EXHIBIT 4

Computer Dictionary

and

Handbook

by
Charles J. Sippl
and
Roger J. Sippl

Howard W. Sams & Co., Inc.
4300 WEST 62ND ST. INDIANAPOLIS, INDIANA 46268 USA

THIRD EDITION
FIRST PRINTING—1980

International Standard Book Number: 0-672-21632-9
Library of Congress Catalog Card Number: 79-67133

Printed in the United States of America.

Prefa

Because personal computers are now c
hours of training, more and more systems
nesses. As a result, they are reaching users
use of computers. These users, especially
need to learn exactly what the move to m
search for answers, they are perplexed b
industry, and they discover that they m
computer language. They must study anc
it is becoming very unbusinesslike, and
what is a 64K RAM, a semiconductor, or

When the first computer is installed in
and managers of the business apprehens
office and administrative personnel are sus
changes that take place. Management mu
and knowledgeable approach to explaini
they must know something about the "my

Filling the need for this information is
tion to the definitions of terms, of equa
serve as a "state-of-the-art" guide section
essential elements of computer concepts
to time.

This is a "browsing" dictionary. It is a
be brief. Many definitions and explanatio
so. Users of this book can easily and leisu
supplemental entries of an "area," such
detail about the products, procedures, p
tions. While we have included many def
the art of programming, the basics of ele
components of systems, we have limited t
them as clear and "unconfusing" as the l
product manuals, applications notes, in
descriptions, seminar notes, and conferenc

cards, start-stop times are checked by clock notations, completions are developed by recording dials at inquiry stations throughout plants.

transaction tape — A paper or magnetic tape carrying information that is to be used to up-date filed information. This filed information is often on a master tape.

transceiver — A terminal device that can both transmit and receive signals.

transceiver, card — A device that transmits and receives data from a punched card to a punched card. It is essentially a conversion device which at the sending end reads the card and transmits the data over the wire. At the receiving end it punches the data into a card.

transcribe — To copy, with or without translating, from one external storage medium to another.

transcriber — The equipment associated with a computer for the purpose of transferring the input or output data from a record of information in a given language to the computer medium and language, or from a computer to a record of information.

transcription — Conversion of data from one language, medium, or code to another. Includes the reading, translating, and recording (writing) operations.

transcription break — A flowchart symbol or device that shows the relationship between two files. The symbol is directional and suggests the flow of information from one file to the file that is affected by the information. The operation symbol should be on the history lines of the file that is affected.

transducer — A device that converts energy from one form to another; e.g., a quartz crystal imbedded in mercury can change electrical energy to sound energy as is done in sonic delay lines in computer-storage systems.

transducer, incremental — A rotary or linear feedback device with discrete on-off pulses. All pulses are the same, and there is always the same number of signals per unit length or per revolution. Direction is determined by special logic circuits.

transducers, analog/digital — Analog transducers output either voltages or currents. Digital transducers fall into two basic categories. Some incorporate a sensing unit as part of an oscillator

circuit and determine the frequency of that circuit as a function of the measured quantity. Others detect the position of a primary sensor and convert that quantity into a coded digital word.

transducer, syntax — A subroutine which recognizes the phase class in an artificial language, normally expressed in Backus normal form.

transducer translating device — A device for converting error of the controlled member of a servomechanism into an electrical signal that can be used in correcting the error.

transfer — 1. To change control by means of an instruction or signal that specifies the location of the next instruction and directs the computer to that instruction; to jump. A transfer is used to alter the normal sequence control of the computer. 2. To copy, exchange, read, record, store, transmit, transport, or write data. 3. To terminate one sequence of instructions and begin another sequence.

transfer, average data, rate — *See* data transfer rate, average.

transfer, block — The conveyance of a group of consecutive words from one place to another.

transfer check — A check on the accuracy of a data transfer.

transfer circuit — A circuit which connects communication centers of two or more separate networks in order to transfer the traffic between the networks.

transfer command — A particular order or instruction which changes control from one part of the program to another part by indicating a remote instruction.

transfer, conditional — *See* branch, conditional.

transfer control, unconditional — *Same as* branch, unconditional.

transfer function — A mathematical expression or expressions that describe(s) the relationship between physical conditions at two different points in time or space in a given system, and also describes the role played by the intervening time or space.

transfer instruction — *Same as* branch instruction.

transfer instruction, conditional — *See* branch, conditional.

transfer instruction, unconditional — *See* branch, unconditional.

transfer medium — The material which enables the transfer of ink during printing, i.e., sheets, ribbons, plastic film.

transfer of control — *Same as* branch.

transfer operation — An operation that moves information from one storage location or one storage medium to another, e.g., read, record, copy, transmit, or exchange. Transfer is sometimes taken to refer specifically to movement between different storage media.

transfer, parallel — In a parallel transfer, all the bits stored in one string of flip-flops are transferred simultaneously to another string, using one wire (or a pair of wires) for each flip-flop.

transfer peak — *See* data transfer rate.

transfer, peripheral — A procedure or process for transferring data between two units of peripheral or auxiliary equipment.

transfer, radial — A procedure or process for transferring data between peripheral equipment and the internal memory of the machine.

transfer rate, character — The speed at which data may be read from or written to the unit, exclusive of seek or latency delays.

transfer rate, data — The speed at which data may be read from or written to the device, from the lowest to the highest speed and density available.

transfer rate, instantaneous — *See* data transfer rate.

transfer rate, maximum — The maximum number of binary digits per second which can be accommodated on the channel. For a duplex channel (input-/output) the transfer rate is usually shown for one direction only.

transfer rate, system — A measure of how fast data can be read from or written into the storage medium. Often this is qualified further by specifying a burst transfer rate and an average transfer rate. The burst rate is the actual speed during reading or writing. The average rate is measured for a long transfer of several thousand bytes. It is usually less than the burst rate because of the gaps between blocks of data or time spent searching for the next block of data.

transfers, automatic-word — An instruction that uses the data-break facility to allow concurrent information processing and data acquisition during block transfers.