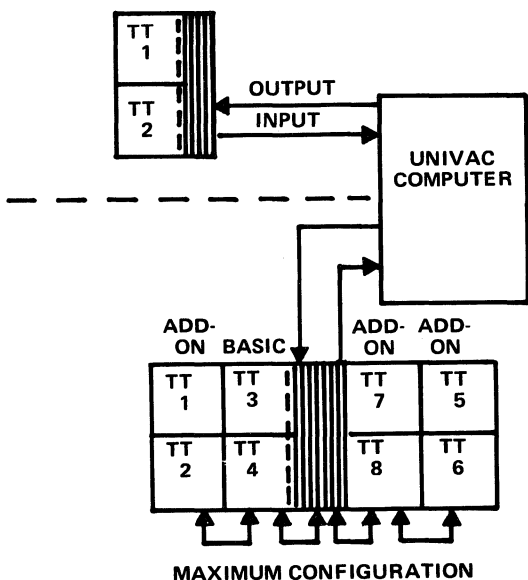
Outline and Dimension Drawings

  2 Handler   7006650
  4 Handler   7006651

PRODUCT INFORMATION

UNIVAC 1540A MAGNETIC TAPE UNIT (RD-294(V)/UYK)
PX 3662

Requirements for a more rugged and faster magnetic tape unit than the 1240 units are reflected in the 1965 development of the UNIVAC 1540 magnetic tape peripheral units. Increased tape transporting speed, higher packing density (to 800 bpi) more rugged environmental characteristics and more functional capabilities are features of this generation product. Dual computer (duplexing) operation and the air or water cooled cabinet are standard options. Two to eight transports may be connected to one computer channel and are available in two-transport basic cabinet which encloses the control unit and the two-transport add-on cabinet. The 1540A reflects the 1967 improvement effort in making the device more reliable.

MAXIMUM CONFIGURATION

FUNCTIONAL DIAGRAM
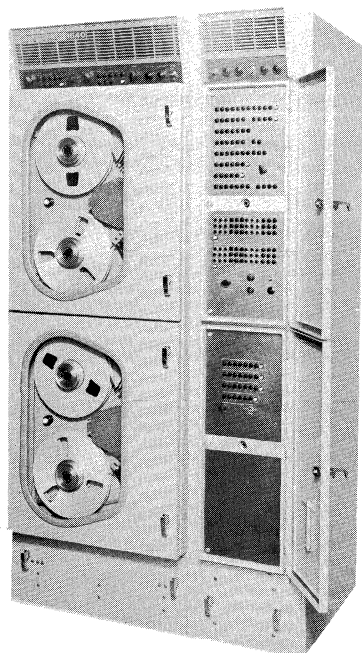
FUNCTIONAL CHARACTERISTICS

TRANSPORT CHARACTERISTICS

Tape drive	Dual capstan, pinch rollers
Tape reservoir	tension arms (servo controlled)
Tape sensors	BOT, EOT, Low Tape
File protect	Absence of write enable ring on Master Reel

TAPE

Width	1/2 inch
Length	2400 feet, 1.5 mil
Wind	"A" wind, oxide surface in
Reels	10-1/2 inch, compatible hub, payout reel above

TAPE SPEED

Read/Write forward	120 ips
Backread	120 ips
Rewind	240 ips
Start time	3.0 ms
Stop time	1.5 ms (from 120 ips)

RECORDING TECHNIQUES

Method	NRZI
No. of tracks	7 (6 data, 1 parity)
Density	200, 556, 800 bpi (program controlled)
Format (program controlled)	Odd or even lateral parity Bioctal or redundant octal frame modulus 3, 4, 5 or 6
Block Length	Read-Variable by frame Write-variable in computer word increments
Inter Block Gap (IBG)	3/4 inch (industry compatible)
Head Arrangement	Dual gap read/write Full-width DC erase
Post-Write Read	Read after write for parity check

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CONTROL UNIT CHARACTERISTICS (1540)

Program compatible with UNIVAC 1240 by switch selection

Write function	Forward only
Read function	Forward and backward
Write start delay	IBG — 4.5 ms
	BOT — 24.0 ms
Search function	Forward and backward
	"Find" on bit-by-bit equality
	or on greater-than-or-equal-to
Duplexing	Dual computer control by
	External function command

Interface word length — 18, 24, 30, or 36 bits (one only)
Interface signal voltage — N3 or N15 volts (one only)

Frame transfer rate (frames per second)	
200 bpi density —	24,000
550 bpi density —	66,670
800 bpi density —	96,000

Word transfer rate (words per second)

	18 Bit	30 Bit	36 Bit
200 bpi	8,000	4,800	4,000
556 bpi	22,220	13,330	11,110
800 bpi	32,000	19,200	16,000

Read Bias Control — Normal/High/Low by program selection

Transports per Control Unit — up to 8

PHYSICAL CHARACTERISTICS

	BASIC UNIT		ADD-ON UNIT	
	Air Cooled	Water Cooled	Air Cooled	Water Cooled
Size (inches)	72Hx38Wx30D	72Hx38Wx36D	72Hx26Wx30D	72Hx26Wx36D
Weight (pounds)	1400	1600	450	1100
Cooling Air (CFM)	600	—	400	—
Cooling Water (GPM)	—	4.0@70°F	—	4.0@70°F
Input Power (KW)				
115 vac, 400Hz, 3 ph	0.7	1.2	0.01	0.34
115 vac, 60Hz, 1 ph	3.3	3.2	3.3	3.2

Separate power cable to basic unit and to add-on unit.

ENVIRONMENTAL CHARACTERISTICS

Construction design of the 1540 included greater emphasis on the requirements of MIL-E-16400 and related specifications and standards. Tests performed provided data on its environmental characteristics in the following categories:

|	
General Specification:	MIL-E-16400
Temperature:	
Operating	0° to 50°C
Non-Operating	-62° to —75°C
Relative Humidity:	Operation up to 95%, continuous and intermittent, including condensation in the form of water and frost
Enclosure:	MIL-STD-108 (Drip Proof)
Salt Spray:	Federal Std. No. 151, test Method 811
External Radiation:	MIL-I-16910
Shock:	MIL-S-901, Grade A, Deck mounted, Class II, Med. Weight
Vibration:	MIL-STD-167, Type I

MIL-approved circuit modules (CP-642B type).

REFERENCES:

MANUALS	DESCRIPTION
PX 3334-1-4	1540/41 Magnetic Tape Unit, Vol. I
PX 3334-2-4	1540/41 Magnetic Tape Unit, Vol. II
PX 3644-0-1	1540 18-Bit Maintenance Test
PX 3645-0-2	1540 30-Bit Maintenance Test
PX 3873-0-1	Potter MT-120A Tape Transport

Design Specification: DS4726, SB10110
Outline and Dimension Drawing: Air = 7075029
                                Water = 7075030
Installation Checkout Kit: Log 7441
One-Year Spares Kit: Log 7505

PRODUCT INFORMATION

UNIVAC 1560 MAGNETIC TAPE UNIT
RD-261/USQ-20

The UNIVAC 1560 Magnetic Tape Unit is a large capacity, special format, militarized storage device designed in 1962 to operate with the CP-642A/USQ-20(V) Computer as part of the Integrated Operational Intelligence Center. The tape unit records and retrieves 39-bit computer words on one inch tape at one of 32 discrete densities which are program selectable from 451 bpi to 1667 bpi. A redundant recording format is provided for increased reliability. The 1560 Magnetic Tape Unit houses two tape transports in a military cabinet with water cooling or air cooling.
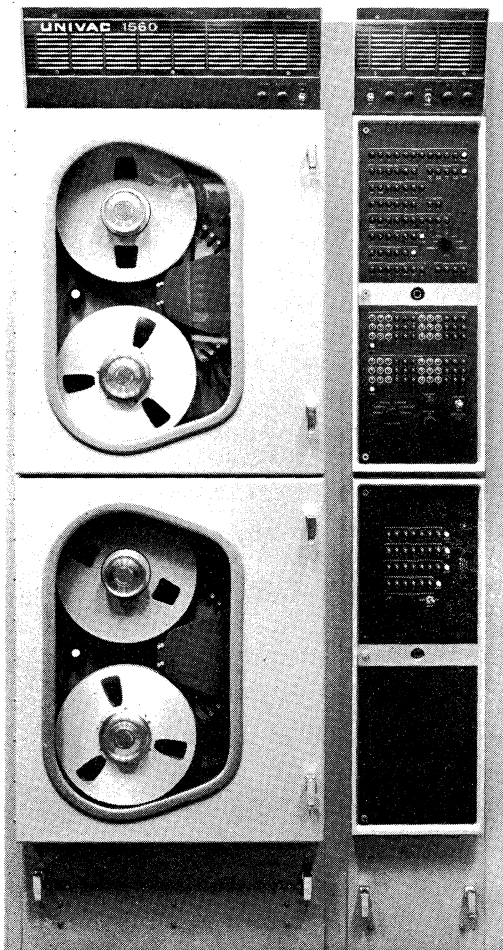
FUNCTIONAL CHARACTERISTICS

TAPE

Width	One inch
Length	2400 ft., 1.5 mil
Wind	"A" wind, oxide surface in
Reels	10-1/2 inch, compatible hub, payout reel below
Tape Markers	EOT, BOT-clear leaders

TAPE SPEED

Read/Write	30 ips Forward
Backread	30 ips Backward
Wind/Rewind/Search	180 ips Forward and Backward

RECORDING TECHNIQUES

Method	NRZI Read after Write for parity check
No. of Tracks	16 (15 data, 1 sprocket)
Density	451 bpi to 1667 bpi, program selectable
Frame Time at 30 ips	20 μS to 74 μS in increments of 2 μS
Format	Normal — 2 frames per 30-bit word
(Program Selectable)	Redundant — 4 frames per 30-bit word, redundant recording Special — 2 frames per 30-bit word, no IBG, read only
Block Length	Variable in computer word increments
Interblock gap (IBG)	3/4 inch

TRANSPORT CHARACTERISTICS

Tape Drive	Dual Capstan, Pinch Rollers
Tape Reservoir	Tension Arms (servo controlled)
Tape Sensors	BOT, EOT, Low Tape, High Tape
File Protect	Absence of Write Enable Ring on Master Reel

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FUNCTIONAL CHARACTERISTICS (Continued)

CONTROL UNIT CHARACTERISTICS

Read Function	Forward and Backward
Write Function	Forward only
Search Function	Forward and Backward Block Count
Interface Word Length	30 bits
Interface Voltage	-15
Frame Transfer Rate (frames per second)	13,500 to 50,000
Word Transfer Rate (words per second)	6,750 to 25,000 Normal Format 3,800 to 12,000 Redundant Format
Transports per Control Unit	2

PHYSICAL CHARACTERISTICS

	Water Cooled	Air Cooled
Size (inches)	72Hx38Wx36D	72Hx38Wx32D
Weight (pounds)	1500	1500
Cooling Air (CFM)	—	600
Cooling Water (GPM)	4.0	—
Input Power (KW)		
115 vac, 400 Hz, 3 ph	1.4	0.6
115 vac, 60 Hz, 1 ph	2.0	2.2

ENVIRONMENT CHARACTERISTICS

The following specifications were used as a guide for the design and construction of the 1560 Magnetic Tape Unit

Temperature:	MIL-E-16400 Class 4, operating 0° to 50°C, non-operating -62° to +75°C
Relative Humidity:	MIL-E-16400, operation up to 95% R.H., continuous and intermittent, including condensation in the form of water and frost
Enclosure:	MIL-STD-108 (Drip Proof)
Salt Spray:	Fed. Std. No. 151, Test Method 811
External Radiation:	MIL-I-16910
Shock:	MIL-S-901 Grade A, Deck mounted, Class II, Med. weight
Vibration:	MIL-STD-167 Type I
Inclination:	MIL-E-16400

MIL — approved circuit modules (CP-642A type)

CONFIGURATION OPTIONS

The following are the part numbers for the two versions of the 1560:

7038878	Air Cooled
7007800	Water Cooled

Reference: DS4634

UNIVAC 1840 MODULAR MAGNETIC TAPE SET
(AN/USH-20(V))

The need for a compact reliable magnetic tape unit adaptable to a variety of application in adverse environments prompted Univac to design the 1840 Modular Magnetic Tape Set (MMTS) in 1968. The set utilizes a new, compact tape transport designed and fabricated by UNIVAC. New concepts in tape handling techniques were employed to produce a transport with vacuum buffers and still maintain industry compatible functional characteristics. The tape set consists of four basic rack mountable modules: Control Unit, Remote Operator's Unit, Tape Transport and Maintenance Console. This modularity allows a broader range of applications in airborne, shipboard and mobile land installations, especially where conservation of space and weight is a basic requirement. Either a completely modular configuration or a cabinet configuration is available.
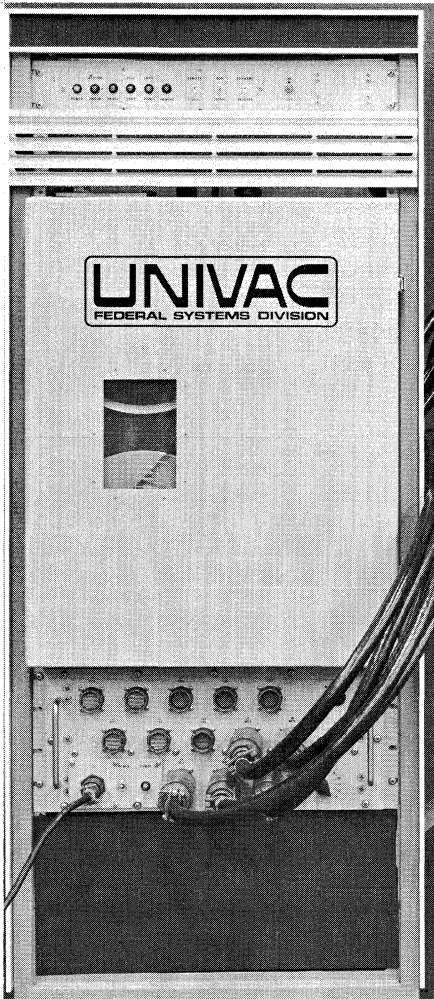
MODULES

Photo 36043 (USL)
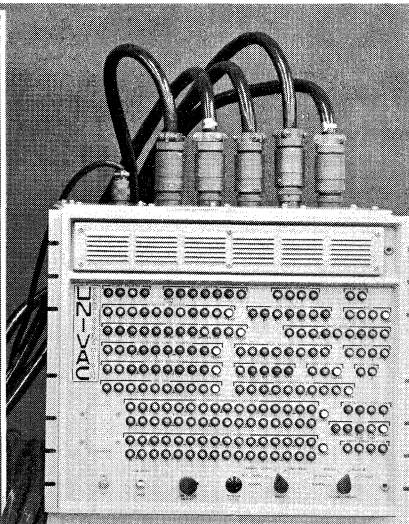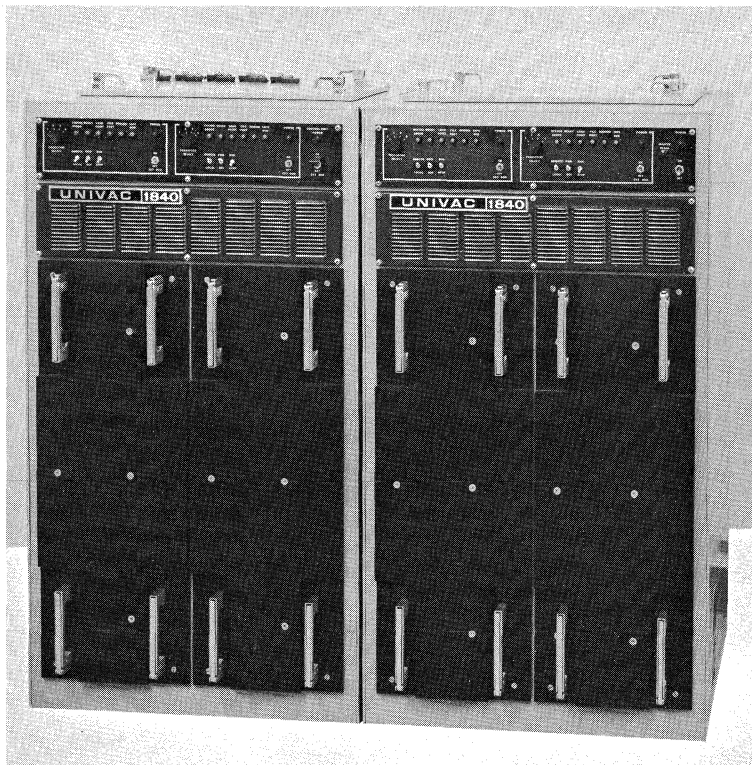
CABINET

MT-4-1   Photo 35644 (USL)   8.72

TAPE TRANSPORT MODULE (RD-366/USH-20(V))

Contains one tape transport, servo mechanism associated read/write and transport control circuitry internal cooling system and power supply with overload, overvoltage and undervoltage protection.

Transport Type — Univac
Tape and Reels — Industry Compatible
  1/2 inch wide, 1.5 mil thick, "A" wound reels
  Reflective markers for EOT and BOT

Tape Handling Methods
  Single friction drive capstan, vacuum column tape reservoir and servo control, BOT and EOT sensors

  Quick release, low profile, reel lock for 6, 8 or 10-1/2 inch reels

  Dual gap read/write head arrangement
    Full width DC erase, 2000 hour minimum life

    Tape life — More than 100,000 passes

    7- or 9-track

  Master Reel File Protect — write enable ring removed

  Error rate — Less than 1 non-recoverable in 10^8 bits

Tape Handling Speed
  Read/write at 75 inches per second (ips)

  Rewind at 150 ips

  6.4 ms start/stop time

RFI Covers Optional

REMOTE OPERATOR'S UNIT (C-9105/USH-20(V))

One Remote Operator's Unit is required for operating each tape transport. It provides all controls for changing and loading tapes, primary power switches, indicators and controls for operating either on-line or off-line with the Control Unit.

