



The multiply and divide options deal with both positive and negative 24 bit numbers.

The engineering form, based on the sub-board/main-board/unit hierarchy, successfully proved in MYRIAD I, is used in MYRIAD II. The basic circuits of the computer are constructed from integrated circuit, diode transistor logic similar to the MYRIAD I designs, resulting in an expected mean time between failures of not less than 2,000 hours.

Peripheral Equipment

(see page 325)

Features

High reliability with silicon micrologic modules and diode transistor logic.

High-speed operation—
add, less than 3 μ s.
multiply, less than 28 μ s.

Expandable storage to 32,768 words, directly addressable.

True multi-level priority interrupts, high-way connection system to external peripherals, multiply and divide orders, and store protection available as options.

Sophisticated programming aids User Code, Algol, Fortran and Coral compilers. Basic software generated for MYRIAD I available for use on this machine.

Data summary

Type: Parallel fixed-point single address.

Word length: 24 bits.

Representation: Binary.

Number range: $-1 \geq +1$.

Storage:

Coincident-current ferrite core stores.

(1) 4,096 word block.

(2) 16,384 word block.

Providing 4,096, 8,192, 16,384, 20,480 and 32,768 word storage capacity.

Cycle time: 1.5 μ s. Store protection facility available as option.

Input/Output: Common input and output highways.

Interrupt: Up to 8 levels of external interrupt with priority. Each level capable of being multiplexed to 24 or more sub-levels.

Data transfers in 6.5 μ s.

Order speeds: Add, Fetch, etc, less than 3 μ s. Multiply, less than 28 μ s.

Function code: Includes Fetch, Add, Subtract, Store, Exchange, Collate, Not Equivalent, Complement, 7 jump actions, 6 shift actions, 4 link actions.

Modifiers: 3 are available and form part of the instruction word, they are: modify with contents of B register, modify with contents of instruction counter and modify with address of instruction.

Instruction format:

Store address 15 bits.

Function code 6 bits.

Modifier digits 2 bits.

Stop digit 1 bit.

Power supplies:

230V \pm 10%–20%.

Single phase 45–65Hz.

1500–2500W.

Dimensions:

Computer

Height 165cm (5ft 5 $\frac{1}{4}$ in.)

Width 115cm (3ft 10in.)

Depth 38cm (15 $\frac{1}{4}$ in.)

Control Desk

Height 76cm (2ft 6in.)

Width 152cm (5ft)

Depth 76cm (2ft 6in.)

Environment:

Forced-air cooling: 10°C to 45°C, relative humidity: 90%.

Software:

User Code compiler.

Algol compiler.

Fortran compiler with segmentation facilities.

Coral compiler.

Sub-routine library.

Test routines.

Full details are given in TDL4001

'Myriad III' Digital Computer System

The MYRIAD III system is the latest extension in the MYRIAD range of computers. It is very compact and constructed in a totally modular form which provides flexibility of application, simple installation and ease of expansion. Any programs written for MYRIAD II can be run on a MYRIAD III system of similar peripheral configuration. The input/output interface is similar to that of MYRIADS I and II.

A MYRIAD III computer system works in parallel binary fixed point with single address operation. It has a word length of 24 bits with facilities for double-length working and extensive input/output capability. Storage capacity is up to 262,144 words by a paging system in 16,384 word units. One 16,384 word unit is always associated with the Central Processor (Page '0'). A second

unit is 'paged' by program instruction so that the machine behaves as a 32,768 word machine, but has access to 262,144 words.

The machine consists of a number of modular units. These include:

Central Processing Unit.

16K 1.8 μ sec Store Unit.

16K 0.7 μ sec Store Unit.

Power Unit for C.P.U.

Power Unit for 1.8 μ sec Store Unit.

Power Unit for 0.7 μ sec Store Unit.

Operators Control Unit.

Programmers/Engineers Control Unit.

Store Extension Unit.

Highway Extension Unit.

Two types of store unit are available. Both are 16,384 \times 24 bit word modules but one has a cycle of 1.8 μ sec and the other has a cycle time of 0.7 μ secs.

Because the store timing is controlled from within the store unit and the machine as a whole is asynchronous, it is possible to mix the two types of store unit in a machine configuration so that the cheaper unit can be used to store information which is not critically time-dependant, and so minimise the system costs.

