MINUTEMAN 'I' GENERAL PURPOSE DIGITAL COMPUTERS AND RELATED INERTIAL GUIDANCE EQUIPMENT

INTRODUCTION:

This bulletin provides information on the Minuteman "I" General Purpose Digital Computer and related inertial guidance equipment scheduled to become available during the next 4 years. Detailed availability of systems will be provided when reported by Air Force. The original acquisition cost per system was approximately $234,000. These systems and/or computers are available for redistribution to qualified agencies, through appropriate ADPE Reutilization channels on an "AS IS" non-reimbursable basis, as follows:

DoD ACTIVITIES:

Contact respective service Hqs for ADPE acquisition approval.

DEFENSE CONTRACT (PROFIT OR NOT FOR PROFIT) FOR USE ON CONTRACT OR GRANT:

Contact your contracting officer for guidance in acquisition and for forwarding of approved documentation to DARO for requirements.

AGENCIES OF THE FEDERAL GOVERNMENT OTHER THAN DoD ACTIVITIES:

Contact General Services Administration, Federal Supply Service, ATTN: Excess Equipment Utilization Branch, Crystal Mall Building 4, Washington, D. C. 20406.

CIVIL AGENCY CONTRACTOR (PROFIT OR NOT FOR PROFIT) FOR USE ON CONTRACT OR GRANT:

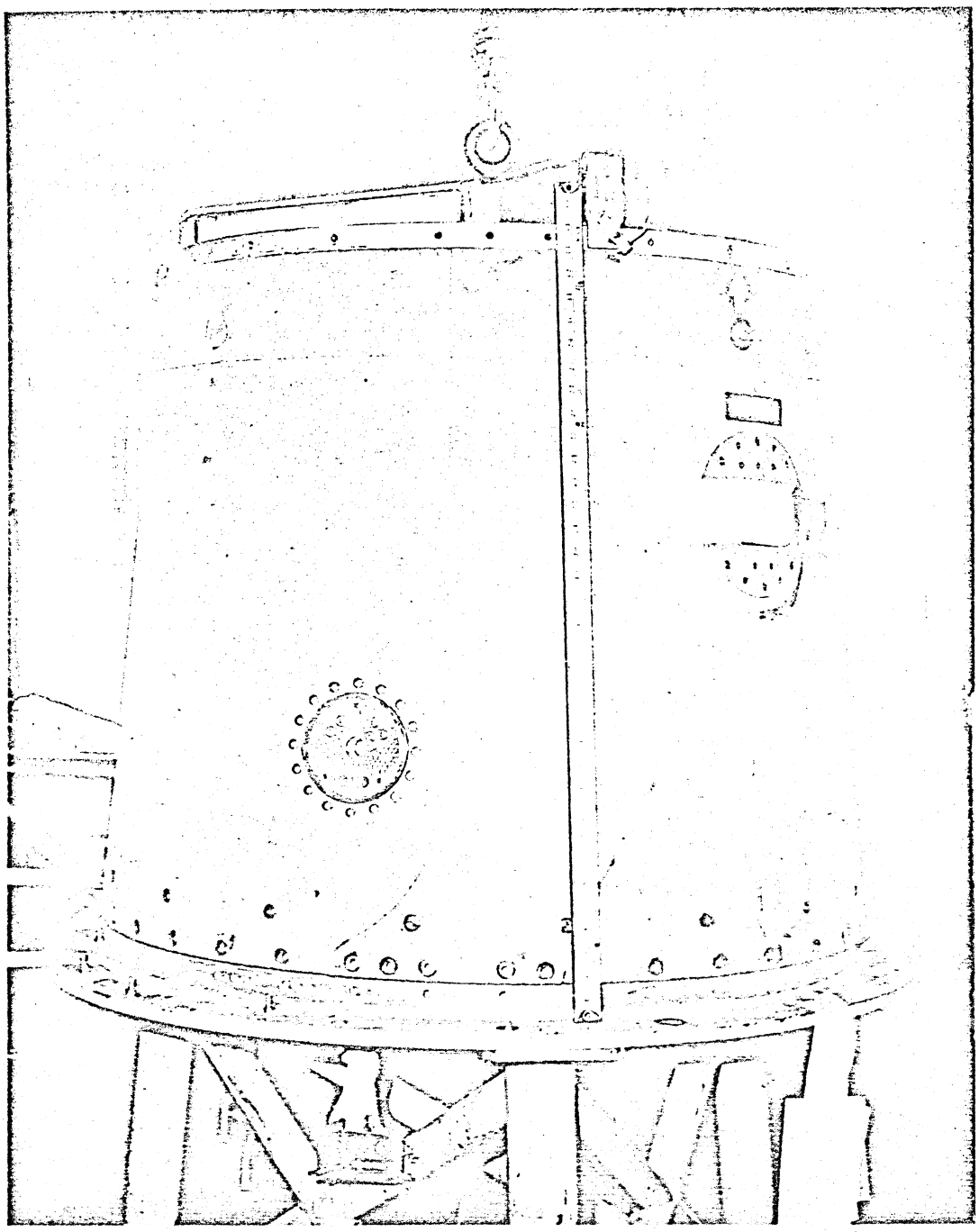
Contact your contracting officer for acquisition thru GSA (address shown above).