MAINTENANCE CONSOLE MODULE (TS-3232/USH-20(V)) (TS-3233/USH-20(V))

The Maintenance Console is used to simulate operating functions in a test mode and to show dynamic indications of subsystem operation for efficient troubleshooting and maintenance of the MMTS. It may, but need not be a part of the operating subsystem. Operating controls, indicators and test points are provided on the front, hinged door panel through which access is provided to all printed circuit cards and power supply in both the console and the inserted control unit. The unit is packaged in a standard 19-inch rack mounting or a portable unit.

CONTROL UNIT MODULE (C-9104/USH-20(V))

Contains all interface and control logic for functional operation of the MMTS, power supply timing circuits, buffer registers and interface connectors for one or two computers, one to four Tape Transport Modules and for the Maintenance Console.

  Computer Interface Characteristics
    Word Length: 18, 24, 30, 32 or 36 bits
    Signal Voltage: P3, N3 or N15 (one only by card interchange)
    Control Lines: 2 Request, 2 Acknowledge
    External Function & Interrupt

  Computer controlled functions — read, search or space file forward and backward; write forward, duplex control, format control (odd or even parity; 200, 556 or 800 bpi density), select transport 1, 2, 3 or 4 and rewind.

  Interrupts — Errors detected, and status indication via interrupt word

Recording Techniques — Industry Compatible
  NRZI, post write/read for parity check on 7 channels (6 data + 1 parity) variable block length, 3/4 inch inter-block gap (IBG), longitudinal parity checking. 3-1/2 inch extended IBG.

  Block length
    Read — Variable by frame;
    Write — Variable in computer word increments.

ENVIRONMENTAL CHARACTERISTICS

Attitude independent modules
Temperature

Continuous operation	-54° to +55°C
Intermittent operation	-54° to +71°C
Non-operating (storage)	-62° to +85°C

Relative Humidity

Operating	20% to 90%
Non-operating	0% to 100%

No resonant frequencies below 50 Hz
MTT shock and vibration susceptibility
Withstands shock impacts without isolators
  50 g perpendicular to plane of reels
  25 g parallel to long axis of tape deck
Operating altitude
  to 10,000 feet with standard case
  to 70,000 feet with pressurized case
ROU & CU
  Operating altitude to 70,000 feet
Shock
  50 g at 11 ms duration

PHYSICAL CHARACTERISTICS (1840)

The following specifications were used as guides for the design and construction of modules for the MMTS.

General Specifications	MIL-E-16400 (Amendment 4) and MIL-E-5400L
Altitude	MIL-E-5400 Class 2
Temperature	MIL-E-5400 Class 1 (altitude to 10,000 ft)
Enclosure	MIL-STD-108E (Drip proof)
Salt Spray	FED-STD-151 Test Method 811
RFI	MIL-I-6181
Shock	MIL-S-901C Grade A, Deck Mounted and Class II
Vibration	MIL-STD-167B, Type I
	MIL-E-5400, Curve IV

All modules are designed to fit a standard 19" rack mounting and have physical characteristics to withstand airborne and ship/shore mobile environments. Various packaging options are offered to meet customer requirements. These include open or dust covered modules for rack mounting, heavy ruggedized enclosures for stand alone modules or ruggedized single cabinet assemblies integrating all modules. (See supplementary listing for fully documented options.)

Size, Weight & Power

Dimensions in inches exclude connector and cable protrusions.

Power consumption in VA is maximum per module.
Weight in pounds is given according to configuration.

	MTT	ROU	CU	MC	UNIFIED MC-CU	CABINET 2TT	4TT
Width	19.5	19.0	19.0	19.0	19.0	24.25	48.75
Height Without Air Filters	25.35 24.5	3.0	7.88	16.75	18.0	45.0	45.0
Depth	9.5	5.5	12.19	13.88(6)*	13.88	24.25	24.25

Weight (Baseline)
  Without Enclosure
  With Pressurized Case
	130
	120
	150
		2.75	40.0
			32.0
				42.0	75.0	555.	1050.

Power (Maximum VA)	1100	2.0	250	100	250		
Power Factor	0.9	0.99	0.95	0.95	0.95	See Individual Modules	

MTBF—Calculated per MIL-STD-756A
  Ship/Shore (hrs) 40°C
  Airborne (hrs) 55°C
	2283
	588
			1240
			324
				3925			

MTTR (minutes)	45		30	15			

*Portable unit

Control Unit Wiring Options:

    a.   Simplex: 18- or 30-bit interface
    b.   Duplex: 18-, 24-, 30- or 36-bit interface

References:

SB 12215	Magnetic Tape Transport Design Characteristic Specification
SB 10330	MMTS 1840 Acceptance Procedure 30-bit Computer
SE 00150	MMTS 1840 Acceptance Procedure 18-bit Computer
SE 00151	MMTS 1840 Inspection Spec.
SE 00122	MMTS 1840 Maintenance Console PN7601842 Test Specification
SE 00121	MMTS 1840 Control Unit PN7601841 Test Specification
SE 00120	MMTS 1840 Modular Magnetic Tape Transport PN7601840 Test Specification
SE 00114	MMTS 1840 Remote Operator's Unit PN7601843 Test Specification
SE 00101	Product Specification 1840 MMTS
PX 8122	Technical Manual, MTT and ROU
PX 8197	1840 System Manual
PX 6573	Technical Manual — Cabinet MMTS

PRODUCT INFORMATION

UNIVAC 1840 (MOD) MAGNETIC TAPE SET
(RD-358/UYK)

PX-10205

The UNIVAC 1840 (Modified) Magnetic Tape Set is a 1972 development of a compact militarized (MIL-E-16400) and modular magnetic tape unit with two or four tape transports and a microprogrammed controller. Either a two-transport or four-transport cabinet can be supplied. The 7-track NRZI recording subsystem can operate either as a 1240 or a 1540 by simply changing a switch position. The 9-track version writes in the NRZI or NRZI and phase-encoded format. In both versions, interface word lengths (16, 18, 24, 30, 32 and 36) are programmable by modules selection. Off-line tape to card punch, tape to printer, and card reader to tape operations are provided as an option via the read-only micromemory in the controller. Duplex computer operation is a standard feature on all units.
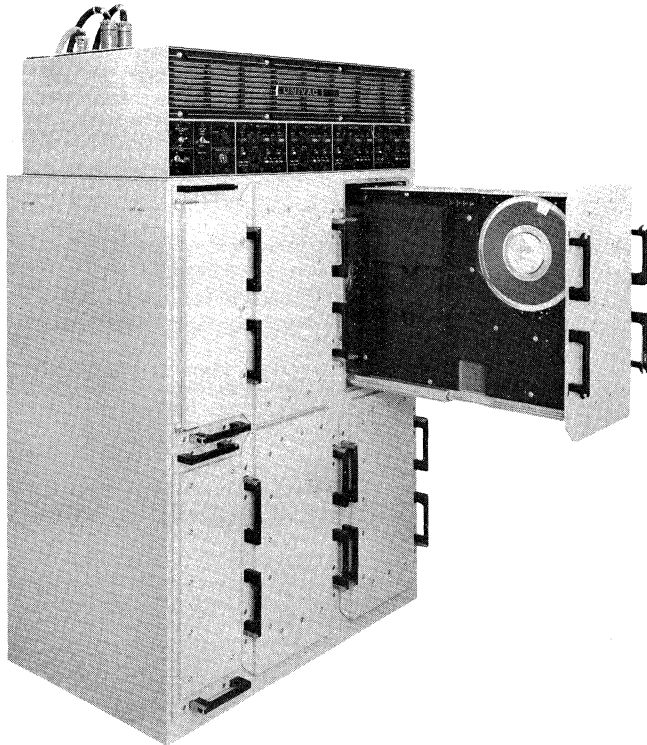
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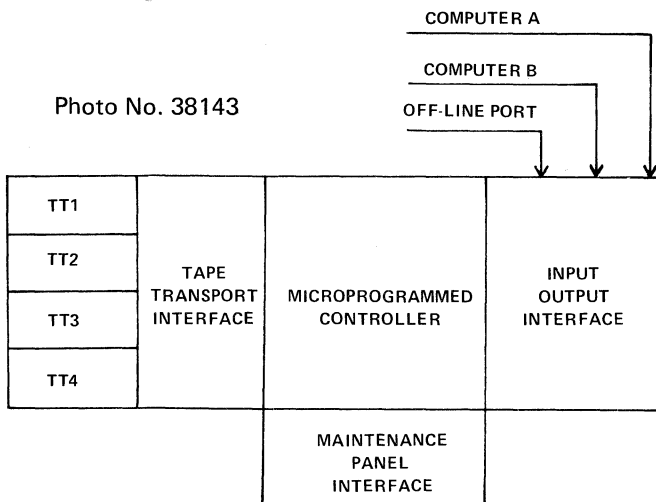
FUNCTIONAL CHARACTERISTICS

TAPE TRANSPORT—Univac

Single capstan tape drive
    120 ips read/write speed
    200 ips fast forward/backward (rewind)
    Vacuum column tape buffer
    Start/stop distance — compatible with both 7- and
    9-track formats
Reels and hubs
    Quick release supply hub
    A-wound industry compatible supply tape
    B-wound (oxide out) take-up tape
    10½ inch reels; ½ inch, 2400 feet, 1.5 mil. tape
    Permanent take-up reel mounting
Tape loading
    Automatic loading and threading
Recording formats
    7-track
    9-track
Sensors
    BOT, EOT
    Low tape (100 feet or less on supply)
    High tape (100 feet or less on take-up)
Gentle tape handling
Oxide side of tape touches only the read-write heads

CONTROL UNIT CHARACTERISTICS

Basic Functions:
    Read, space and search forward/backward, write
    forward, and rewind.
Data Block Length:
    Read — Variable by frame;
    Write — Variable in computer word increments.
Post-Write Read: Read after write for parity check.
Duplexing: 2 computers, 2 channels, programmed
    request, release, or demand duplex control.

FUNCTIONAL DIAGRAM

2·74

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Recording Technique (mode):

7-track subsystem	9-track subsystem
NRZI 1240 and 1540 compatible (manual selection)	NRZI or NRZI and phase encoded (PE) (program selection)
Recording density (frames per inch):	
200, 556 or 800 (Program controlled)	NRZI: 200, 556 or 800 (Program controlled) PE: 1600
Interface word size (bits); program controlled	
18, 24, 30 or 32/36	16, 18, 24, 30, 32, or 36

Input/output transfer rates:

	6-bit characters or 8-bit bytes per second	
Density selected	Non-redundant recording format	7-Track redundant recording format
200	24,000	12,000
556	66,720	33,360
800	96,000	48,000
1600	192,000	

Input/output interface:

> Signal levels: -3 volts, -15 volts, or +3.5 volts
> Off-Line: Tape to printer, tape to card punch, card reader to tape
> Word size: 16, 28, 24, 30, 32 and 36 bits; program controlled

Transports per control unit: 1, 2, 3 or 4

CONSTRUCTION

The 1840 (Mod) is packaged in a ruggedized air-cooled cabinet that can be bolted directly to a deck (floor) without shockmounts. One drawer-type chassis contains the control unit and one contains the power supply. All modules — tape transports, control unit and power supply are mounted on slides that permit pulling them forward from the cabinet, for maintenance and for changing tapes without interrupting operation. The 1840 (Mod.) can be disassembled to permit major modules and cabinet sections to pass through a 25-inch circular hatch. All cable connectors are located on the top of the cabinet near the rear.

PHYSICAL CHARACTERISTICS

General Specification: MIL-E-16400F

	2-transport unit	4-transport unit
Size (inches)	60H x 28D x 22.75W	60H x 28D x 37W
Weight (pounds)	730	980
Power		2500 (watts)

Input power:
> 1 phase, 115V ±10%, 60Hz ±5% or
> 3 phase, 208V ±10% line-to-line, 400Hz ±5%, 4 wire WYE or
> 3 phase, 115V ±10% line-to-line, 400Hz ±5%, 3 wire delta

Temperature*
> $0^{o}C$ to $+50^{o}C$ operating
> $-62^{o}C$ to $+75^{o}C$ non-operating (storage)

Relative Humidity*:
> 10% to 90% at $25^{o}C$
> 10% to 80% at $50^{o}C$

Operating altitude: To 12,000 feet without pressurization
Vibration: MIL-STD-167, Type I for surface craft
Shock Resistance: MIL-S-901, Class I (Deck mounted)
*Excludes recording tape

REFERENCES
> Design Specification: SB-10673
> M.T. Transport Specification: SE-00201
> Acceptance Specification: SB-10675-100
> Outline and Dimension Dwg: 7059825
> 4TT Cabinet 7059800
> 2TT Cabinet 7096375
> TYA-20 Cabinet 7101300
> Water Cooled 7120142

PRODUCT INFORMATION

UNIVAC 1232 INPUT/OUTPUT CONSOLE
RD-271(V)/UYK

PX 3450

The first effort put forth by Univac to combine 5, 6, 7, and 8 level paper tape read/punch and keyboard/printer operations in a single peripheral device operating with a computer on a single input/output channel was in the development of the 1232 input/output console. Fieldata code was a strong contender for standardization during this 1962-1963 period. Although rather sturdy, the 1232 was not built with physical characteristics capable of meeting military specifications.
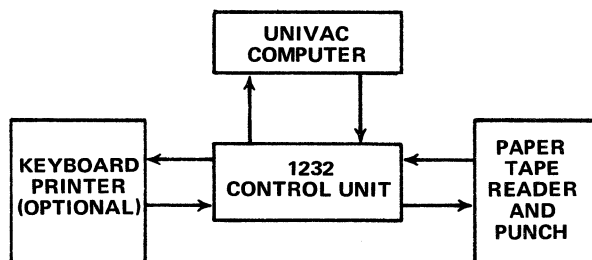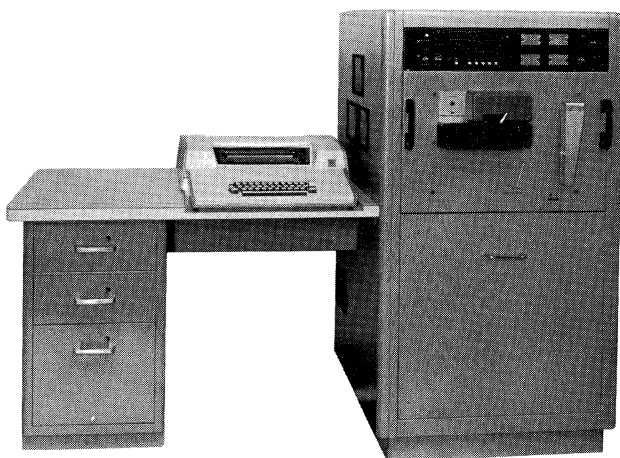
FUNCTIONAL CHARACTERISTICS

CODES
  Keyboard/printer
    Fieldata
  Reader
    Any 5, 6, 7 or 8 bit
  Punch
    Any 6, 7, or 8 bit
    5 bit optional

PRINTING
  Speed
    10 characters per second
  Format
    10 characters per inch horizontally
    6 lines per inch vertically
    72 characters per line

PAPER
  Page Printer
    Single-ply, white bond Teletype paper

TAPE
  Read
    5, 6, 7, or 8 level oiled or dry paper or Mylar*
  Punch
    6, 7, or 8 level oiled or dry paper 7/8" or 1" widths (5 level 11/16" optional)
  Speed
    Read at 300 characters (30 inches) per second
    Punch at 110 characters (11 inches) per second

CONTROL UNIT — COMPUTER INTERFACE
  Character parallel transmission
  Function command output
  Interrupt
  Voltage level options: N3 volt or N15 volt

OFF-LINE OPERATIONS
  Reproduce punched paper tape (read and punch)
  Print on paper and/or punch paper tape from paper tape reader
  Print on paper and/or punch paper tape from keyboard

ON-LINE OPERATIONS (COMPUTER CONTROLLED)
  Keyboard input to computer
  Paper tape reader input to computer
  Print and/or punch computer output data
  Print and/or punch keyboard input data
  Print and/or punch reader input data

Combined operations are performed at speed of the slowest operating device

*Trademark of E.I. duPont deNemours

```
          ┌──────────────┐
          │   UNIVAC     │
          │  COMPUTER    │
          └──────────────┘
                 ↑↓
┌──────────┐  ┌──────────────┐  ┌──────────┐
│KEYBOARD  │←─│    1232      │←─│  PAPER   │
│PRINTER   │  │ CONTROL UNIT │  │  TAPE    │
│(OPTIONAL)│─→│              │─→│  READER  │
└──────────┘  └──────────────┘  │  AND     │
                                │  PUNCH   │
                                └──────────┘
```

FUNCTIONAL DIAGRAM

8.69

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

PHYSICAL CHARACTERISTICS

Controls and control unit are assembled in the upper part of the main cabinet with a Digitronics Reader Model 2500 and a Teletype Punch BRPE-11 (BRPE-9 for 11/16" tape) mounted directly below. The front, lower half of the cabinet is a bin for receiving the perforated tape and a power supply is mounted directly behind. A desk supporting the optional Teletypewriter Model 35ASR keyboard/printer is attached to the left side of the main cabinet.

