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INPUT/OUTPUT CONTROLLER, TYPE I (IOC-I)

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1.0 GENERAL DESCRIPTION

1.1 SCOPE

This document defines the product, functional, and operational requirements of the Input/Output Controller, Type I (IOC-I). It includes definition of the allowable payload channels and options as well as the basic IOC-I capabilities.

1.2 PRODUCT DESCRIPTION

The IOC-I is an integrated circuit I/O controller with performance and configuration capabilities similar to the IOC-C, M50EB00163.

To the extent possible the IOC-I is to be comprised of elements of the Input/Output Multiplexer design, while still meeting the requirements of this specification.

Interim control word storage (scratchpad) internal to the IOC-I will not be provided.

Common Peripheral subsystems as listed in Paragraphs 2.2.3.1 and 2.2.3.2 are the only supported peripherals. Additions to this list, if required and authorized, will be made later by Appendix to this specification.

The basic IOC-I will include one (1) H6000 System Controller port interface, and five (5) medium speed and three (3) high speed common peripheral channels.

Options to the basic IOC-I will be available as follows:

- 1) Additional H6000 System Controller port interface.
- 2) Additional three (3) high speed common peripheral channels.
- 3) Additional five (5) medium speed common peripheral channels.
- 4) Additional five (5) medium speed and three (3) high speed common peripheral channels.

A maximum of three item 1)'s can be added. A maximum of one each of items 2) and 3) or a maximum of one item 4) can be added.

The system software interface presented by the IOC-I must be such that no changes or modifications to GCOS/6000 or user slave programs are required.

1.3 APPLICABLE DOCUMENTS

Except as stated or implied to the contrary within this specification, the requirements of the below-listed documents form a part of this specification.

H6000 System EPS-1, 43A219600
IOM Central EPS-1, 43A219604
Common Peripheral Channel EPS-1, 43A219605

2.0 REQUIREMENTS

2.1 PRODUCT

The IOC-I shall present a size, visual, and operational interface compatible with the IOM and other elements of the H6000.

Except for externally visible nomenclature (doors/skins closed) the strict use of "Input/Output Controller", "IOC", or "IOC-I" functional identification is not required.

2.2 FUNCTIONAL

The primary functional task of the IOC-I is to provide the control of system input/output between the central system main memory and any configured system peripherals. It is comprised of a central logic structure, a central system main memory interface area, and a set of channels interfacing with the system peripherals.

2.2.1 Central Logic

The IOC-I central logic structure will provide functional capabilities similar or identical to those of the IOM Central, 43A219604, except that internal control word storage via scratchpad memory will not be provided.

2.2.2 Memory Interface

The IOC-I central system main memory interface will be identical to that of the IOM Central, except that physical connection to and operation with other than H6000 System Controllers is prohibited. The basic IOC-I will include one H6000 System Controller interface unit, with expansion by option to a maximum of four interface units.

2.2.3 Channels

The IOC-I will provide for connection to and operation with specific peripherals/peripheral subsystems by way of the separate high speed and medium speed common peripheral channels. The basic IOC-I will provide five (5) medium speed and three (3) high speed channels, with expansion by option to include either five (5) additional medium speed, and/or three (3) additional high speed channels.

- 2.2.3.1 The medium speed common peripheral channel will be a single-precision word indirect channel capable of a maximum data transfer rate of at least 150,000 characters per second when operating in conjunction with the IOC-I central logic. The channel must meet the H6000 requirements of 43A219605, paragraphs 2.3 thru 6.0.

The medium speed common peripheral channel can be connected to and will operate with the following:

CO8030
CO8031
PTS200
DATANET 30 (via CIU 933 G2)
CRZ201
CPZ201
PRT201

PRT300
OPT510

Note: Common Peripheral tape subsystems having data transfer rate \leq 150,000 characters per second can be configured to the medium speed channel if necessary.

2.2.3.2 The high speed common peripheral channel will be a double-precision word indirect channel capable of a maximum data transfer rate of at least 450,000 characters per second when operating in conjunction with the IOC-I central logic. The channel must meet the H6000 requirements of 43A219605.

The high speed common peripheral channel can be connected to and will operate with the following:

- MDC 201
- DSS/ADC 167
- DSS/ADC 270
- DSS 180
- DSS 170
- MTC 201/202/221/222
- MTC 301/302/321/322/330/334
- MTC 400/404
- OPT 510

Additionally, with exception of the PTS 200, the peripherals listed in Paragraph 2.2.3.1 can be configured with the high speed channel if the system peripheral configuration requires it.

2.2.4 Configuration Limits

The IOC-I can, by option, include interfaces to a maximum of four (4) H6000 System Controllers. The maximum central system main memory which it can address is 256K 36-bit words.

The IOC-I can, by option, include as many as sixteen (16) common peripheral channels (10 medium speed, 6 high speed). Provision for 34 payload channel board spaces will be made, in line with the constraints of Paragraph 1.2.

If additional channel types are later authorized for inclusion in the IOC-I, the maximum number of such channels (along with any CP channels) will be limited by the available 34 payload channel board spaces.

2.3 PERFORMANCE

The IOC-I will be capable of supporting a total data throughput of 1.6 million characters per second under the following conditions:

- 1) System Controller and Store Unit are continuously busy.
- 2) Several high speed channels are operating in pure data transfer modes simultaneously.
- 3) Data transfers in either direction (Read or Write) are equally probable.
- 4) Nominal circuit delay times are assumed.
- 5) Turn around time between \$INT and \$DA as seen at the IOM port interface (50 foot cables assumed) is \leq 1500 nanoseconds.

2.4 SOFTWARE INTERFACE

The IOC-I must present a programming interface such that the system supervisory software and user slave programs which execute on an H6000 system with an IOM and Common Peripherals only are transparently executable on the same system with an IOC-I.

To the extent that OPTS/HEALS/TOLTS and off-line T&D programs and monitors for the IOM use, test, or refer to scratchpad storage, they will be modified to remove or disable that function. Otherwise, the IOC-I is to present a programming interface which will allow their execution without change.

3.0 GENERAL DESIGN REQUIREMENTS

General design requirements for the IOC-I are as specified in Paragraph 5.0 of 43A219604.

4.0 RELIABILITY AND MAINTAINABILITY

Reliability and maintainability requirements for the IOC-I are to be as specified in paragraphs 6.0 of 43A219604 and 6.0 of 43A219605.

Date

Prepared by: R. G. Daniel
R. G. Daniel
Systems Design Engineering

3/27/72

Approved by: W. W. Castor
W. W. Castor, Director
Large Systems Product Marketing

4/12/72

C. W. Dix
C. W. Dix, Director
Engineering

3/28/72

W. M. Gaines
W. M. Gaines, Program Director
Large Systems Program Management

3/29/72

Reviewed by: G. B. Krekeler
G. B. Krekeler, Manager
Language & Data Management Systems

3/27/72

R. F. Stevens
R. F. Stevens, Manager
Operating Systems Engineering

72/3/28

R. L. Ruth
R. L. Ruth, Manager
Computer Design Engineering

3/27/72

P. F. Straka
P. F. Straka, Manager
Systems Maintainability Engineering

3/27/72

L. I. Wilkinson
L. I. Wilkinson, Manager
Systems Engineering

3/27/72

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SYSTEMS
C. T. CLINGEN, C121