AUTHORIZED DONEES:

Contact your local state surplus property officials for acquisition thru Department of Health, Education, and Welfare, Division of Surplus Property and Utilization, 4452 DHEW North Building, Washington, D. C. 20201.

Various spare parts, test equipment and accessories, valued at approximately 1.5 million dollars, will also become available. Each acquiring activity must fund for packing, crating, shipping and/or desired repairs. The total systems have a security classification of "CONFIDENTIAL", however, removal of the gyros and velocity meters from the stable platform, downgrades the balance of the system to unclassified. Technical manuals, manufacturers drawings and training manuals are available, as required, thru DARO; however, they are of limited value for operation in other than missile guidance applications. A users group has been established to support both hardware modifications and software to utilize these computers in a general purpose mode. Recommend this bulletin be held for future reference as additional Minuteman "I" computers will be reported available. Department of Defense activities will be notified of availability in the Defense Excess ADP Equipment Bulletin.

GUIDANCE BODY SECTION



GENERAL DESCRIPTION:

The Guidance Body Section provides the guidance set the capability of becoming an integral part of the missile skin, when installed. This section may be removed and will have no effect upon the operation of the remainder of the guidance system if reutilized for other purposes.

A. GENERAL DESCRIPTION:

1. The stable platform is composed of a support structure, two gyros, three velocity meters, three gimbal motors, three gimbal digital resolvers, an alignment set, a pitch transformation resolver and an excitation amplifier.

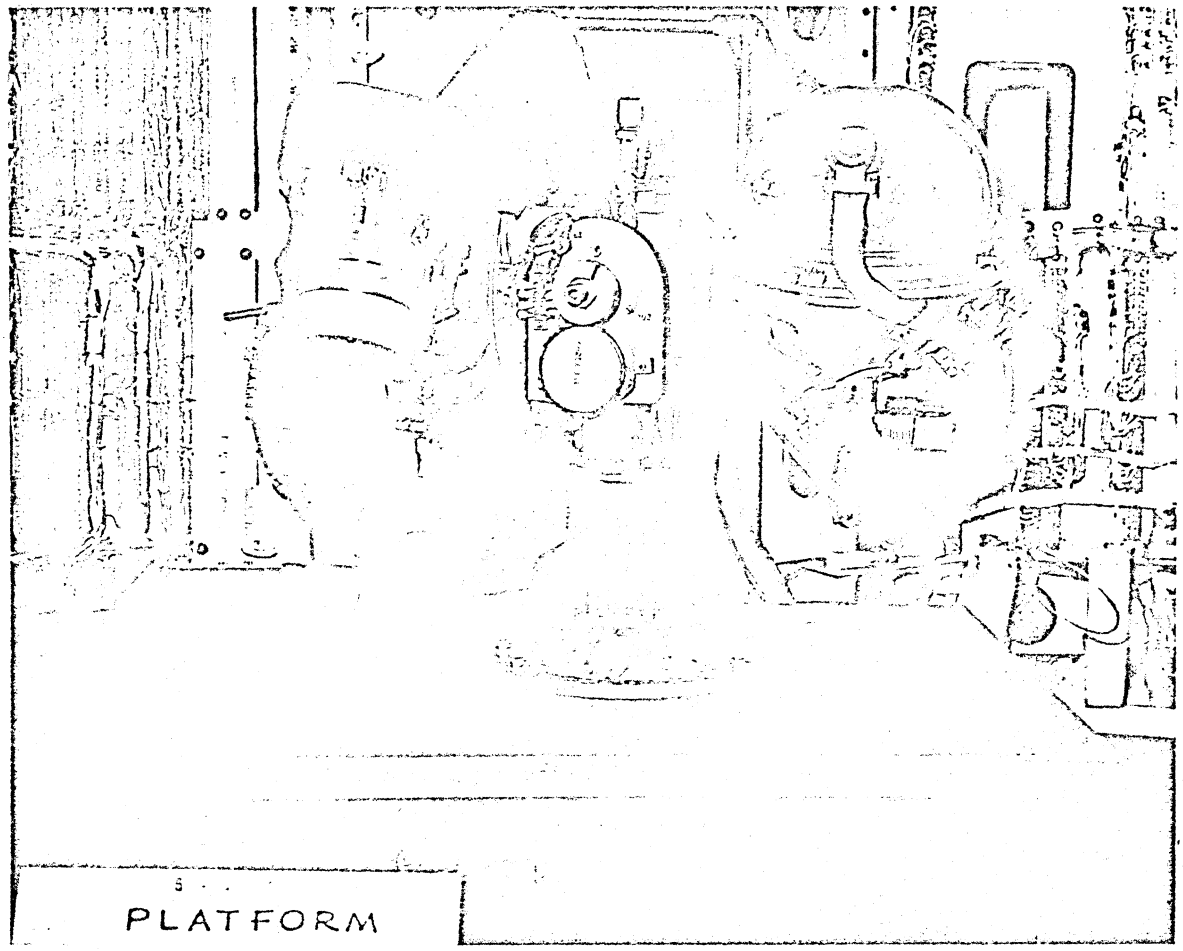
2. The stable platform has gimbal travel limits as follows:

Roll Axis	− 70 to -140 Degrees
Pitch Axis	±100 Degrees
Yaw Axis	± 20 Degrees

The platform coordinates consist of three orthogonal (right angle) axes, X, Y, and Z. The X Axis is the down range or yaw axis and the Y and Z axes are pitch and roll axes respectively. Mounted on each axis of the platform is a screw to which is fastened balancing weights. The platform can be balanced in each axis by the positioning of these weights.

3. The stable platform has three main coordinate systems; the platform coordinates, the gyro coordinates and the velocity meter coordinates. The platform is held stable by the gyros and its sole purpose is to provide a stable reference for mounting the inertial measuring instruments.

STABLE PLATFORM



SECURITY CLASSIFICATION:

The Stable Platform carries a security classification of "CONFIDENTIAL." This is due to the two gyros and the three velocity meters being classified. Only agencies having the proper security environment are eligible to receive the complete stable platform. Proof of security must be furnished at time of request.

B. FUNCTIONAL DESCRIPTION:

The NS-10Q1 Inertial Navigation System consists of a D17 computer, the associated stable platform, and power supplies. The high degree of reliability and strength was engineered into this equipment for use in the weapons system. A 28V DC regulated power supply capable of supplying 25 amperes must be provided for operation of the computer. An additional 40V DC power supply is required if the stable platform is to be operated.

The 24-bit, 2727 word memory for this serial machine is a ferrous oxide coated magnetic disc which rotates at 6,000 RPM. Computer operations are synchronized by a 345.6 KHz clock channel. The word time is 78 1/8usec. The execution time for basic instructions is one word time for either 11-bit single precision or 24-bit double precision data. Single precision multiply requires seven word times and thirteen word times are required for double precision multiply Parallel processing such as the execution of two identical single precision add, subtract, shift, or multiply instructions is possible. Simultaneous execution of a store operation is possible coincident with the initiation of operations such as add, subtract, and multiply. Eight rapid access memory loops also provide for increased speed of execution.

The D17 has special facilities for handling various types of data, but all peripheral devices and interfaces must be provided separately. Dedicated registers for I/O transfers reduce the housekeeping requirements common to many computing systems. The program and data can be read from punched paper tape at the rate of 800 5-bit characters per second or from manual keyboard entry. A total of 43 discrete input lines are under program control. Incremental input data transfers with direct access to memory from peripherals are also provided. Program controlled outputs include a 4-bit character output, a 5-bit register which controls 28 discrete output lines, 12 analog voltage outputs controlled by three 8-bit registers, and pulse type output lines.

Program security can be maintained by disabling the write heads to a portion of the memory to effect a read only memory. By enabling these write heads it is possible to perform instruction and address modification under program control. A library of typical subroutines that can serve as useful tools for many computing problems is under development.