SIZE
    Cabinet: 51"H x 29"W x 26"D
    Keyboard/Printer Desk: 29"H x 42"W x 24"D

WEIGHT
    Cabinet, desk and typewriter: 475 pounds
    Cabinet (basic unit only): 305 pounds

POWER REQUIREMENTS
    Logic: 115 volts ±10%, 3 phase, 400 Hz, 250 watts
    Motors: 115 volts ±10%, 1 phase, 60 Hz, 600 watts

COOLING
    Ambient air circulation at 240 cfm

ENVIRONMENT
    Operating temperature range: 0° to 40°C
    Relative humidity: to 95%
    Nonoperating temperature range (storage): -29° to 50°C

MTBF
    7200 hours exclusive of electromechanical devices

REFERENCES
    Design Specifications   DS 4648, DS 4786, SB 10148
    Acceptance Specifications   DS 4682, DS 4700, SB 12135

MANUALS	TITLE
PX 2527-0-3	1232 I/O CONSOLE
PX 3871-0-1	DIGITRONICS READER, MODEL 2500
PX 3865-0-1	TELETYPE HIGH-SPEED TAPE PUNCH
PX 3866-0-1	TELETYPE, PARTS, HIGH-SPEED TAPE PUNCH
PX 4424-0-1	TELETYPE MOTOR UNITS
PX 3869-1-1	TELETYPE, MODEL 35 TELETYPEWRITER VOL. I
PX 3869-2-1	TELETYPE, MODEL 35 TELETYPEWRITER VOL. II
PX 4423-0-1	TELETYPE, PARTS, MODEL 35 PAGE PRINTER
PX 3719-0-2	1232 30-BIT MAINTENANCE TEST
PX 3930-0-1	1232 18-BIT MAINTENANCE TEST
PX 3948-0-1	1232 MAINTENANCE STUDY GUIDE
PX 4363-0-1	1232 30-BIT DIAGNOSTIC TEST

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PRODUCT INFORMATION

UNIVAC 1257/1259 TELETYPEWRITER SET
(OJ-93(V)/TSQ-90(V))

PX 3412

The UNIVAC Teletypewriter Set consists of a Teletype* ASR-28 Send-Receive set modified for interfacing with a UNIVAC Adapter that performs the serial-parallel and parallel-serial conversion and control for communication with a Univac computer. The 1257 performs the send-receive function under control of a two-position toggle switch. The 1259 performs the send-receive function under control of circuitry in the Adapter. An Auxiliary Line Relay connects the 1257/1259 to other teletypewriters in the system or to a full duplex common carrier communication line.

FUNCTIONAL CHARACTERISTICS

DATA TRANSMISSION
5-bit parallel input and output (computer)
7.0 or 7.42 unit start-stop pattern (line)
60, 75, 100 or 200 words per minute
Mark = 60 or 20 ma
Space = 0.0 ampere

PRINTER
72 characters per line
8-1/2-inch wide paper

OFF-LINE OPERATIONS
Printed and punched paper tape preparation

Keyboard transmission

Simultaneous keyboard transmission and paper tape preparation

Automatic tape transmission

Page copy of either incoming or outgoing messages

ON-LINE OPERATIONS
Keyboard entries to the computer

Paper tape entries to the computer

Simultaneous keyboard entries to computer with paper tape copy and/or page copy and/or external line transmission

Simultaneous paper tape entries to the computer with page copy and/or external line transmission

Data outputs from the computer to page printer and/or paper tape copy and/or external line transmission

FUNCTIONAL DIAGRAM

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SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION
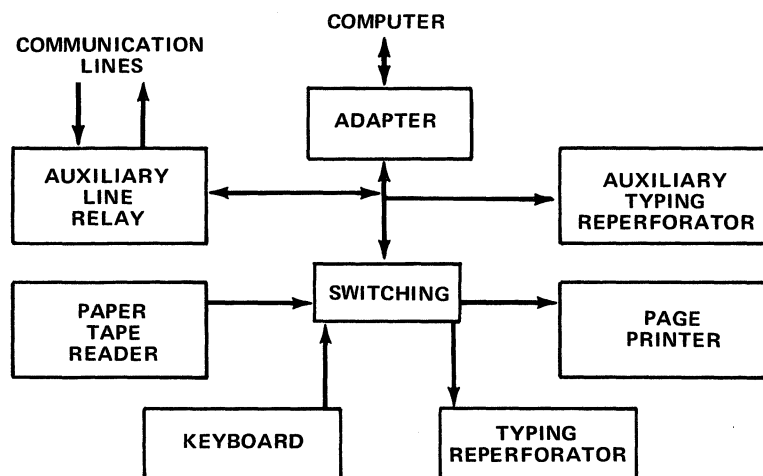
PHYSICAL CHARACTERISTICS

The UNIVAC Adapter is built to fit into the Teletype ASR-28 cabinet and with MIL-E-16400B as a design goal. As a unit, therefore, the 1257 or 1259 Teletype Set is ruggedized to the extent of the electromechanical device's ability to withstand environmental conditions.

DIMENSIONS
  Height: 41 inches
  Depth: 24 inches
  Width: 40 inches

WEIGHT
  305 pounds

COOLING
  Forced air @ 280 CFM

TEMPERATURE
  0° to $+50^oC$ operating
  -29° to $+50^oC$ nonoperating

POWER REQUIREMENTS
  115 volts $\pm$ 10%, 400 Hz $\pm$ 5%, 3 phase, 300 watts
  115 volts $\pm$ 10%, 60 Hz $\pm$ 5%, 1 phase, 200 watts

REFERENCES
  Specifications: See configuration listing

MANUALS	TITLE
PX 2729-0-2	1206 Teletypewriter
PX 3379-0-2	1259 Teletypewriter
PX 3721-0-2	1259 30-Bit Maintenance Test
PX 4271-0-1	1259 18-Bit Maintenance Test
PX 3870-1-1	Teletype Bulletin 270B Vol I
PX 3870-2-1	Teletype Bulletin 270B Vol II
PX 2870-3-1	Teletype Bulletin 270B Vol III

8.69

UNIVAC 4012 DATA EXCHANGE AUXILIARY CONSOLE (DEAC)   PX5304

The UNIVAC 4012 Data Exchange Auxiliary Console (DEAC) is a multipurpose input/output unit that incorporates several low to medium speed devices in a single ruggedized cabinet. It contains a two computer duplexing controller that furnishes interface logic and timing for the following independent modules:
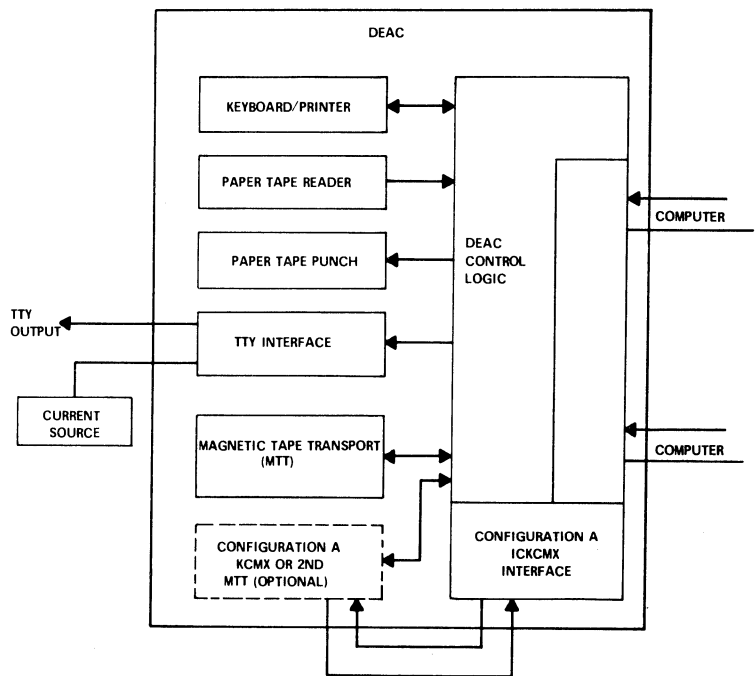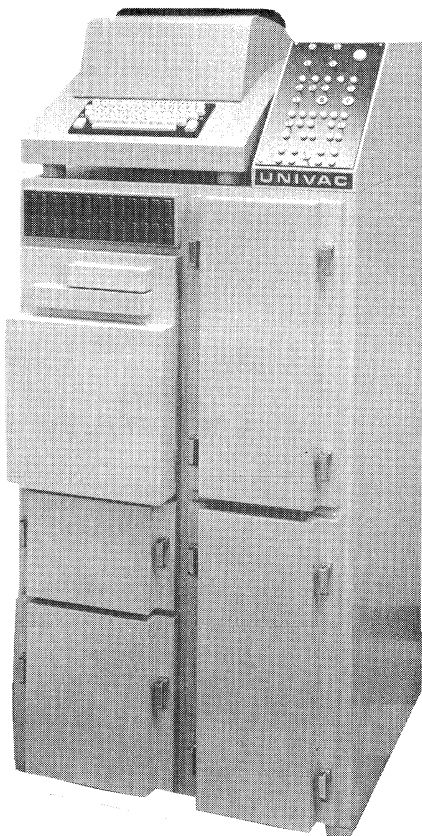
Paper Tape Punch   Keyboard and page printer
Paper Tape Reader   Teletype output line
Magnetic Tape recorder/reproducer   Configuration A Keyset Central Multiplexer

FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS

OFF-LINE OPERATIONS (MANUALLY CONTROLLED)
1. Keyboard entries printed on paper.
2. Keyboard entries printed on paper and punched on paper tape in ASCII.
3. Contents of ASCII coded perforated tape printed on paper.
4. Duplicate ASCII coded perforated tape with data printed on paper.
5. Duplicate (any 5, 6, 7, or 8 level code) perforated tape.

FUNCTIONAL CHARACTERISTICS

INPUT/OUTPUT DEVICES

Page Printer:
    Speed: 0 to 40 characters per second
    Printing Format: 72 characters per line, 10 characters per inch, 6 lines per inch (single space), 3 lines per inch (double space)
    Paper: Single part roll or 4-part fanfold
    Code: ASCII

Paper Tape Reader — Photoelectric:
    Speed: 300 frames per second
    Tape: Paper or Mylar* .0025" to .005" thick, 7/8" or 1" wide
    Reading Levels: 5, 6, 7, or 8

Paper Tape Punch:
    Speed: 75 frames per second
    Tape: Paper or Mylar*, .0025" to .005" thick, 7/8" to 1" wide
    Punching Levels: 5, 6, 7, or 8
    Frame Spacing: 10 per inch

Magnetic Tape Transport:
    Read/Write Direction: Forward
    Transfer Rate: 19,200 or 9600 bits per second
    Read;/Write Speed: 24 or 12" per second +4%
    Rewind Speed: 90" per second
    Recording Density: 800 bits per inch
    Format: One track, serial, phase encoded
    Tape: Cassette, 282 feet, +13, -0 feet. 1600 flux changes per inch.

Keyboard:
    36 alphanumerics
    27 symbols and punctuation
    1 space
    control keys

Trademark of E.I. duPont de Nemours.

CONSOLE FUNCTIONS 1870

    Computer to printer
    Computer to printer and paper tape punch
    Computer to paper tape punch
    Computer to magnetic tape
    Paper tape reader to computer
    Keyboard to printer and computer
    Magnetic tape to computer
    Keyboard interrupt to computer when keyboard is disabled.
    Magnetic tape transport status interrupt to computer.

Magnetic Tape Functions (Computer Controlled)
    Read
    Write
    Write extended interrecord gap
    Write file mark
    Backspace
    Space file mark
    Rewind
    Modulus select: 8-, 16-, or 18-bit words
    Master clear
    Transport Select: Manual, MTT 1, MTT 2, or MTT 3

Magnetic Tape Functions (Manually Controlled)
    Forward or reverse direction (off-line)
    24 or 12 inches per second tape speed

Off-Line Functional Operation
    Magnetic tape operations remain on-line
    Print keyboard entries on paper
    Print keyboard entries on paper and punch on paper tape
    Print paper tape reader information on paper
    Punch paper tape reader information on paper tape (duplicating perforated paper tapes)
    Duplicate paper tape and print on paper

External Function Words designate:
    Device enables
    Device disables
    Input or output functions
    Magnetic tape unit addresses
    Magnetic tape functions

PHYSICAL CHARACTERISTICS

All peripheral units comprising the Mark 95 Mod. 0 are contained in a militarized cabinet. The console can be separated into assemblies that can pass through a 30" square opening with rounded corners of 7½" radius through a 26" x 45" opening with rounded corners of 8" radius. MIL-STD-1472 was used as a controlling document for human engineering.

Size:
    Height: 50" overall; 42" cabinet
    Width: 23" overall, 22.5" base
    Depth: 31" overall; 24.5" base
Weight: 375 pounds maximum
Power:
    Logic: 115 volt, 400 Hz, 3 phase, 300 watts maximum
    Motors: 115 volts, 50 Hz, 1 phase, 200 watts maximum
Cooling: Ambient air circulation
Computer Interface: Two input/output parallel channels, -15 volt, -3 volt and +3.5 volt signal levels.

REFERENCES

Product Specification:	NOSC WS 14290
Top Assembly No.:	7601754
PT Reader Punch:	Remex 3075
Cassette Drive:	Interdyne IC2500
Keyboard Printer:	Klienschmidt 311

ON-LINE OPERATIONS (COMPUTER CONTROLLED)

DEAC, with a full complement of I/O modules, provides the following operations on-line with a computer.

On-line Optional I/O Operations	Inputs to Computer from					Outputs from Computer to				
	Paper Tape Reader (Any 5-8 level code)	Keyboard (ASCII) with printed copy	Magnetic Tape Reader *	ICKCMX *		Paper Tape Punch (Any 5-8 level code)	Page Printer (ASCII)	TTY Communication *	Magnetic Tape Write *	ICKCMX *
1	×					×				
2							×			
3							×			
4		×								
5	√	√	√	√					×	
6	×						×			
7	×					×				
8						×	×			
9									×	
10			×							
11		×							×	
12	×								×	
13			×			×				
14			×				×			
15				×						
16										×
17				×		√	√	√	√	
18	√	√	√							×

×   Single or simultaneous operations
√   Choice of one operation with × for simultaneous input and output
*   Operable on-line while remaining units are off-line

PAPER TAPE READER

Tape:	Paper or Nylon
Width:	11/16", 7/8", or 1"
Thickness:	0.0025 to 0.005 inch
Frame:	5, 6, 7, or 8 Level Code
Speed:	400 Frames per second
Manual Controls:	Power On/Off
	Tape Load
	Tape Width Adjust

PAPER TAPE PUNCH

|	
Tape:	Paper
Width:	7/8" or 1"
Thickness:	0.0025 to 0.005 inch
Frame:	5, 6, 7, or 8 Level Code
Speed:	110 Frames per second
Punch Density:	10 Frames per Inch
Manual Controls:	Power On/Off

PRODUCT INFORMATION

UNIVAC 1532 INPUT/OUTPUT CONSOLE
OA-7984/UYK

PX 3699B

The UNIVAC 1532 Input/Output Console contains design improvements over the UNIVAC 1232 Console in environmental characteristics and versatility. Cabinet and packaging design used in the ruggedized Univac computer construction were utilized in the 1532 console. Either a 10-character-per-second Teletype model 35 KSR or a 20-character-per-second Kleinschmidt model 311* Electronic Data Printer can be provided as an option with the paper tape read and punch capability. A mechanical linkage between the keyboard and page printer provides hard copy of all entries from the keyboard. Seven bit American Standard Code for Information Interchange (ASCII) is generated by the keyboard and recognized by the printer from computer or paper tape reader sources.
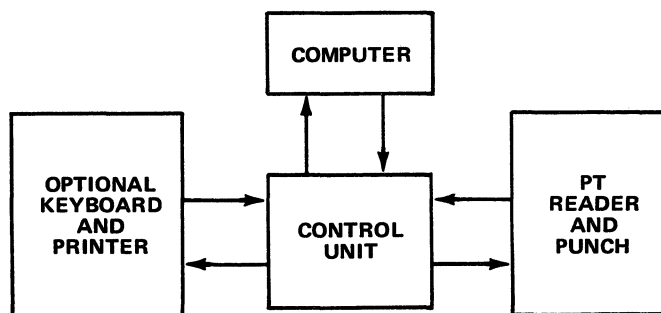
FUNCTIONAL CHARACTERISTICS

CODES
Keyboard/printer
7-bit ASCII
Reader
Any 5, 6, 7 or 8 bit
Punch
Any 6, 7 or 8 bit

PRINTING
Speed
10 characters per second; 20 characters per second optional*
Format
10 characters per inch horizontally
6 lines per inch vertically
72 characters per line; 76 characters per line on option*

PAPER
Page Printer
Single-ply, white bond Teletype paper

TAPE˙
Reader
5, 6, 7 or 8 level oiled or dry paper or Mylar**
11/16", 7/8" or 1" widths
Punch
6, 7 or 8 level oiled or dry paper tape 7/8" or 1" widths; 10 frames per inch
Speed
Read at 30 inches (300 characters) per second
Punch at 11 inches (110 characters) per second

CONTROL UNIT – COMPUTER INTERFACE
Character parallel transmission
Function command output
Interrupt with keyed character code input
Voltage level options: N3, P3.5 or N15

*UNIVAC 1538 recommended
**Trademark of E.I. duPont deNemours

PHOTO #26169A

COMPUTER

OPTIONAL KEYBOARD AND PRINTER

CONTROL UNIT

PT READER AND PUNCH

FUNCTIONAL DIAGRAM

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DEFENSE SYSTEMS DIVISION

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FUNCTIONAL CHARACTERISTICS (Continued)

OFF-LINE OPERATIONS
Print on paper by keyboard entry
Punch paper tape (7-bit ASCII) and print on paper by keyboard entry
Print on paper from paper tape entry (7-bit ASCII)
Punch paper tape from paper tape entry (any code)
Punch paper tape and print on paper from paper tape entry (7-bit ASCII)

ON-LINE OPERATIONS
Read paper tape input to the computer (any code)
Punch paper tape (any code) from computer output
Print on paper (7-bit ASCII) from computer output
Keyboard input to the computer (7-bit ASCII) with print on paper
Keyboard input to the computer with print on paper and (under program control) punch paper tape in any code
Read paper tape input to the computer and (under program control) print on paper
Read paper tape input to the computer and (under program control) punch paper tape (any code)
Read paper tape input to the computer and (under program control) print on paper and punch paper tape (7-bit ASCII)
Computer output to punch paper tape (7-bit ASCII) with print on paper

Combined operations are performed at speed of the slowest operating device

PHYSICAL CHARACTERISTICS

The 1532 is packaged in a ruggedized cabinet, compatible in appearance with the UNIVAC 1218/1219 family. Air is taken in at the top front, kept at a positive pressure inside and exhausted at the lower rear of the cabinet. Controls and control unit logic printed circuit cards are assembled on a front access, pull-out drawer mounted at the upper part of the console cabinet. Similarly a Digitronics Reader model 2500 and a Teletype Punch BRPE-11 are mounted on a drawer directly below. The front, lower half of the cabinet is a bin for receiving perforated tape behind which is installed the power supply. The optional Teletype model 35 KSR keyboard-printer can be mounted on top of the main cabinet or on a desk attached to the left side.

