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ICL 2900 Series

2980
2976
2970
2960
with
VME/B
Communications Excellence
Your Future System will be required to serve large numbers of people operating at many different locations.

The 2900 Series provides
an efficient, totally protected communications environment through virtual machine processing
simple implementation of transaction processing systems through High Level Languages and the shareability of all code
fast interrupt handling due to the use of a hardware-driven stack
software and hardware designed with an inherent ability to handle communications systems naturally
a wide range of communications equipment

Evolutionary Data Management
Your Future System must provide flexible methods of handling large amounts of business information.

The 2900 Series
ensures effective data handling by incorporating the basic data management functions within the fundamental system architecture
enables the user to implement complex information systems easily through the independence of programs and files
allows the user to grow from simple to complex information systems without the need for reprogramming

Ease of Implementation
Your Future System must combat the problem of rising people-costs.

The 2900 Series
is a High Level Language machine allowing the user to implement and test all his applications in these languages
provides a natural System Control Language making the system easy to use
enables simple systems to be developed with minimal effort by using an integrated Data Management Utilities System
offers modular application software to meet a wide range of user requirements

Workload Versatility
Your Future System will need to offer a wide range of services to satisfy your organisation’s total information processing requirements.
The 2900 Series provides
operating software which supports multiple transaction processing, multi-access and batch services, simultaneously
virtual machine processing, ensuring a secure environment for all users and enabling the various services to be handled efficiently
both hardware and software which can be tailored so as to match an organisation’s particular needs

Hardware and Software Resilience
Your Future System will be at the heart of your organisation. It must therefore provide a reliable service.

The 2900 Series provides
hardware which has been built using advanced, proven technology
error detection and containment, inherent in the system architecture
structured hardware which can be reconfigured so as to isolate faulty units
a unique engineering approach to software ensuring improved levels of reliability
layered software implementation enabling errors to be contained and system software protected

More Usable Power
Your Future System will need to be powerful, but it must not dissipate this power in managing its own activities.

The 2900 Series provides
hardware and software designed together as part of a single range architecture to support user needs
greater system throughput by dispersing intelligence throughout the hardware structure
operating software that has been built to maximise total work throughput
a reduction in system software administration by means of hardware-assisted procedure calling

Application Continuity
Your Future System must protect the users’ investment in current applications while ensuring the continuity needed for those new applications which will be implemented during the coming decade.

The 2900 Series
protects your investment in peripherals and terminals through their range-independence
provides application continuity through a comprehensive set of transition aids
protects your future investment in applications through a totally open-ended design. Changes both to technology and hardware devices can be made without invalidating the user’s investment
Store Multiple Access Control cabinet showing multi-layer platters and engineers’ control panel.
Section

1

Powerful, structured hardware

The 2900 Series hardware offers the user a powerful method of satisfying his future computer needs. In particular it provides:

- Advanced, proven technology
- High-speed processing through the use of slaving and pipelining techniques
- Very high data throughput using dispersed intelligence
- Natural multi-processor systems
- Total resilience capability
- Specialist intelligent peripheral controllers
- New and expanded set of peripherals

A structured approach to hardware

The 2900 Series has taken to its logical conclusion the structured approach to hardware design towards which previous ICL systems have progressed.

The system is entirely modular with each module performing a particular specialist function autonomously and therefore in parallel with other modules.

The 2960, 2970, 2976 and 2980 processor systems consist of a number of modules including:

- **Order code processors**
  These execute program instructions at high speed and are concerned with arithmetic, logical functions and data manipulation.

- **Store access controls**
  These are autonomous units satisfying all the main store access requirements of the peripheral controllers. The order code processor is thus freed from this activity.

- **Main store units**
  2900 Series main store uses semiconductor technology providing high-speed access and improved reliability. Main store highways are several bytes wide providing exceptionally fast data throughput.

All main store units are independent and can be accessed simultaneously via Store Multiple Access Controls (SMACs).

This structured approach to hardware design provides the 2900 Series with:
- High efficiency, since each module is now performing a specialised function;
- Very powerful systems, through the natural ability to provide multi-processor systems;
- Systems that can be tailored more to the specific needs of the user, either in the area of processing power or data throughput;
- Extensive growth potential in economic stages through the addition of extra modules;
- The ability to incorporate new techniques and technologies with complete forward compatibility so as to provide the user with new and improved levels of performance and reliability.

Advanced, proven technology

The 2900 Series uses a development of the proven advanced circuit and matched interconnection technology currently in use on the larger ICL 1900 and System 4 ranges of computers.

The circuit technology used is ICL 1000 and Schottky TTL. This provides the advantages of:
- Higher circuit speeds;
- Less power consumption;
- Lower heat dissipation.

Thus the 2900 Series can provide the user with more processing power than current range systems within the same physical environment.

The matched interconnection platter technology, in which ICL leads the world, has been further developed on the 2900 Series.

The 2970, 2976 and 2980 use up to 20-layer platters, and the 2980 uses up to 17, each supporting...
macro circuit boards. This technique ensures that the circuits operate at their optimum performance and allows more power to be packed into a smaller space.

The 2900 Series has been designed and built using the advanced computer aided design techniques developed by ICL. Some of the most significant aspects of the technology have arisen from using this approach.

This highly automated design system ensures that the design is accurately progressed through the implementation phase and, by automatically generating circuit testing procedures, ensures that the final product performs to its specification.

**Advanced processing techniques**

The 2980, 2970, 2976 and 2980 order code processors derive their considerable power from the use of two advanced processing techniques:

- **Pipelining**
- **Slave Stores**

**Pipelining**

Pipelining is a development of the technique of instruction overlap, currently in use on the largest 1900 processors, and allows the execution of several instructions simultaneously.

Each computer instruction is broken down into a number of logically separate operations, and the hardware logic of the order code processor is divided into corresponding sections. In this way it is possible, by the use of hardware interlocks, to process several instructions simultaneously, each instruction being at a different stage of execution.

**Slave stores**

The use of slave stores on the 2900 Series ensures that the pipeline is provided with high-speed access to the instructions and operands that it requires.

These new specialised slave stores, when compared with the traditional general purpose cache memories, considerably improve the access time to operands. This is possible because of the ability to predict the location of the next operands required, due to the concentration of activity provided by the 2900 Series' use of stack processing.

**New levels of hardware availability**

The 2900 Series has been built to set new standards in reliability through its use of proven, advanced technology. In addition, the hardware incorporates a wide range of features to deal with errors that may occur, either through human mistakes or hardware malfunction. These include:

- Internal hardware self-correction
- Reconfiguration

**Hardware self-correction**

The 2900 Series hardware incorporates extensive features for error detection and correction to minimise the effects of any failure.

In the main store modules, the SMAC performs Hamming-type checks in order to correct single-bit errors and to detect the majority of multiple-bit errors.

The Store Access Control (SAC) carries out comprehensive parity checks not only on all data received from trunk links or the main store but also on all addresses and control information.