Following is a listing of the repertoire of instructions for the D17 computer.

Numeric Code	Code	Description
00 20, s	SAL	Split accumulator left shift
00 22, s	ALS	Accumulator left shift
00 24, 2	SLL	Split left word left shift
00 26, s	SLR	Split left word right shift
00 30, s	SAR	Split accumulator right shift
00 32, s	ARS	Accumulator right shift
00 34, s	SRL	Split right word left shift
00 36, s	SRR	Split right word right shift
00 60, s	COA	Character output A
04 c, s	SCL	Split Compare and limit
10 c, s	TMI	Transfer on minus
20 c, s	SMP	Split multiply
24 c, s	MPY	Multiply
30 c, s	SMM	Split multiply modified
34 c, s	MPM	Multiply modified
40 02, s	BOC	Binary output C
40 10, s	BOA	Binary output A
40 12, s	BOB	Binary output B
40 20, s	RSD	Reset detector
40 22, s	HPR	Halt and Proceed
40 26, s	DOA	Discrete output A
40 30, s	VOA	Voltage output A
40 32, s	VOB	Voltage output B
40 34, s	VOC	Voltage output C
40 42, s	ANA	And to accumulator
40 44, s	MIM	Minus magnitude
40 46, s	COM	Complement
40 50, s	DIB	Discrete input B
40 52, s	DIA	Discrete input A
40 60, s	HFC	Halt fine countdown
40 62, s	EFC	Enter fine countdown
40 7-, s	LPR	Load phase register
44 c, s	CLA	Clear and Add
50 c, s	TRA	Transfer
54 c, s	STO	Store accumulator
60 c, s	SAD	Split add
64 c, s	ADD	Add
70 c, s	SSU	Split subtract
74 c, s	SUB	Subtract

S_i	Channel	S_i	Channel
00	No flag operation	10	E loop
02	F loop	12	L register
04	Telemetry output	14	H loop
06	Modifiable channel	16	U loop

ELECTRONIC EQUIPMENT CHASSIS

A. GENERAL DESCRIPTION:

The Electronic Equipment Chassis forms the other half of the system toroid. It contains the guidance set power supplies for the computer and stable platform, the servo control amplifiers, oscillators and converters. All required external electrical connections have plug-in features and all components are modular solid state design.

ADDITIONAL INFORMATION:

DoD activities and Defense contractors contact Defense ADPE Reutilization Office:

Director, Defense Supply Agency
ATTN: DSAH-LSR/DARO
Cameron Station
Alexandria, Virginia 22314

Telephone AC 202 - OX 46317 or AUTOVON 22-46317

All other Federal Government users and donees contact appropriate representatives listed on page 2 of this bulletin if interested in acquiring a Minuteman Computer.

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

W. L. PHILLIPS
Colonel, USAF
Executive

OFFICIAL

S. A. MacKENZIE
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Staff Director, Administration

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CHAPTER IV

ACQUISITION OF EXCESS ADPE

SECTION I

40101–Policy. All acquisition of excess ADPE from other DoD components or Federal agencies will be processed thru the DoD ADPE Reutilization Office. Transfers of ADPE between installations of a DoD component do not require processing thru DARO, however, such intra-service transfers are reportable in accordance with Paragraph 60202 of this manual.

40102–Approval of Requests for Excess ADPE. Requests for acquisition of major items of excess ADPE must be approved in accordance with individual component publications indicated in Appendix 2. Requests for acquisition of minor items of ADPE and related supplies not requiring component approval may be submitted direct to DoD ADPE Reutilization Office for processing.

40103–Contracting Officers are responsible to determine ASPR requirements for acquisition of ADPE have been satisfied before approving and forwarding requests for excess ADPE to DARO.

SECTION II

40201–Determination of Availability.

A. Holds will be placed on excess by telephone:

(1) Requiring activity. On determining that a requirement exists for excess ADPE identified in a DSA or GSA Excess ADP Equipment Bulletin, the requiring activity will:

(a) Call DARO and place a "hold" on the equipment.

(b) Confirm the "hold" in writing within 15 days if acquisition of the equipment requires approval of higher authority and action is being originated to obtain acquisition approval. If the requiring activity does not require additional approval for acquisition as in the case of minor ADP items and related equipment, the transfer document will be forwarded to DARO within 15 days. "Holds" should be canceled by phone if it is later determined the equipment is not required, or acquisition approval will not be granted. All calls, inquiries, and correspondence should reference the DoD or GSA Case Number assigned to the equipment.