SIZE (Inches)

Height with top mounted printer	64
Height, basic unit cabinet	49
Width, basic unit cabinet	23
Depth	28
Desk	
Height without printer	30
Width	46
Depth	25

WEIGHT (Pounds)

Basic unit only	300
With top mounted printer	405
Basic unit with desk mounted printer	515

POWER REQUIREMENTS

Logic	
Volts	115 ±10%
Frequency (Hz)	400 ±5%
Phases	3
Watts	250
Motors	
Volts	115 ±10%
Frequency (Hz)	60 ±5%
Phases	1
Watts	600

COOLING

Forced air at	540 CFM

PHYSICAL CHARACTERISTICS (Continued)

The following specifications and standards were used as design goals:

General Requirements	MIL-E-16400
Temperature	MIL-E-16400, Class 4 (0°C to 50°C)
Humidity	to 95% (Except for paper media)
Enclosure	MIL-STD-108
Salt Spray	FED-STD-151 (Method 811)
Shock	MIL-S-901, Class II (Without 30° inclination)
Vibration	MIL-STD-167 (Type I)
Inclination	MIL-E-16400
Mean Time Between Failures	200 Hours — Exclusive of electromechanical devices

REFERENCES

Design Specification	DS 4754
Technical Manual	PX 3618
Outline and Dimension Drawing	7030351
Installation and Checkout Kit	LOG 7119
One Year Spares Kit	LOG 7504

PRODUCT INFORMATION

UNIVAC 1533 KEYBOARD-PRINTER MARKETING DOCUMENT PX 4021A
(TT-515/UYK)

The UNIVAC 1533 Keyboard-Printer is a Model 35 Teletype* Keyboard Send Receive Set (KSR) modified to operate on a single input/output channel under computer program control via logic in the UNIVAC 1549 (see OP-2-1) or other compatible control logic. Entries to the computer may be made at the keyboard. An electrical linkage with the typing unit (page printer) is provided by a code (ASCII) return to the unit each time a character or function is initiated at the keyboard. This provides for a printout of keyboard input information. ASCII outputs from the computer (via 1549) are printed by the typing unit.

Negative No. 26791
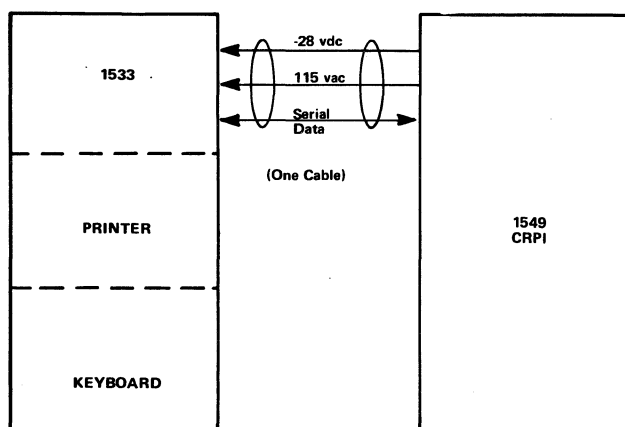
FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS

Keyboard Input to Computer — ASCII

Output to Printer — ASCII

Serial Code Transmission

Signalling Code — 11 unit pattern

Mark Signal — Current

Space Signal — No current

Send Receive — 10 characters/second

Paper — Single or multicopy

Printing — 72 characters/line
          — 10 characters/inch
          —   6 lines/inch

PHYSICAL CHARACTERISTICS

Height — 16.72 inches

Width — 22.28 inches

Depth — 26.12 inches

Weight — 115 pounds

POWER REQUIREMENTS

115 VAC 60 Hz

— 28 VDC

ENVIRONMENTAL CHARACTERISTICS

Operating Altitude — 10,000 feet

Operating Inclination — To 20° from vertical

Operating Temperature — 0° to 50°C

Storage Temperature — 62° to +75°C

Humidity — To 95%

Vibration — MIL-STD-167 Type I

REFERENCES

Design Specification	DS 4867
FACT Specification	DS 4881 (1218)
	SB 10149 (CP-808)
Final Assembly Dwg. No.	7033650

*Trademark of the Teletype Corporation

SPERRY RAND

UNIVAC

PRODUCT INFORMATION

UNIVAC® 1870 (MARK 95, MOD. 0) CONSOLE   PX-10362

The Mark 95, Mod. 0 is a militarized input/output console that incorporates a number of commonly used, system input and output devices in a single cabinet. It can operate on-line with two computers or off-line under the operator's control. Features that make the UNIVAC 1870 attractive as a general-purpose console include keyboard, printer, paper tape punch, paper tape reader and three dual-speed magnetic tape units, power supply, control logic and cooling system in a single cabinet.

Two computers can communicate with the console on a time-shared basis (see Functional Diagram). The magnetic tape control logic includes a 128-word buffer memory for each computer. The memory is divided into two 64-word sections to allow more continuous and efficient data recording. A computer can load one-half of its dedicated buffer memory with data, and while this half is being recorded on tape, it can load the other half. This process can continue until the computer completes its data output or until it issues a different external function. In addition, the second computer can issue a magnetic tape function and then transfer data to its dedicated buffer while the console is busy with the current operation. When data from the first computer are recorded, data from the second can be recorded on the same tape without stopping. If a different transport is selected, the one will finish recording and the newly selected unit will start recording data.
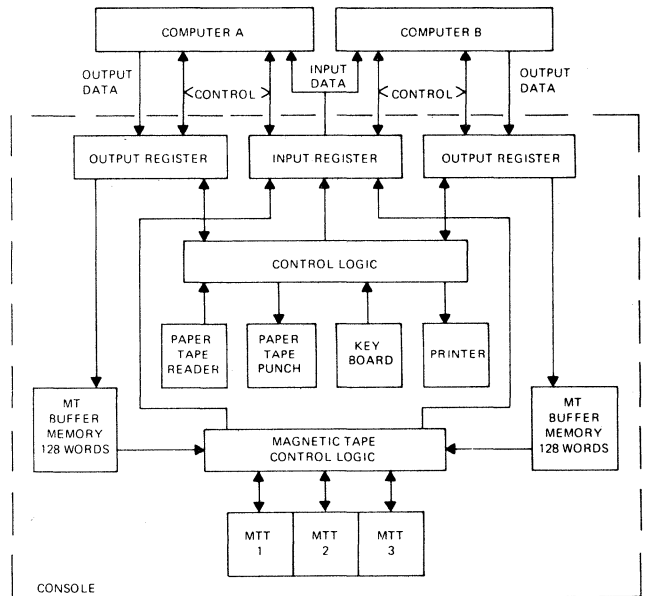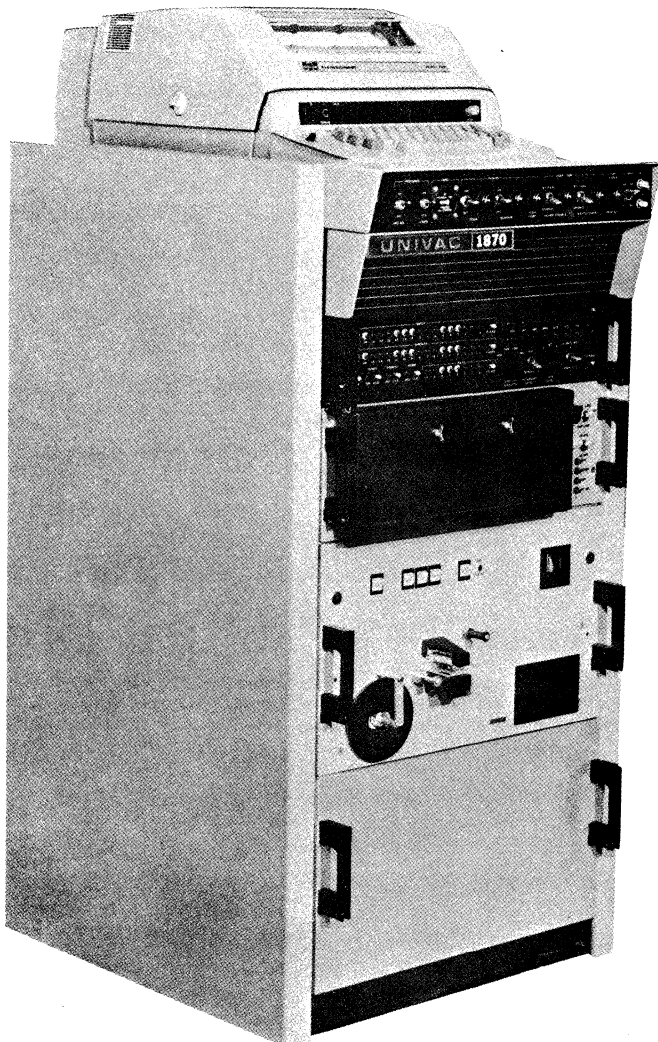
MARK 95, MOD. 0 FUNCTIONAL DIAGRAM

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UNIVAC

PRODUCT INFORMATION

UNIVAC 1538 INPUT/OUTPUT CONSOLE
(0J-65/TYA-20)

The UNIVAC 1538 Input/Output Console is a version of the 1532 with logic modified to interface with a **40** character per second Kleinschmidt Electronic Data Printer model 311. The keyboard generates 5-bit Teletype* codes and has an electrical linkage to the printer which responds to teletype codes when the print function is activated.
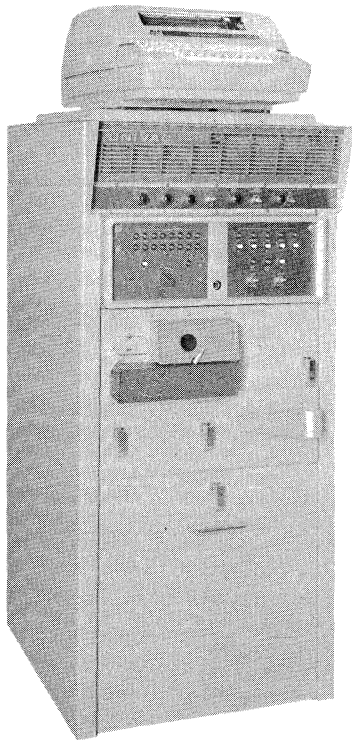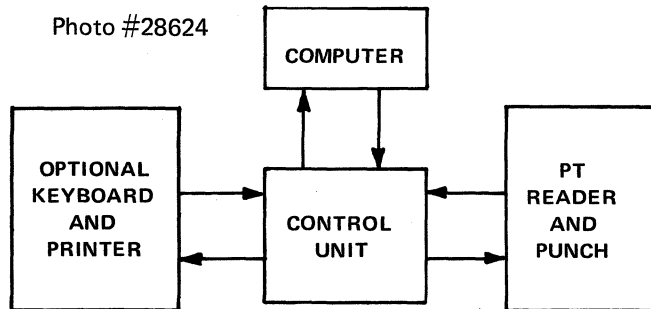
Photo #28624

FUNCTIONAL CHARACTERISTICS

CODES
Keyboard/printer
   5-bit Teletype
Reader
   Any 5, 6, 7 or 8 bit
Punch
   Any 5, 6, 7 or 8 bit

PRINTING
Speed
   40 charcters per second
Format
   10 characters per inch horizontally
   6 lines per inch vertically
   76 characters per line

PAPER
Page Printer
   Single-ply, white bond Teletype paper

TAPE
Reader
   5, 6, 7 or 8 level oiled or dry paper or Mylar**
   11/16", 7/8" or 1" widths, chad type
Punch
   5, 6 or 7 level on 7/8" width tape or
   5, 6, 7 or 8 level on 1" width tape
   Oiled or dry paper or Mylar
   10 frames per inch
Speed
   Read at 30 inches (300 characters) per second
   Punch at 11 inches (110 characters) per second

CONTROL UNIT – COMPUTER INTERFACE
Character parallel transmission
Function command output
Interrupt with keyed character code input
Voltage level: -3

FUNCTIONAL DIAGRAM

*Trademark of Teletype Corporation
**Trademark of E.I. duPont deNemours

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UNIVAC
DEFENSE SYSTEMS DIVISION

OFF-LINE OPERATIONS

- Print on paper by keyboard entry
- Punch paper tape (5-bit Teletype Codes) and print on paper by keyboard entry
- Print on paper from paper tape entry (5-bit Teletype Codes)
- Punch paper tape from paper tape entry (any code)
- Punch paper tape and print on paper from paper tape entry (5-bit Teletype Codes)

- Read paper tape input to the computer (any code)
- Punch paper tape (any code) from computer output
- Print on paper (5-bit Teletype Codes) from computer output
- Keyboard input to the computer (5-bit Teletype Codes) with print on paper
- Keyboard input to the computer with print on paper and (under program control) punch paper tape in any code
- Read paper tape input to the computer and (under program control) print on paper
- Read paper tape input to the computer and (under program control) punch paper tape (any code)
- Read paper tape input to the computer and (under program control) print on paper and punch paper tape (5-bit Teletype Codes)
- Computer output to punch paper tape (5-bit Teletype Codes) with print on paper

Combined operations are performed at speed of the slowest operating device

PHYSICAL CHARACTERISTICS

The 1538 is packaged in a ruggedized cabinet, compatible in appearance with the UNIVAC CP-808. Air is taken in at the top front, kept at a positive pressure inside and exhausted at the lower rear of the cabinet. Controls and control unit logic printed circuit cards are assembled on a front access, pull-out drawer mounted at the upper part of the console cabinet. Similarly a Digitronics Reader model 2500 and a Teletype Punch BRPE-11 are mounted on a drawer directly below. The front, lower half of the cabinet is a bin for receiving perforated tape behind which is installed the power supply. The keyboard-printer is mounted on top of the main cabinet.