A Master Peripheral Unit designed to accept standard control modules, accommodates the input/output control circuits for the immediate peripheral devices such as the paper tape reader, paper tape punch, teletypewriter, line printer, Watchdog Timer, Real Time Clock, etc. Because any standard module can be plugged into any position, complete flexibility of system design with the minimum of effort is obtained. One of the standard modules is the



Input/Output Extension Module which, in the larger systems, is the link between the main peripheral highway and the Central Processor.

Each unit making up the computer system is engineered to fit into a standard 19-in. rack, but if rack mounting is inconvenient the units can be distributed to make the most efficient use of the space available. This is a particularly important feature in mobile applications.

Because the input/output interface is compatible with MYRIAD I and II, all the peripheral devices that have so far been interfaced with MYRIADS can also be used with MYRIAD III.

Features

Modular unit construction.

High reliability from the use of integrated circuit technology throughout based on Transistor Transistor Logic in Dual-in-Line Packages (D.I.Ps).

Storage up to 262,144 × 24 bit words.

Peripheral device data transfers take place along a single set of cables which form a highway system. More than one highway may be connected to the central processor.

Over 4000 peripheral addresses available.

Eight priority levels of interrupt in hardware. Each level may be multiplexed as many ways as required.

Sophisticated programming facilities include User Code, Algol 60, Fortran, Mini-Coral. Basic software generated for MYRIAD I and II compatible with MYRIAD III.

'Myriad' Peripheral Equipment

All MYRIAD real-time control systems are built up from a comprehensive range of peripheral units, from major items such as a Disc or Display System to small 'building bricks' which can be engineered to give any required configuration of input/output interrupt and addressing. Wherever possible integrated circuits are used on these boards.

The following are some of the major units available at the present time, new peripherals are, however, continually being added to the list.

Disc Store

The MYRIAD Disc Controller (see page 329) allows up to eight CDC9460 replaceable disc stores to be connected to the highway. Each disc store has a maximum capacity of 7.25 million bytes (over 2 million MYRIAD words). Variable block length working, seek overlap and parity checking are features of this design.

X2000 Data Displays

Full graphic and alphanumeric capability on this new range of c.r.t displays and an entirely new Laminar Beam cathode ray tube give higher definition pictures than previously available. A range of units enables widely different system capabilities to be provided, for instance with or without buffer storage, software or hardware character generation, vector and circle generators. Touch Wire, Light Pen or Tracker Ball input devices are available (see pages 328 and 329).

Line Printer

The SF400 line printer which operates at 300 lines per minute gives up to 136 columns.

Graph Plotter

Computer Instrumentation models 341 and 361 incremental graph plotters may be included in MYRIAD systems.

Typewriters

Teletype ASR33 or 35, Friden Flexo-writers, or IBM 73 typewriters are available.

Paper Tape Punch and Reader

Facit tape reader (1000 chars/sec) and tape punch (150 chars/sec) are available. A powered tape dispenser is available for use with the reader.

Magnetic Tape Systems

Ampex 7 or 9 track, 36 or 75in/sec, 800 b.p.i tape stations may be used in MYRIAD systems. Four stations can be controlled from one Tape Controller.

Digital and Analogue Inputs

To accommodate the special inputs required in all real-time systems the following units are available.

Highway Connection Units: To tap the highway and provide an internal highway at logic levels within a cabinet, the highway connection unit is required.

Input/output Register: contains a 12 bit register together with a standard address circuit.

Interrupt Gate: contains 6 channels each capable of handling one interrupt signal.

Interrupt Generator (Clock): contains an oscillator and 3 stage counter to provide interrupts into the computer at preset intervals.

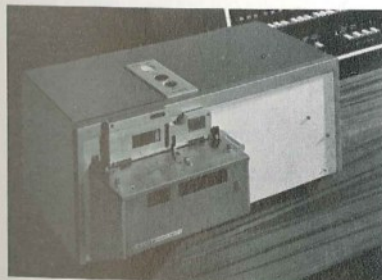
Counter Register: provides 5 stages of counter, may also be used as a shift register.

Watchdog Timer: detects failure of the computer.

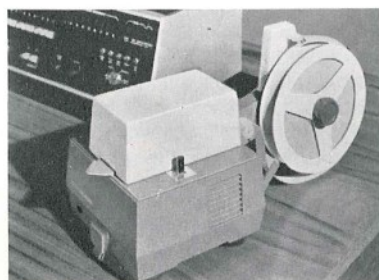
Power Drive: contains 36 power drive circuits to drive lamps, relays, etc.

Transfer Control Unit: used for transferring data from one MYRIAD computer to another.

Contract Input Gate: used to gate signals into the computer when received over long lines.



Paper Tape Reader



Paper Tape Punch