(2) DARO will:

(a) Provide additional information on equipment if needed.

(b) Record the "hold," and advise the activity placing the hold if previous holds have been placed on the equipment requested. In the event an activity with an earlier hold cancels their requirement the activity with a later hold will be advised of the availability of the equipment.

(c) Keep activities placing holds on equipment advised of changes in the availability date of the equipment or withdrawals.

B. Multiple Requirements. In the event there are multiple requirements for major items of ADPE, DARO will determine the allocation of the equipment based on military urgency and savings to the Government.

40202–Requisitioning of Excess ADPE.

A. DoD Components. DD Form 1149, Requisition and Invoice/Shipping Document, will be prepared and forwarded in original and 3

equipment excessed by another DoD component or Defense contractor, see Appendix 7A for instructions on completing this Form. SF Form 122, Transfer Order Excess Personal Property, will be prepared and forwarded in original and 4 copies for equipment excess by other Federal agencies or their contractors. See Appendix 7B for instructions on completing this form.

B. Defense Contractors. DD Form 1419 will be prepared in accordance with Appendix 6, except the DoD or GSA Case Number will be inserted in Section 5–1 and Sections 46 thru 49 will be completed.

C. DARO. Upon receipt of transfer documents with necessary approval from the DoD component or contracting office, DARO will forward the approved transfer document to the holding activity and advise the requiring activity of a point of contact for final coordination of the transfer.

D. Special Action on Leased ADPE

(1) Releasing Activity. Notify the supplier in writing of the intention of the acquiring activity to further utilize the equipment. This communication will indicate the name of the acquiring activity and will state that the acquiring activity will contact the supplier. Copies of his correspondence will be furnished the requiring agency.

(2) Acquiring Activity. When the acquiring agency receives a copy of the releasing activity's notice to the supplier, the acquiring activity will contact the supplier and enter into necessary procurement (lease/purchase) agreements. Special attention should be given to the suppliers Federal Supply Schedule to ensure the acquiring activity takes advantage of the free time generally allowed while the equipment is in transit and undergoing installation.

Appendix 2

MILITARY SERVICE AND DoD AGENCY PUBLICATIONS
ESTABLISHING APPROVAL CHANNELS FOR
ACQUISITION AND REPORTING OF MAJOR ADPE ITEMS

Reporting and acquisition channels for excess ADPE and related support items:

Army - AR 18-1, Army Information and Data Systems, Objectives and Policies, 14 February 1966, as changed

AR 18-2, Army Information and Data Systems and Procedures September 1967 as changed

AR 18-4, Army Information and Data Systems, Automatic Data Processing Equipment Reutilization Screening, 8 March 1965, as changed

AR 18-7, Army Information and Data Systems, Data Processing Installation Management Procedures, and Standards, 29 September 1966 as changed

Navy- SECNAVINST 10462.7B, 11 March 1966, subject: Automatic Data Processing Program. For reutilization purposes Navy considers "Minor Items" to be support items peculiar to ADPE operations and leased PCAM. Major items include digital and analog computers, systems and components, regardless of initial use or ownership and government owned PCAM.

Air Force- AFR 300-2, subject: Objectives and Policies

AFR 300-3, subject: Management Support Data Systems

AFR 300-7, subject: Research and Development

AFM 171-9, subject: Management of Data Processing Equipment

AFM 67-1, subject: USAF Supply Manual

Defense Atomic Support Agency - DASA Circular 150-2

Defense Communications Agency - DCA Instruction 630-230-2, Automatic Data Processing, Reutilization Screening of Automatic Data Processing Equipment (ADPE) and Associated Equipment

Defense Supply Agency - Defense Supply Agency Regulation 4160.3, subject: DSA Reutilization Screening of Automatic Data Processing Equipment (ADPE)

Defense Supply Agency Manual 8130.1, subject: Plant Clearance Manual for Contract Administration Services

National Security Agency - NSA Regulation No. 110-5(C), subject: Reutilization Screening of Automatic Data Processing Equipment (U)

NSA Circular No. 60-5(C), subject: Excess SIGINT Materiel Utilization Program (U)

Defense Contractors - Armed Services Procurement Regulations (ASPR)