SIZE (Inches)			Motors	
Height with top mounted printer	59		Volts	$115 \pm 10\%$
Width, basic unit cabinet	23		Frequency (Hz)	$60 \pm 5\%$
Depth	38		Phases	1
			Watts	600
WEIGHT (Pounds)	440		The 60 Hz motor power is taken from a 400 Hz frequency converter.	
POWER REQUIREMENTS				
Logic			**COOLING**	
Volts	$208 \pm 10\%$		Forced air at	540 CFM
Frequency (Hz)	$400 \pm 5\%$		Operating Temperature Console	
Phases	3		Console	0° to 50^oC
Watts	250		Keyboard Printer	$+10^o$ to 50^oC
			Non-Operating (Storage)	
			Temperature	-72° to $+75^o$C

The following specifications and standards were used as design goals:

General Requirements	MIL-E-16400
Temperature	MIL-E-16400, Class 4 (0^oC to 50^oC)
Humidity	to 95% (Except for paper media)
Enclosure	MIL-STD-108
Salt Spray	FED-STD-151 (Method 811)
Shock	MIL-S-901, Class II (Without 30° Inclination)
Vibration	MIL-STD-167 (Type I)
Inclination	MIL-E-16400
Mean-Time-Between-Failure	200 Hours — Exclusive of electromechanical devices

6.70

REFERENCES

Design Specification　　　　　　　　　　　　SB-10067
Outline and Dimension Drawing　　　　　　7050901
One Year Spares Kit　　　　　　　　　　　　Log 7558

MANUALS	TITLE
PX 5005-0-2	1538 I/O CONSOLE TECHNICAL MANUAL
PX 3871-0-1	DIGITRONICS PERFORATED TAPE READER, MODEL 2500
PX 3865-0-1	TELETYPE HIGH-SPEED TAPE PUNCH
PX 3866-0-1	TELETYPE, PARTS, HIGH-SPEED TAPE PUNCH
PX 4424-0-1	TELETYPE MOTOR UNITS

Available Configuration:
Final Assembly No. 7050900-00; USMC Controlled Drawing
Status: ACTIVE (Special Project Design) A(S)

6.70

PRODUCT INFORMATION

UNIVAC KEYSET CENTRAL MULTIPLEXER (KCMX)
(CV-2036/USQ-20(V))

The KCMX is an intermediate input/output multiplexer and conversion device that operates under a two computer control as an unattended unit. It converts and multiplexes input signals to digital data for the computer and converts and multiplexes computer digital output data to appropriate signals for output devices.
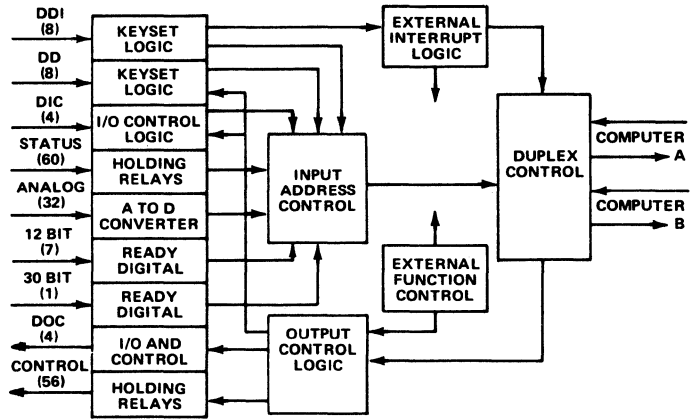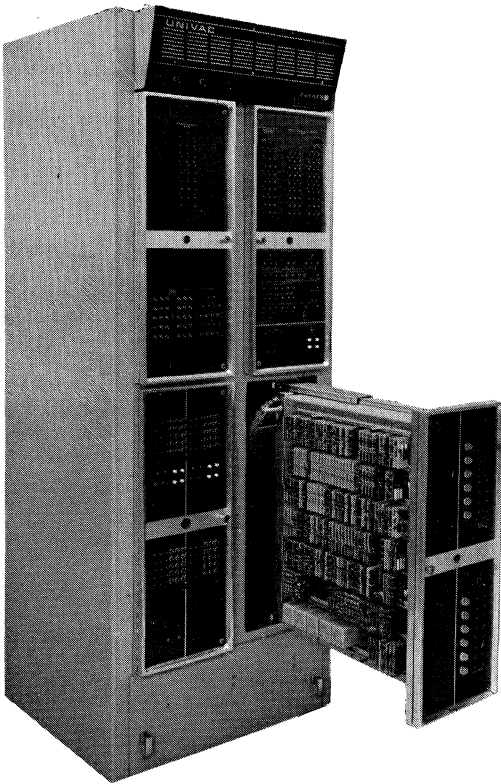
FUNCTIONAL DIAGRAM

FUNCTIONAL CHARACTERISTICS

KCMX→ COMPUTER INTERFACE
Duplexed Computer Control   2 Computer (Duplexed) Control
30 Bit, N15 Interface
External Functions, Interrupts, Data

8.69

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KCMX → EXTERNAL DEVICES INPUT AND OUTPUT (MULTIPLEXED)

SIGNAL IDENTIFICATION	MAXIMUM CAPABILITY	FORMAT	KCMX PROCESSING	INPUT KCMX ADDRESS ASSIGNMENT (OCTAL)
Demand Digital (with or without interrupt)	8 inputs	30-bit digital keyset input	None	1 through 10
Demand Digital (DD)	8 inputs	30-bit digital keyset input	None	11 through 20
Ready Analog	32 inputs (8-60 or 400 Hz) (24-400 Hz only)	Synchro analog inputs (dual or single speed)	A to D	21 through 60
Status Signals	60 inputs	Contact closures, input	Encoding to 2 30-bit words	61 and 62
12-Bit Ready Digital	7 inputs	12-bit digital radar azimuth input	None	63 through 71
30-Bit Ready Digital	1 input	30-bit digital radar azimuth input	None	72
Digital Input Data Channel (DIC)	4 inputs	30-bit digital input	None*	73 through 76
Digital Output Data Channel (DOC)	4 outputs	30-bit digital output	None*	Output
Control Signals	56 outputs	Contact closures, output	Digital to relay	Output

*Five options of Count-Down-Time-Delay for holding up the KCMX multiplexing functions

PHYSICAL CHARACTERISTICS

Four pullout drawers containing wire wrapped chassis assemblies of logic cards and discrete components are mounted in a ruggedized cabinet. Required indicators, controls and switches are located on the front panel of each drawer and on the control panel above the four drawers.

CABINET SIZE
 72"H x 26"W x 39"D

WEIGHT
 Approximately 1055 pounds

COOLING
 Forced, water cooled air; 4 gpm at 70°F maximum

POWER REQUIREMENTS
 Logic: 115 volts ± 10%, 400 Hz ± 5%, 3 phase, 1085 watts
 Blowers: 115 volts ± 10%, 400 Hz ± 5%, 3 phase, 186 watts

ENVIRONMENT

Operating Temperature	0° to 50°C
Nonoperating Temperature	-62° to +75°C
Relative Humidity	to 95%

SPECIFICATIONS AND STANDARDS USED AS DESIGN GOALS

General	MIL-E-16400
Enclosure	MIL-STD-108
Salt Spray	FED-STD-151 (Method 811)
Shock	MIL-S-901 (except inclination)
Vibration	MIL-STD-167 (Type I)

MTBF
 1200 Hours

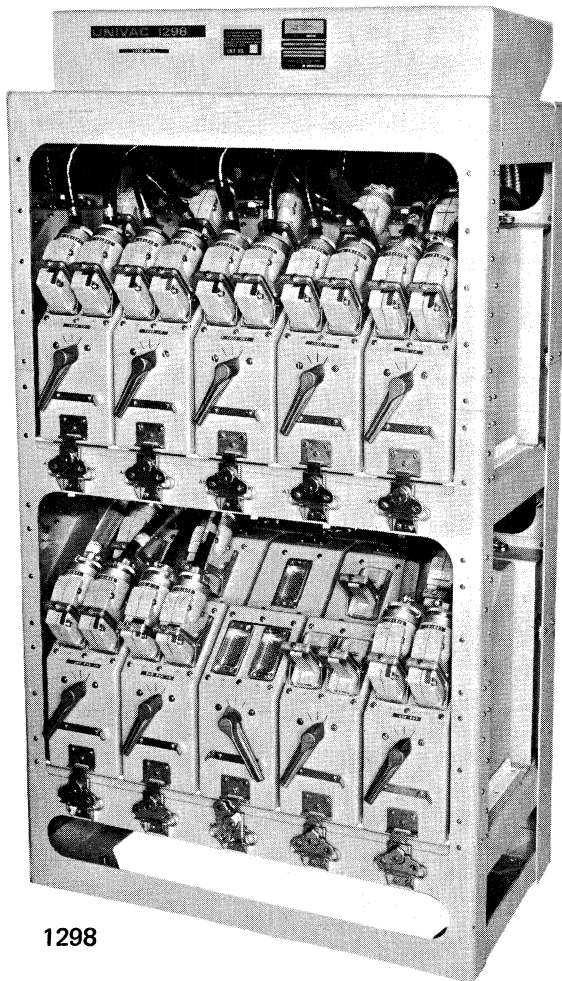**REFERENCES**

Design Specification	DS 4852
Acceptance Specification	DS 4859
Outline and Dimension Drawing	7033298
Part Number	7033011-00
Installation Checkout Kit	Log 7609
One Year Spares Kit	Log 7615
Ordering Data	See paragraphs 3.3.4, 3.3.6.2, and 3.3.6.5 of DS 4852

PRODUCT INFORMATION

UNIVAC 1298, 1299, 1299B, 1299C INTERCONNECTING PANEL
### (SB-1299)

The UNIVAC Digital Data Signal Distribution Switchboard (interconnecting panel) is an assembly of rotary switches used for reconfiguring computer/peripheral hardware in a system. The 68- and the 80-pole switches have three positions: center position disconnects the interface; positions one and three are used to connect one computer channel to two peripheral devices, one peripheral device to one of two computer channels, or cascaded with others in the assembly to accomplish more complex configurations. The 96-pole rotary switch assembly (1299C) has six positions; five of which are wired to 90-pin connectors for peripheral or computer interface and one OFF position is unwired. A seventh connector is provided for indicating the switch handle position to a controlling computer. With the 96-pole switch assembly a peripheral device can be connected to one of five computers; or a computer to one of five peripheral devices. Up to ten multipole switch modules may be contained in the main frame or cabinet.

The 1298 assembly has a cable adapter unit on top of the rack frame. This adapter, contains proper switch output jack interconnections that allow two peripheral devices to be interchanged on 2 computer input and output channels through four switch units (2 for input and two for output); 68 pole or 80 pole and special teletypewriter circuit switches can be used in the 1298 (up to 10 total). The special TTY switch module provides a signal and control line switching capability between two 1262 adapters and two 1450 auxiliary line relays and for closed loop testing for two teletypewriter systems.
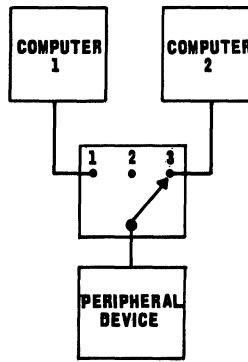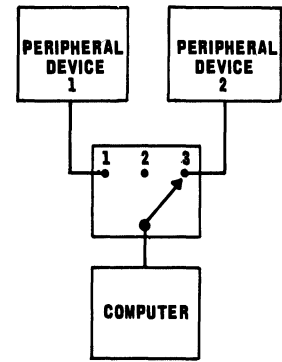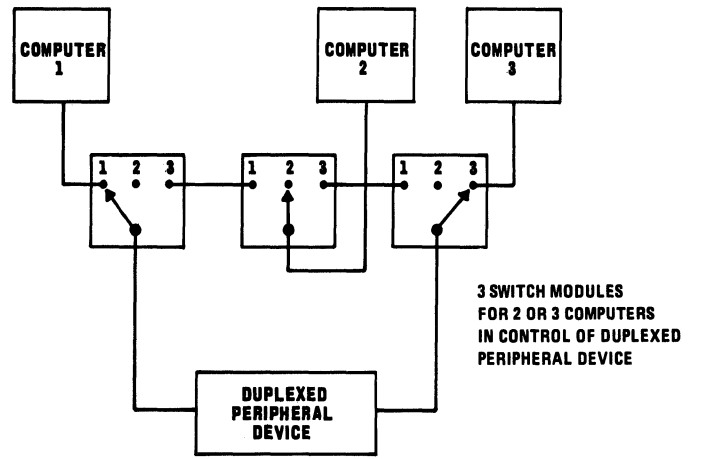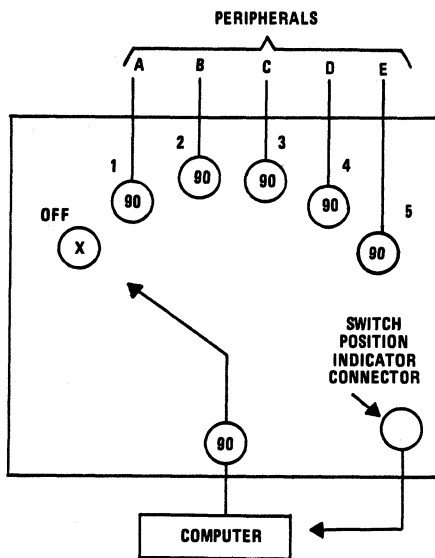

1298

Photo No. 29643

1299

Photo No. 21235

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION 3-71
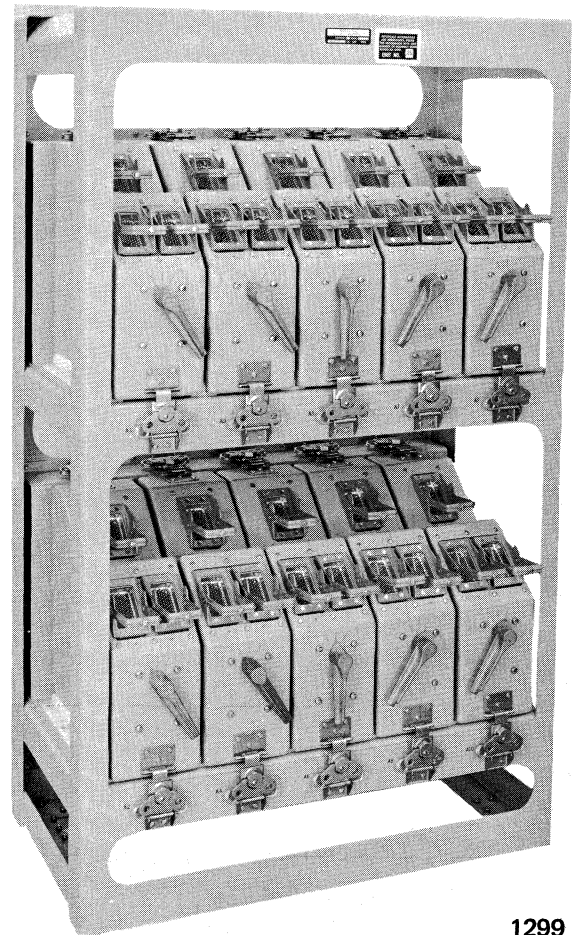
CONFIGURATION 1

CONFIGURATION 2

3 SWITCH MODULES
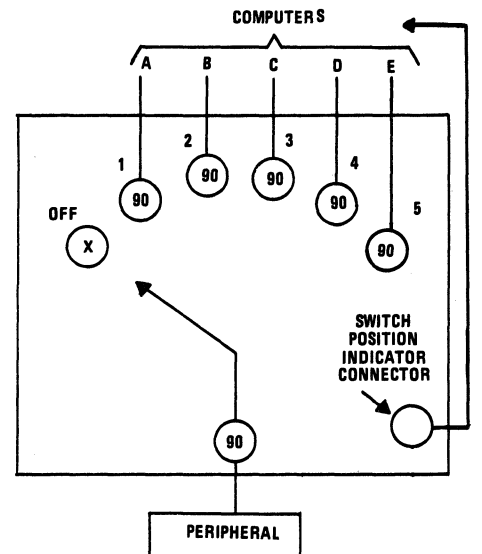FOR 2 OR 3 COMPUTERS
IN CONTROL OF DUPLEXED
PERIPHERAL DEVICE

CONFIGURATION 3

1299C 96 POLE 6 POSITION SWITCH

1299C 96 POLE 6 POSITION SWITCH

FUNCTIONAL CHARACTERISTICS

Equipment Configuration Switching

Two switch modules for each channel (one for output, one for input)

Type	No. of Poles	Maximum Interface (Bits)	Switch Handle Positions		Position Indicator
			On	Off	
1299	68	30	1 & 3	2	Handle
1299B	80	36	1 & 3	2	Handle
1299C	96	44	1,2,3,4, & 5	Off	Handle and Binary Coded Circuit

PHYSICAL CHARACTERISTICS

Switch modules are mounted in a sturdy equipment rack by quick disconnect locks. The unit can be ordered with or without a sway brace (stabilizer). The 1299C switches (SA-1722/UYK) which are longer than the 68 and 80 pole switches extend farther in front of the rack. Interconnecting cables plug directly into the connector on each switch module.

Type	Dimensions (Inches)			Max Weight (Pounds)
	Height	Depth	Width	
1298	56	19	31	300
1299, 1299B	52	17	31	300
1299C	52	23	31	300

Environmental	MIL-E-16400
Operating Temp.	0 to 50°C
Non-Operating Temp.	-29 to +50°C

References:

SB 1299 and SB 1299B Technical Manual: PX 3123-0-2

SA-1722/UYK (1299C) Rotary Switch Technical Manual: NAVSHIPS

Design Specifications:

|	
SB 1299 and SB 1299B	DS 4558
1298	DS 4614
1299	DS 4608, DS 4558
SA-1772/UYK Switch	SB 10427
Acceptance Specification	SB 10039, SB 10108

PRODUCT INFORMATION

UNIVAC 1549 CARD READER-PUNCH INTERPRETER
RD293( )/UYK-5V

The UNIVAC 1549 Card Reader-Punch Interpreter (CRPI) in its original design provides card reading, punching, and interpreting (printing) for the UNIVAC 1500. Although an I/O device, the 1549 unit is the primary means of entering data for storage and for retrieving data from storage.

The 1549 has two major units: a common control unit and a punched card unit. The control unit contains the computer interface and control logic for the 1533 keyboard-printer, 1569 high-speed printer, and the reader-punch-interpreter. Later 1549 versions do not include the interpreter. A 256-word, 12-bit core memory provides the buffer requirements for the card equipment and the high-speed printer. The card unit provides the card reading assembly, the card punching assembly, the printing assembly, associated drive circuitry, card feed and output hoppers. All functional operations, maintenance, and repair can be performed with front access.
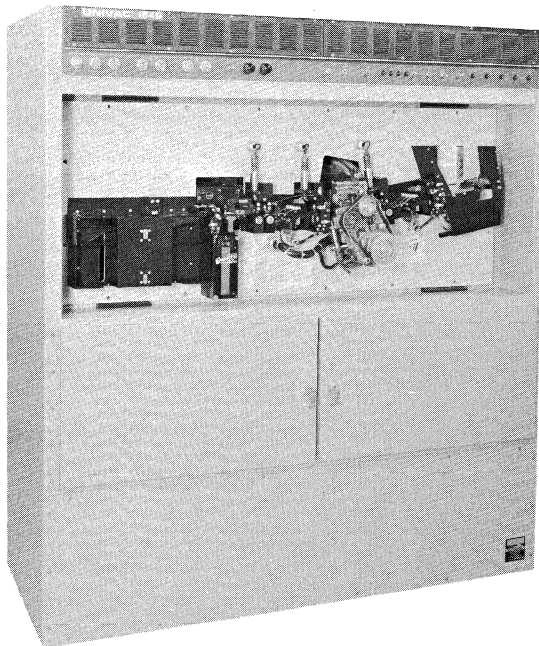

FUNCTIONAL CHARACTERISTICS

Card Punching Speed — 200 cards per minute, nominal

Card Reading Speed — 330 cards per minute, nominal

Card Printing Speed — 32 cards per minute minimum (faster when fewer characters are printed)

Input Hopper Capacity — 500 cards minimum

Output Stacker Capacity — 500 cards minimum

Number of Stackers — 2

Card Size — 3.250 inch x 7.375 inch — 80 column per RS-292

Hole Size and Shape — EIA Standard Rectangular per RS-292

Reading Method — Photoelectric

Punching — Paper or plastic cards

Card Printer Code — XS3, others optional at extra cost

Card Printer Type Font Size — 0.090 inch high x 0.062 inch wide; 60 characters per line on each of two lines

Card Punching Verification — Post punch read

Card Printing Method — Print hammer strikes against drum containing 63 printable symbols and characters

BUFFER MEMORY

Type — Magnetic core, DRO random access

Read-Write Cycle Time — 4 microseconds

Word Length — 12 bits

Size: 256 decimal words provide storage for:

    Code conversion
    120 character line table
    132 character line table
    80 column card data storage
    CRPI Index Addresses
    HSP Index Addresses
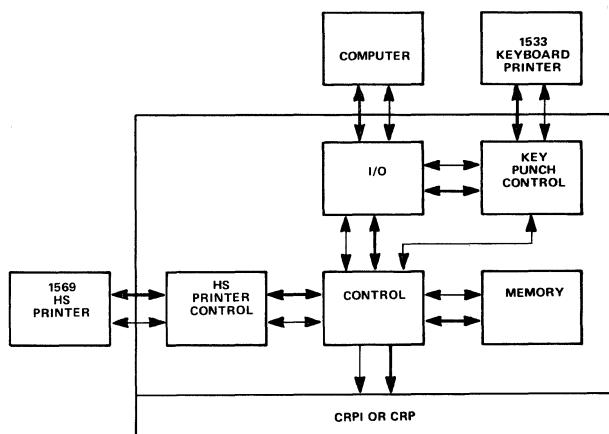
FUNCTIONAL BLOCK DIAGRAM

UNIVAC

CONSTRUCTION

The 1549 is designed for military applications with logic and cabinet ruggedized for military applications. A card handling unit, a power supply, a hood assembly and three logic chassis are housed in the three compartment cabinet. Logic chassis are hinged and can swing out to allow front access for maintenance. The card handling unit is mounted on a 22 x 56 inch recessed panel in the upper third of the cabinet and can be withdrawn on its mounting slides for easy maintenance. Access to the power supply that is located behind the logic chassis is provided through the left hand door or from the rear by removing the back panel. The hood assembly contains operating controls and air intake grille on the front and interconnecting cable connectors on the rear top. Air filters and blowers are inside the hood.

PHYSICAL CHARACTERISTICS

Size (inches) 66H x 62W x 28D

Weight (pounds) — 1000

Cooling — Ambient Air; internal blowers

Heat Dissipation — 4400 Watts/Hr at 75°F

Primary Power — 400-cycle power — 115V ± 5%
  3-phase 400 cycle ± 10%,
  1800 watts maximum
  60-cycle power — 115V ± 10%
  single phase, 60 cycle ± 5%,
  2600 watts maximum

ENVIRONMENTAL CHARACTERISTICS

The following specifications were used as guides for design and construction:

General Specification	MIL-E-16400E
Temperature	0–50°C
Relative Humidity	(up to 95% operating)
Shock	MIL-S-901C
External Radiation	MIL-I-16910A
Enclosure	MIL-STD-108D
Vibration	MIL-STD-167

REFERENCES

1549 (7033500-00) Moonbeam

  PX 3750-1-1, Vol. 1 Technical Manual
  PX 3750-2-1, Vol. 2 Technical Manual
  PX 3752-0-1 Maintenance Test Manual

1549 Modified (7033500-01) FBM

  Same technical manual as above plus
  FBM Supplement PX 4087-0-1
  PX 4089-0-1 (Applies to tests for CRPI which controls a 132-column printer)

1549A (7047325-00) TSS

  PX 4634-1-1 Vol. 1 Technical Manual
  PX 4634-2-1 Vol. 2 Technical Manual

1549B (7047326-00) 18-bit Omnibus

  Same technical manual as for 1549A plus supplement PX 4681-0-1

1549C (7047327-00-01) 30-bit Omnibus

  PX 4707-1-1 Technical Manual
 PX 4707-1-1 Technical Manual

PX 5007-1-1 1549 CRPI, Vol. 1

PX 5007-2-1 1549 CRPI, Vol. 2

PRODUCT INFORMATION
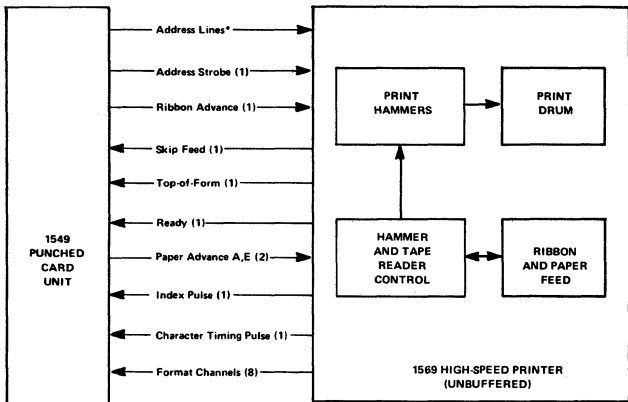
UNIVAC 1569 HIGH-SPEED PRINTER
RO-302( )/UYK-5(V)

The UNIVAC 1569 was originally designed to supply high-speed printing capability in the UNIVAC 1500 Management Information System (MIS). The 1569 HSP accepts digital data in XS-3 code from the buffer memory and controls in the UNIVAC 1549 (see OP-2-1) and prints the information on single or multicopy paper. Printing data and control information are furnished to the appropriate 1549 version by a computer or by a magnetic tape unit in an off-line environment. Printing options of 120 or 132 characters per line are available.
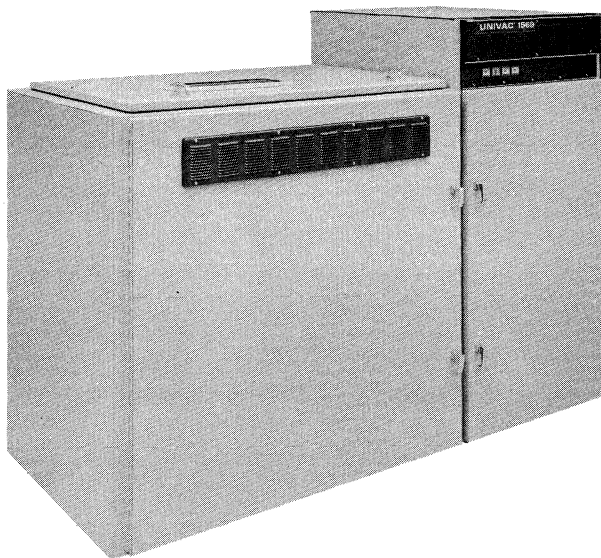
Negative No. 28308

FUNCTIONAL CHARACTERISTICS

Printing Speed — 600 lines per minute maximum
                450 lines per minute average

Format — 120 or 132 characters per line (option)
          10 characters per inch horizontal
          6 lines per inch vertically
          Printed characters: 63 plus space

Paper Types: Up to 6 parts, 12 pound bond
              Single copy 15 pound bond (min. wt.)

Paper Form Length — 22 inches maximum

Paper Width — 17-25/32 inches to approximately 5 inches

Print Type Font — Open Gothic characters

Printing Method — Print hammer impact against rotating drum containing 64 characters in each character position of a line

Paper Slew Rate — 8 inches per second

Vertical Format Control — Punch tape loop

Paper Feed — Pin feed type tractors (four)

Printer Code — XS-3


```
1549
PUNCHED
CARD
UNIT

    Address Lines* ─────────▶
    Address Strobe (1) ──────▶     ┌──────────┐     ┌──────────┐
    Ribbon Advance (1) ──────▶     │  PRINT   │────▶│  PRINT   │
    Skip Feed (1) ◀──────────      │ HAMMERS  │     │  DRUM    │
    Top-of-Form (1) ◀────────      └──────────┘     └──────────┘
    Ready (1) ◀──────────                ▲
    Paper Advance A,E (2) ───▶     ┌──────────┐     ┌──────────┐
    Index Pulse (1) ◀────────      │ HAMMER   │     │  RIBBON  │
    Character Timing Pulse (1)◀─   │ AND TAPE │◀───▶│ AND PAPER│
    Format Channels (8) ◀─────     │ READER   │     │  FEED    │
                                   │ CONTROL  │     └──────────┘
                                   └──────────┘
                              1569 HIGH-SPEED PRINTER
                                   (UNBUFFERED)
```

*7 Address lines for 120 ch/line printer
 8 Address lines for 132 ch/line printer

HSP-1549 FUNCTIONAL DIAGRAM

CONSTRUCTION

The 1569 Cabinet consists of two major sections: 1) a mechanical section that contains a Data Products High-Speed Line Printer Mechanism Model 421 and space for paper supply 2) an electrical section that consists of the Data Products HSP Electronics Model 422 for driving and controlling the printing mechanism. The 2 compartment ruggedized cabinet has two front doors that allow servicing and maintenance access and one top cover door over the printer compartment. Cooling blowers are contained in both compartments. Operating controls are located in the hood assembly of the electronics compartment just below the air intake grille.

PHYSICAL CHARACTERISTICS

Size (inches) — 45H x 65W x 28D

Weight — 750 pounds

Cooling Air — Ambient (410 CFM)

Primary Power — 60 cycle, 115V, $\pm$ 10% single phase, 900 watts

ENVIRONMENTAL CHARACTERISTICS

The following specifications were used as design guides:

General Specification	MIL-E-16400
Temperature	50° to 90°F
Relative Humidity	20 to 85%
Shock (while not operating)	MIL-S-901C(1)
External Radiation	MIL-I-16910C(1)
Enclosure	MIL-STD-108E
Vibration	MIL-STD-167

REFERENCES

Design Specifications — DS-4866, SB-10126, SB-10193

Acceptance Specifications — DS-4871 (1218), SB-10047 (1218), SB-10123 (CP-808)

MANUALS

PX 5008-0-2	1569 High-Speed Printer

Data Products Manual for 1569

PX 3748-0-1	Technical Manual (7036900-00)
PX 4085-0-2	Technical Manual (7036900-01) supplement
PX 4665-0-1	Technical Manual (7036900-02) supplement

CONSTRUCTION

The unit is packaged in a ruggedized cabinet with removable skin sections for access during maintenance. The keyboard has three distinct areas of operator control (viz., Data Keyboard, Control Keys, and Function Keys). It is mounted in front of the CRT viewing area.

Built for military application — field operations, transportable systems and ships, aircraft and aerospace applications — requiring ruggedized construction, the display unit was designed with the following military specifications as design goals:

- General Requirements: MIL-E-16400E
- Shock: MIL-S-901B
- Vibration: MIL-STD-167
- Inclination: MIL-E-16400
- Salt Spray: Fed STD No. 151 (Meth. 611)
- Temperature: MIL-E-16400 (0 to 50°C)
- Humidity: MIL-E-16400 (10 to 95 percent)
- Interference: Conducted Radiation per MIL-I-16910C
- Enclosure: Dripproof per MIL-STD-108D (Keyboard excepted)

DIMENSIONS:
16"H x 24"W x 34"D with keyboard

WEIGHT:
125 pounds

POWER REQUIREMENTS:
115 volts ±10%, 400 Hz ±5%, 3 phase, 300 to 350 watts

COOLING:
Forced ambient air

OPTIONS:
Detached keyboard to 6 feet of cable
No keyboard
-3 volt or -15 volt interface
60 Hz primary power

DS 4833   Design Specification
PX 4537-1-X   Technical Manual

PRODUCT INFORMATION

UNIVAC 1551 ALPHANUMERIC DISPLAY

The UNIVAC® 1551 alphanumeric display unit consists of a desk-top cabinet containing a 17-inch cathode ray tube (CRT) for displaying 25 lines of 80 characters each in text-type format, a keyboard for data control and function selection, a power supply, ferrite core memory, and the necessary logic, character generating, and control electronics. The unit is completely modular, thereby allowing the sections to be readily interchangeable with similar units.

Storage is provided in a ferrite core memory, which may be loaded by a computer output channel or by keyboard entry. After the memory is loaded, the alphanumeric symbols will be displayed continuously at the selected positions on the CRT. Characters are regenerated on the screen at a minimum of 50 times per second. The communication path between memory and the computer or the keyboard need be resumed only when the display is to be changed. Cycle time of the memory is approximately four microseconds.
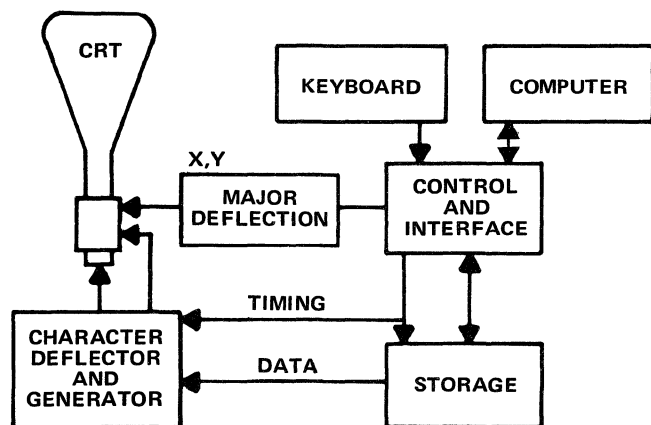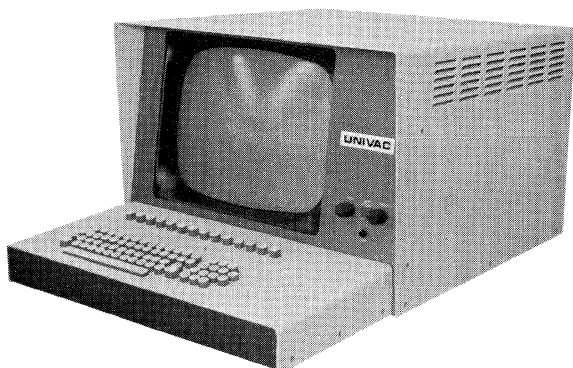
FUNCTIONAL CHARACTERISTICS

Cathode Ray Tube

* 17-inch rectangular tube
* 9-inches by 12-inches active display area
* Electromagnetic deflection
* 25 lines of 80 characters per line
* 0-50 foot-lambert brightness at 50 cps refresh rate
* P-31 Phosphor

Alphanumerics

* 63 characters: 26 alphabetic, 10 numerals, 27 symbols
* Character height 0.15 inch, vertical spacing 0.36 inch

Data Entry

* Full range alphanumeric keyboard (modified ASCII)
* 14 key function keyboard
* Display clear, line erase, message erase
* Cursor Control Keys:

  Forward Space — 1 space right

  Back Space — 1 space left

  Carriage Return — Move to left-hand margin and advance 1 line

  ← (Back space) — Move left continuously until released

  → (Forward space) — Move right continuously until released

  ↓ (Downward space) — Move downward continuously until released

  ↑ (Upward space) — Move upward continuously until released

  Cursor Reset — Move to column 1 of line 2

Refresh Memory

* 2048 eight-bit words with 4-microsecond cycle time

FUNCTIONAL DIAGRAM

9.69

UNIVAC

DEFENSE SYSTEMS DIVISION

PRODUCT INFORMATION

MOTOR GENERATOR SETS

A variety of Motor Generator Sets is available from Univac to provide system users a regulated 400 hertz three phase power source and line isolation to meet the requirements of Univac computers and associated peripheral equipment. Both heavy duty militarized types and heavy duty commercial grade are offered for these requirements. Type numbers in some cases are assigned to 1) complete Motor Generator Sets, 2) Motor Generator Units, and 3) Motor Generator Control Units.
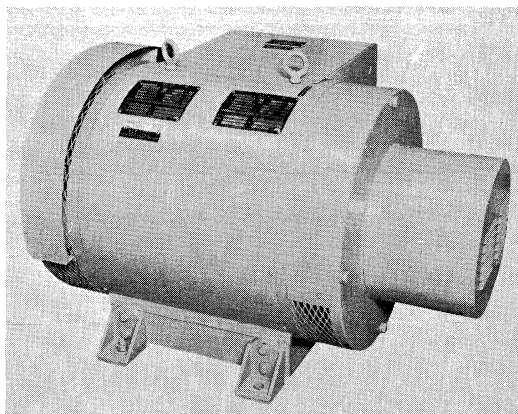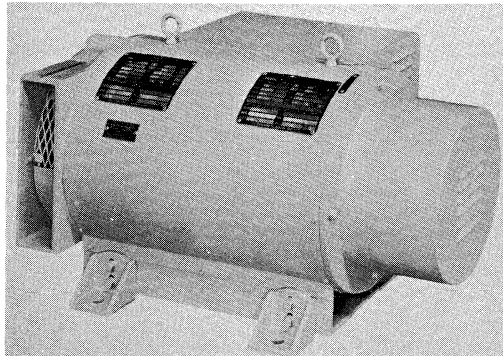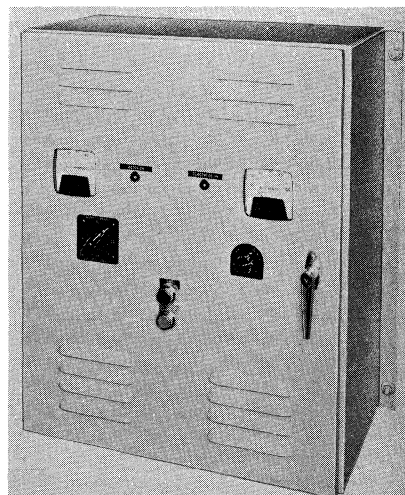
MG SET 8503

PHOTO NO. 26605

PHOTO NO. 27053

MG SET 1547

MG SET

1392
1394
1395

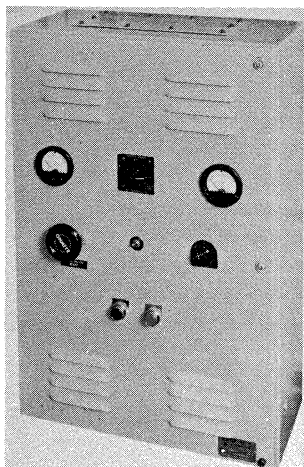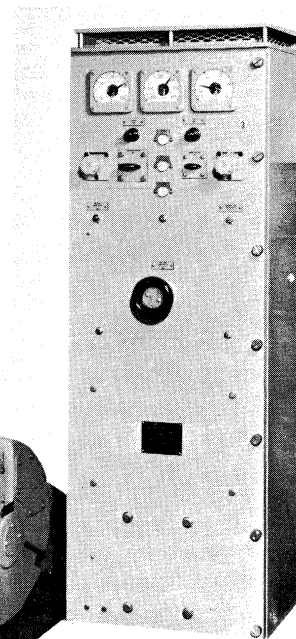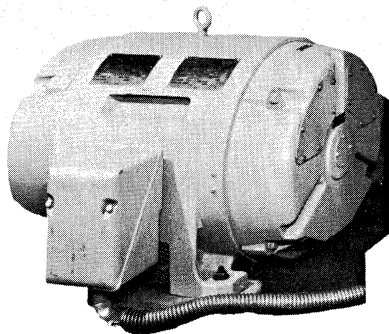PHOTO NO. 20307-17A

PHOTO NO. 27054

SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION

MOTOR GENERATOR (MG) SETS (ALLIS CHALMERS)
ALL MOTOR GENERATORS — 5 KW, 90-135 V (120 NOMINAL) 400 Hz, 3 PHASE
DIRECT DRIVE, CONTINUOUS, 120 RPM, 1.5% MAX SLIP, 0.8 POWER FACTOR (LAGGING)
ALL CONTROLLERS — 1% REGULATION, 90-135 V RANGE

MG SET	MG ONLY	CONT ONLY	UNIVAC PART NUMBER	MIL-TYPE	COLOR	3Ø INPUT POWER VOLT	Hz FREQ	AUDIBLE NOISE (db)	WEIGHT (LB)	DEPTH LENGTH (INCHES)	WIDTH (IN)	HEIGHT (IN)	SPEC	PRODUCT STATUS*	COMMENTS
1392			911919-00		GREEN								DS4511 & DS4610	A	
	1390		-03	PU491	GREEN	440±44	60±3	75	1100	31-3/8	29-3/8	22			
		1389	-04	C3414	GREEN				433	16-3/4	19-1/2	58-1/2	↓		
1392			-01		GREY-NAVY										
	1390		-05	PU491	" "	440±44	60±3	75	1100	31-3/8	29-3/8	22			
		1389	-06	C3414	GREY-NAVY				433	16-3/4	19-1/2	58-1/2			
1392			-02		GREY-A.F.										
	1390		-07	PU491	" "	440±44	60±3	75	1100	31-3/8	29-3/8	22			
		1389	-08	C3414	GREY-A.F.				433	16-3/4	19-1/2	58-1/2	↓		
1392 LOW NOISE			911920-00		GREEN								DS4511		
	1390		-03	PU492	GREEN	440±44	60±3	70	1050	38-3/8	22	22			
		1389	-04	C3414	GREEN				433	16-3/4	19-1/2	58-1/2			SUBMARINE DUTY
1392			-01		GREY-NAVY										
	1390		-05	PU492	" "	440±44	60±3	70	1050	38-3/8	22	22			
		1389	-06	C3414	GREY-NAVY				433	16-3/4	19-1/2	58-1/2			
1392			-02		GREY-A.F.										
	1390		-07	PU492	" "	440±44	60±3	70	1050	38-3/8	22	22	↓		
		1389	-08	C3414	GREY-A.F.				433	16-3/4	19-1/2	58-1/2			
1394			911921-00		GREEN								DS4511 &DS4610		
	1393		-03	PU680	GREEN	208±21	60±3	75	1100	31-3/8	29-3/8	22			
		1391	-04	C7354	GREEN				433	16-3/4	19-1/2	58-1/2			
1394			-01		GREY-NAVY										
	1393		-05	PU680	" "	208±21	60±3	75	1100	31-3/8	29-3/8	22			
		1391	-06	C7354	GREY-NAVY				433	16-3/4	19-1/2	58-1/2			
1394			-02		GREY-A.F.										
	1393		-07	PU680	" "	208±21	60±3	75	1100	31-3/8	29-3/8	22	↓		
		1391	-08	C7354	GREY-A.F.				433	16-3/4	19-1/2	58-1/2			
1395			911922-00		GREEN										
	1397		-03	PU497	GREEN	208±21	400±20	75	1150	31-3/8	29-3/8	22			2 CABINET
		1396&1388	-04	C3501,02	GREEN				485(BOTH)	47-1/2,30-1/2	19-1/2,19	16-3/4(EA)			CONTROLLERS
1395			-01		GREY-NAVY										MAIN CONTROL
	1397		-05	PU497	" "	208±21	400±20	75	1150	31-3/8	29-3/8	22			&
		1396&1388	-06	C3501,02	GREY-NAVY				485(BOTH)	47-1/2,30-1/2	19-1/2,19	16-3/4(EA)			AUXILIARY
1395			-02		GREY-A.F.										
	1397		-07	PU497	" "	208±21	400±20	75	1150	31-3/8	29-3/8	22	↓	A	
		1396&1388	-08	C3501,02	GREY-A.F.				485(BOTH)	47-1/2,30-1/2	19-1/2,19	16-3/4(EA)			

*A = ACTIVE

MOTOR GENERATOR (MG) SETS (MANUFACTURER – KATO)

MG SET	MG ONLY	CONT ONLY	UNIVAC PART NUMBER	MIL-TYPE	COLOR	3Ø INPUT POWER		ADJUST RANGE	OUTPUT POWER			RPM	SLIP	AUDIBLE NOISE (db)	WEIGHT (LB)	DEPTH LENGTH (INCHES)	WIDTH (IN)	HEIGHT (IN)	SPEC	PRODUCT STATUS**
						VOLT	Hz FREQ		KW KVA*	VOLT	Hz FREQ									
1384	1385	1386	7902510-03 -04 -05		GREY-NAVY "	440	60	90-135	5/6.25	90-135	400	1200	1.5% MAX	75	1100 406	37-3/4 16-3/4	30-2/5 19-1/2	26-1/2 58-1/2	SB10112	A
1381	1382	1383	7902510-00 -01 -02		" "	208	60	90-135	5/6.25	90-135	400	1200	1.5% MAX	75	1100 406	37-3/4 16-3/4	30-2/5 19-1/2	26-1/2 58-1/2		↓
1387	NO TYPE #	NO TYPE #	7900298-00 -01 -02	PU609/ UYK	" "	220/440	60	98-132	3/3.3	115	400-420	3428	2.5%	85	350 165	28-3/4 12	15-3/16 26-1/2	17-1/2 30	SB10004	
1546	1546	NONE	7901546		"	208-220/440	60	–	3/3.3	115	400-420	3428	2.5%	85	350	27-5/8	14-1/4	17-3/16	DS4869	
1547	NO TYPE #	1533	7901572-00 -01 -03	PU655/U C8086/U	"	208-220/440	60	98-132	5/6.25	115	400-420	3428	2.5%	85	350 227	31 12	17-3/4 27	17-1/2 36	DS4872	
NO SET #	NO TYPE #		7901729		"	208-220/440	60	–	5/6.25	120	400-420	3428	–	85	750	30-3/8	17-3/4	17.3		↓
8503-00	NO TYPE #	NO TYPE #	7901048-00 -02 -03		" "	208-416	50	98-132	7.5/9.3	115	390-400	–	–	85	430 150	36-7/8 12	26-1/2 26-1/2	24-5/8 30	–	
8503-01	NO TYPE #	NO TYPE #	7901048-01 -04 -05		" "	208-416	60	98-132	7.5/9.3	115	410-420	–	–	85	430 150	31-5/16 12	16-1/8 26-1/2	17-1/2 30	–	
NO SET #	NO TYPE #	NO TYPE #	7901048-06 -04 -07		" "	208-416	60	98-132	7.5/9.3	115/208	410-420	–	–	85	430 150	31-5/16 12	16-1/8 26-1/2	17-1/2 30	–	A

NOTE: FOR ALL MG's – 3 PHASES, DIRECT DRIVE, CONTINUOUS DUTY
        FOR ALL CONTROLLERS – 1% REGULATION
* KW = POWER FACTOR MULTIPLIED BY KVA
** A = ACTIVE

MOTOR GENERATOR (MG) SETS (MANUFACTURER KATO)

MG SET	MG ONLY	CONT ONLY	UNIVAC PART NUMBER	MIL-TYPE	3Ø INPUT POWER		DUTY	ADJUST RANGE	OUTPUT POWER				RPM	AUDIBLE NOISE (db)	WEIGHT (LB)	DEPTH LENGTH (INCHES)	WIDTH (IN)	HEIGHT (IN)	SPEC	PRODUCT STATUS*
					VOLT	Hz FREQ			VOLT	KVA	KW	Hz FREQ								
X			7901484-00																	A(S)
	X		-01	PU671/U	400	50/60	CONT		115/208	25/62.5	20/50	400/60	1500/1800	100	6300	59-1/2	68			
		X	-04	C7161/U				±10%							2500	24	30	70		
X			7901547-00																	
	X		-01	PU672/U	200-220	60	CONT		115	25	20	400	1200	85	3200	58	38	35-1/16		
		X	-02/03	C7162/U				±10%							1200	-	30/60	97		
X			NONE ASSIGNED																	
	X		7902486-00		380	50	CONT		208/115	50/62.5	40/50	60/400	1500	95	6700	125-7/8	47-1/8	41		
		X	-01					±10%							1200	24	30	73		
X			7902730-00																SB10009	
	X		-01	PU698/U	440	60	-		120	37.5	30	400	1200	-	1715	49-5/8	26-5/8	25-5/8		
		X	-02	C7724/U				90-135							400	14	19-1/2	58-1/2		
X			NONE ASSIGNED																	
	X		7902730-03	PU698/U	380	50	-		120	37.5	30	400	1500	-	1715	49-5/8	26-5/8	25-5/8	SB10240	
		X	-04	C7724/U				90/135							400	14	19-1/2	58-1/2		A(S)

NOTE: FOR ALL MG's — 3 PHASE, 0.8 PWR FACTOR
FOR ALL CONTROLLERS — 1% REGULATION

*A(S) = ACTIVE — SPECIAL PROJECT DESIGN

PRODUCT INFORMATION

UNIVAC 1600 MILITARY COMPUTER
(AN/UYK-20(V))

PX-10431

The AN/UYK-20 (UNIVAC 1600) is a standard 16-bit computer in the military inventory. It is a small to medium, general purpose computer designed to meet the MIL-E-16400 specification for ship and shore applications. Functionally, it is designed around a microprogrammed controller that executes the data processing and I/O chain programs using an instruction set compatible with the UNIVAC 1616 and AN/UYK-15. A two-bus data structure allows for overlapping of functions. Physically the computer is wired for the maximum configuration and assembled in a single cabinet whose hinged front cover contains the maintenance panel on the inside and the operating controls on the outside.
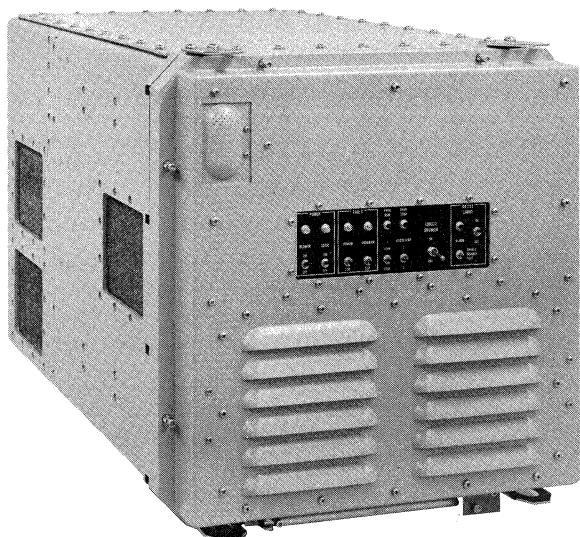
Photo No. 5534-1

FUNCTIONAL CHARACTERISTICS

Central Processor
Microprogrammed controller
Two's complement arithmetic
8-bit, 16-bit and 32-bit operands
16 high speed general purpose registers
2 program status registers
Page addressing and indirect addressing
3-level interrupt processing (hardware serviced)
16-bit and 32-bit instructions — 5 formats
Direct addressing to 65K words
Indexing via general registers
Indirect addressing via status register
Relative addressing by page
Power Fault/Auto-restart
Real-time clock and interrupt clock
NDRO (read only) memory

Central Processor Options
Additional 16 general registers (maximum of 32 registers).
Additional micromemory - 512 words. (Customer defined)
Customer defined NDRO programs.

Main Storage (Magnetic Core)
Expandable — 8K to 65K words to 65K in cabinet
16-bit words
Read/Restore cycle time — 750 nanoseconds
Asynchronous timing

Main Memory Options
Memory Size: 8,192 word increments to 65,536 total
Direct Memory Access (DMA) interface.

Input-Output Control
Program initiated chain control
I/O instruction repertoire — same format as CP
Full Duplex input/output channels
Control memory for each channel
Up to 16 channels (combination serial and parallel)
Parallel channels:
Expandable in 4 channel groups
Serial channels:
Expandable in groups of two
MIL-STD-188C
EIA-STD-RS232
NTDS serial

FUNCTIONAL DIAGRAM

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SPERRY RAND

UNIVAC

DEFENSE SYSTEMS DIVISION
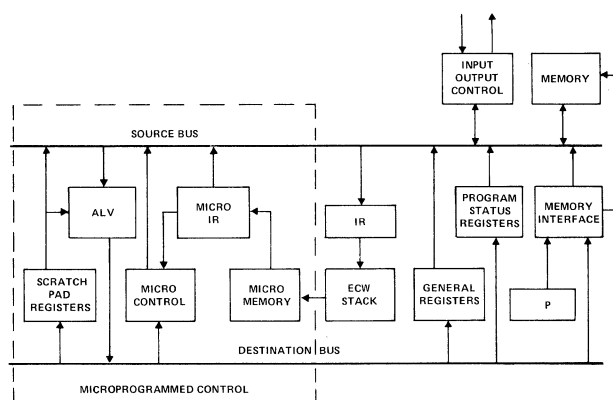
Input/Output Controller Options

A maximum of 16 input/output channels are available in groups as follows:

Parallel Channels in 4 Channel Groups

Types:
- -3 Volt NTDS interface
- -15 Volt NTDS interface
- +3.5 Volt ANEW interface

Modes:
- 8-bit byte, 16-bit word, or 32-bit dual channel
- Dual channel operations on two 4-channel groups (0 and 1, or 2 and 3) having the same interface types.
- Normal transfers available on single or dual channels.
- Externally specified addressing (ESA) operation on dual channels
- Intercomputer operation on single or dual channels

Serial Channels in 2 Channel Groups
- MIL-STD-188C characteristics
- EIA-STD-RS232C characteristics
- Synchronous — to 9600 bits per second
- Asynchronous — 75, 150, 300, 600, 1200 or 2400 bits/second (any four may be obtained by the option) program controlled selection.
- Character size:
  - Synchronous or asynchronous — 5, 6, 7 or 8 level (program controlled selection)
- NTDS serial interface characteristics
- Intercomputer operation on NTDS serial channel

PHYSICAL CHARACTERISTICS

PARALLEL WORD TRANSFER RATES (Thousand words per second)				
Interface & Voltage (Type)	No. of Channels Active			
	1-4	5-8	9-12	13-16
−15V (NTDS)	41.6	83.3	124.9	166.6
+3.5 (A NEW) and −3.0 (NTDS)	190.	400.	750.	1,000.
NTDS serial channel	150,000 32-bit words/sec			

SERIAL TRANSFER RATE (Bits per second)	
Asynchronous channel EIA-STD-RS 232C MIL-STD-188C	2400, 1200, 600, 300, 150 or 75
Synchronous channels	to 9,600

Primary Power

115 or 208 volts
1000 watts (maximum configuration)
Single Phase or 3 phase delta (115 volts) or 3 phase Wye (208 volts)
Frequency — 400 Hz + 5% or 60 Hz ± 5%

Power Supply Input Power Options

3 phase 208 volt, 60 Hz or 400 Hz
3 phase 115 volt, 60 Hz or 400 Hz
1 phase 115 volt, 60 Hz or 400 Hz
Note: 60 Hz and 400 Hz power supplies are different assemblies but have the same dimensions.

Physically, the functional units are assembled in a cabinet that is constructed from aluminum channel and aluminum sheet and braced to provide structural rigidity. One cooling air inlet is located in the door of the cabinet and the three air exhausts are provided on the left side of the cabinet. Provision has been made in the base for a free-standing mount as well as mounting within a standard 19-inch rack. The front cover incorporates a rugged hinge and latch system that provides a uniform high clamping pressure against the cabinet opening. Gasketing around the peripheral of the front cover provides for EMI and moisture sealing. A maintenance panel is located on the inside of the front cover and a control panel on the outside. The rear of the cabinet contains the I/O connector panel, a power connector and its attendant filter assembly, the DMA and external real-time clock jacks. Optional features offered require only the removal, insertion or substitution of plug-in modules.

Summary

Militarized Construction
Microprogram control
Integral blowers and power supplies
Suitable for 19-inch rack mounting
Front access for maintainability
Temperature Range
  Operating: 0°C to 50°C
  Storage: -62°C to +75°C
Relative Humidity: to 95%
Size Maximum Configuration (inches)
  Height: 19.9
  Width: 17.5
  Depth: 24
Weight: 218 pounds maximum

The AN/UYK-20 is wired for the maximum configuration which includes:

65,536 word memory
192 word NDRO memory
16 input/output channels consisting of any combination of parallel channels in groups of four and serial channels in groups of two
32 general registers
Real-time clock and interrupt clock
512 words of user programmable micromemory
Connectors mounted in accordance with MIL-F-18870.

REFERENCES

Design Specification   SB-10160
NTDS serial interface   SB-12407

PRODUCT INFORMATION

UNIVAC 1816 (MPC-16) COMPUTER   PX-10432

The UNIVAC 1816 is a high-performance, miniaturized and militarized (MIL-E-5400) 16-bit microprogrammed computer (MPC-16). It executes instructions that are compatible with the UNIVAC 1616, the AN/UYK-15, and the AN/UYK-20.

Functionally, it is organized around a microprogrammed controller and a two-bus data exchange structure that allows the system to overlap functions. Up to 32,768 words of memory, four or eight parallel input and output channels, an integral power supply and cooling system are assembled in an ATR enclosure which occupies less than 0.9 of a cubic foot and weighs no more than 55 pounds.
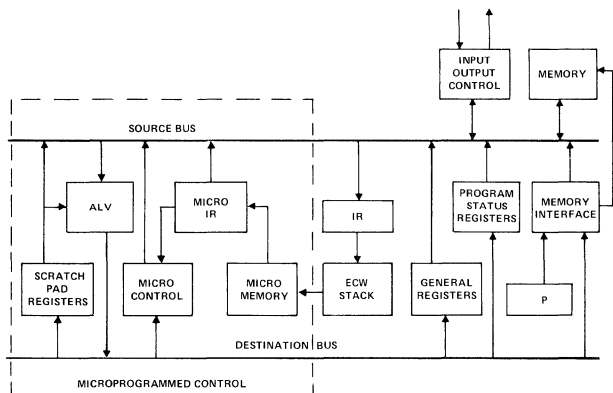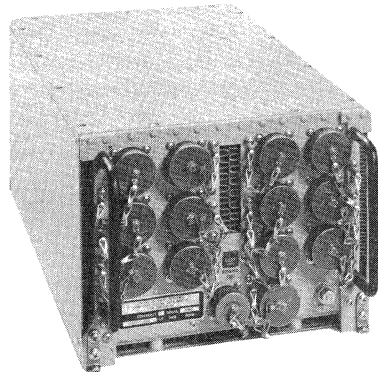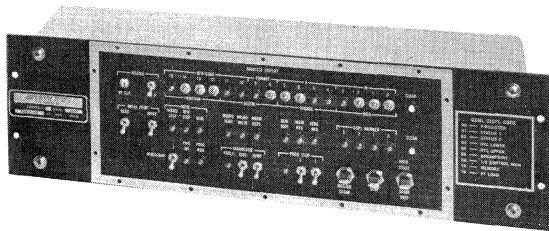
FUNCTIONAL CHARACTERISTICS

CENTRAL PROCESSOR

Microprogrammed controller
Two's complement arithmetic
8-bit byte, 16-bit, 32-bit and 64-bit operands
2 sets of 16 high-speed general purpose registers
Program status register
Direct addressing capability to 65K words
3-level interrupt processing (hardware serviced)
16-bit and 32-bit instructions — 5 formats
Floating point arithmetic
Indexing via general registers
Indirect addressing via status register
Breakpoint
Real-time clock and interrupt clock
Power Fault/Auto-restart
NDRO memory (read only memory)
Hardware trignometric functions
Processor-memory parity checking

MAIN STORAGE

Expandable — 16K to 65K words in 16K increments
16-bit words
Independently accessible memory banks
Read/restore cycle time — 1 microsecond
Asynchronous timing
Multiport interface (optional)

INPUT/OUTPUT CONTROL

Program-initiated chain control
10 instructions
IC buffer control memory for each channel
Parallel channels — asynchronous operation
16-bit channel interface
Full duplex operation — simultaneous input and output
Intercomputer operation on any channel
8-bit, 16-bit or 32-bit (dual-channel) transfers
4 input and output channel groups (2 groups maximum)
Interface voltage levels by 4 channel groups
        -3.0 volts, +3.5 volts or 1108 compatible

FUNCTIONAL DIAGRAM

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DEFENSE SYSTEMS DIVISION

FUNCTIONAL CHARACTERISTICS (Contd.)

TABLE 2. I/O TRANSFER RATES

PARALLEL WORD TRANSFER RATES (Thousand words per second)			
	Number of Active Channels		
Interface & Voltage (Type)	1	2-4	5-8
+ 3.5 (A NEW) or - 3.0 (NTDS)	190.	250.	500.
- 3.0 (1108)	333.	500.	1,000.

POWER SUPPLY

102 to 124 volt, 1 phase, 400 ±20 Hz input
500 watts maximum

SUMMARY

General-purpose, 16-bit digital computer
Real-time capability
Physically and functionally modular
MSI (medium scale integration) elements
Integral cooling blowers and power supplies

MAINTENANCE AND OPERATORS TEST SET

Normally the UNIVAC 1816 is operated without any operator's console. An associated militarized Maintenance and Operator's Test Set is connected for maintenance purposes and may also be used as an operator's console where applications require manual control of operations.

The Test Set is 17.5 inches wide, 5.77 inches deep and 5.12 inches high with a front panel 5.22 inches high and 19 inches wide which dimensions allow it to be mounted in a 19 inch rack. Two cables up to 50 feet long connect it to the computer from which it draws its required direct current power.

PHYSICAL CHARACTERISTICS

Physically, the functional units are assembled as modular sections in a case whose bottom, sides, and a center longitudinal divider are louvered heat exchangers. The central processor input/output control and memory circuit cards plug into a horizontal, wire-wrapped panel. The power supply is located under this panel and transfers heat to the bottom exchanger panel. Memory stacks occupy the full depth of the case in the rightside toward the rear. One side and the center heat exchangers are designed with grooves that hold printed circuit cards in position and provide them with an efficient thermal transfer path. Memory stacks are cooled through their end-supporting structure which makes thermal contact with heat exchangers.

Airborne environment
Temperature Range: MIL-E-5400N for Class I equipment
Relative Humidity: to 100%
Size (inches) — 32K words memory, 8 I/O channels
    Height: 7-5/8
    Width: 10-1/8
    Depth: 19-9/16
Weight: Approximately 60 pounds

REFERENCES

Design Specification SB-10222

UNIVAC 1554 GRAPHIC DISPLAY

The UNIVAC 1554 Graphic Display is a high performance graphic display subsystem designed for application in a militarized environment. The unit is capable of presenting both vector and alphanumeric data. The 1554 includes not only the capability for data entry and presentation, but also an internal refresh buffer and the logical capability to control on-line the organization of data in the refresh buffer. This latter capability is implemented by means of a series of control words (loaded by the central processor and stored in the refresh memory), which define the structure of memory segments during the refresh cycle and certain of the display characteristics for the data contained in the controlled segment.
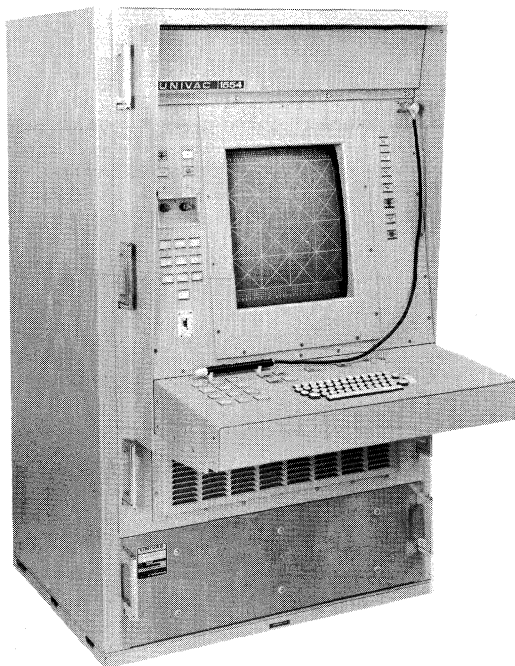

Photo No. 1554

PHYSICAL CHARACTERISTICS

Height—69 inches

Width—36 inches maximum

Depth—24.5 inches plus 15-inch keyboard

Weight—Approximately 1000 pounds

POWER REQUIREMENTS

Nominal Voltage—115 volts or 208 volts

Nominal Frequency—400 Hz or 50-60 Hz

Phase or Line—3 phase

FUNCTIONAL CHARACTERISTICS

Viewing Area—12 inches x 14 inches

Scratch Pad Area—Two 1-inch x 12-inch areas

Deflection—Electromagnetic major and minor deflection; 512 x 512 positive matrix on display surface

Display Brightness—25 foot-lambert brightness

Refresh Rate—50 frames per second minimum

Character Generation—Stroke-type character generator (8 strokes per character)

Character Size—Two character sizes ($\frac{3}{16}$ inch and $\frac{3}{8}$ inch)

Writing Rate—4 microseconds per character

Modes
    Random position mode
    Tabular position mode

Vectors
    Worst case full screen vector in 128 microseconds
    Two types of line structure
    Point-to-point and octagonal vectors
    Off-line expansion
    Two intensity levels plus blank
    In remote mode, operator can blank or unblank data

Thumbwheel switch to limit number of position vectors displayed from 1 to 16

Keyboard
    Full-range alphanumeric keyboard
    12-key function keyboard

Code—ASCII compatible

Light Pen

FOR ADDITIONAL INFORMATION CONTACT:

Univac Defense Systems Division • Univac Park • P.O. Box 3525 • St. Paul, Minnesota 55165
Attention: Mr. J.A. Anderson, Display Manager, MS8261

SPERRY ✧ UNIVAC

COMPARISON CHART – UNIVAC 16-BIT COMPUTERS

	1616	AN/UYK-15	AN/UYK-20	MPC16 (1816)
Technical Description	PX-10210	PX-7917	PX-10431	PX-10432
General Specification	Industrial	MIL-E-16400	MIL-E-16400	MIL-E-5400
Size - H,W,D (inches)	14.3 x 20.8 x 25.9	14.4 (3.5 shocks) x 20.75 x 25.75	17.5 x 19.9 x 24.0	7 5/8 x 10 1/8 x 19 9/16
Weight (pounds) approx. for configuration	150 2 drawer cabinet	170 2 drawer cabinet	less than 218 maximum config.	60 32K word memory
Input Power	115V, 1 phase 60 Hz	115V, 1 phase, 60 Hz	115V, 1 phase, 60 or 400 Hz	102 to 124V,1 phase
		400 Hz	115V, 3 phase, 60 or 400 Hz	40 Hz ± 20 Hz
			208V, 3 phase, 60 or 400 Hz (choice of 6 types)	
Cooling method	Convection	Convection	Convection	Conduction
Physical Assembly	Drawer type chassis in industrial cab.	Drawer type chassis in militarized cab.	Swing out & fixed position modules in militarized cab.	ATR case
Maintenance Panel	Front of CP-IOC chassis	Front of CP-IOC chassis	Inside of front cover	Separate cabinet
Processor Control Logic	Hardwired	Hardwired	Microprogrammed	Microprogrammed
I/O Control Logic	Hardwired	Hardwired	CP-IOC MPC	CP-IOC MPC
General Register Sets	1 to 4	1 to 4	1 or 2	2
Breakpoint	Optional	Optional	Standard	Standard
CP-Memory Parity	Optional	Optional	None	Standard
Hardware Floating Point	None	None	Optional Mathpac*	Standard
Square Root	Optional	Optional	Optional Mathpac*	Standard
Trig & Hyperb. Arith.	Optional	Optional	Optional Mathpac*	Standard
FFT Module	Optional	Optional	None	None
Real Time Clock (count up)	16-bit	16-bit	32-bit interrupt at 16-bit	32-bit interrupt at 16 bit
Interrupt Clock (count down)	16-bit	16-bit	16-bit	16-bit
External RTC Source	No	No	Yes	No
Interrupt Levels	4	4	3	3
Processor-Peripheral Channel	Optional	Optional	None	None
Processor-Interrupt Channel	Optional	Optional	None	None
Instruction Formats	RR, RI, RK & RX	RR, RI, RK & RX	RR, RI, RL, RK & RX	RR, RI, RL, RK & RX
Memory Addressing	Direct to 65K	Direct to 65K	Direct, indirect & relative by page to 65K	Direct & indirect to 65K
Indexing	$y + (R_m)$	$y + (R_m)$	$y + (R_m)$ or $y + (R_m)$ & $IW + (R_n)$ n=x, m or m+1	$y + (R_m)$ or $y + (R_m)$ & $IW + (R_n)$ n=x, m or m+1
Memory				
Word Size (bits)	16 + 2 parity	16 + 2 parity	16	16 + 2 parity
Cycle Time	.75 microsecond	.75 microsecond	.75 microsecond	1.0 microsecond
Access Ports (option)	1 to 4	1 to 4	1 or 2 (DMA)	1 to 3
Minimum Size (words)	8K	8K	8K	16K
Capacity in Cabinet	65K-3 drawer cab. 32K-2 drawer cab.	65K - 3 drawer cab. 32K - 2 drawer cab.	65K	32K
NDRO Memory	Optional	Optional	Standard	Standard
Input/Output Controller				
No. per system	1 to 4	1 to 4	1	1
Max.No.Chan.per IOC	16	16	16	8
I/O Channel Mode	Half duplex	Half duplex	Full duplex	Full duplex
Control Words per Chan.	1 set	1 set	2 sets	2 sets
Types of Channels	Parallel and serial	Parallel and serial	Parallel and serial	Parallel
Serial Channels	RS-232 and 188C	RS-232 and 188C	RS-232, 188C, NTDS	None
Serial Intercomputer Ch.	No	No	NTDS Serial	None
Parallel Channels	DS-4772 & 1108	DS-4772 and 1108	DS-4772	DS-4772 and 1108
Parallel Voltage Levels	-3, +3.5, -15	-3, +3.5, -15	-3, +3.5, -15	-3, +3.5
Peripheral Input Ch.(per)	Optional	Optional	None	None
Parallel Intercomputer Channel	Optional	Optional	Standard	Optional
Max.Single-Channel Transfer Rate				
DS-4772	190K	190K	190K	190K
1108 Compatible	667K	667K	———	333K
Intercomputer Channels	Without timeout	Without timeout	With timeout	With timeout

*Proposed Feature

The following government nomenclature is assigned to identify the overall equipment and units described.

Government Nomenclature	UNIVAC Part No.
RD-358(V)/UYK Recorder-Reproducer, Digital Magnetic Tape	7059800-XX
RD-358(V)1/UYK Recorder-Reproducer, Digital Magnetic Tape (7-track, 4 transports)	7059800-01
RD-358(V)1/UYK Recorder-Reproducer, Digital Magnetic Tape (7-track, 2 transports)	7059800-11
RD-358(V)3/UYK Recorder-Reproducer, Digital Magnetic Tape (9-track, 4 transports)	7059800-02
RD-358(V)4/UYK Recorder-Reproducer, Digital Magnetic Tape (9-track, 2 transports)	7059800-12
CY-7422/UYK Cabinet, Electrical Equipment	7059815-00
C-9583(P)/UYK Control, Magnetic Tape Transport	7059900-00
RD-393(P)/UYK Transport, Magnetic Tape	7601767-00
PP-7067/UYK Power Supply	7601768-01
MK-1698/UYK Installation Kit, Transport	7120018-00
MK-1699/UYK Expansion Kit, Control (7-track)	7059850-00
MK-1700/UYK Memory Kit, Read (7-track)	7059992-00
MK-1701/UYK Interface Kit, Fast (-3 Volt)	7059987-00
MK-1702/UYK Interface Kit, Slow (-15 Volt)	7059988-00
MK-1703/UYK Interface Kit, Fast (+3.5 Volt)	7059989-00
MK-1704/UYK Expansion Kit, Control (9-track)	7059878-00
MK-1705/UYK Format Kit, Read-Write (1600 BPI)	7059879-00
PL-1364/UYK Head, Recorder-Reproducer (7-track)	7601884-01
PL-1365/UYK Head, Recorder-Reproducer (9-track)	7601884-00