Olivetti OH 5400, OH 5480, OH 5490, and OH 6480 Series

MANAGEMENT SUMMARY

In June 1982, Olivetti Computers S.p.A. was merged into its parent company Ing. C. Olivetti & Co. S.p.A. Olivetti is Europe's largest indigenous office automation and computer manufacturer, and in 1984 made net profits of 237.2 billion Lire, representing a 69 percent increase on 1983 profits. Turnover in 1984 amounted to 2,552.5 billion Lire.

Olivetti markets the OH 5400 Series, OH 5480 Series, OH 5490 Series, and OH 6480 Series mainframes, a group of IBM plug-compatible processors that are manufactured by Hitachi. The range of compatibility of the OH 5400 models falls between the IBM 4341 and IBM 3083. The OH 5480 singleprocessors are compatible with the IBM 4381 and 3083, and the OH 5480/8MB and OH 5480/10MP dual processor systems are compatible with the IBM 3081. The uniprocessor OH 5490 models, the 5490/7, 5490/9, and 5490/11, are compatible with IBM 3083 processors, while the dual processor 5490/9MP and 5490/11MP are compatible with the 3081. The OH 6480/300 and 6480/600 are compatible with the IBM 3090 Models 200 and 400 respectively.

The four CPUs of the Olivetti mainframes are fully compatible and can operate under the following IBM System Control Programs: DOS/VSE, MVS/SP, and VM/SP. In addition, a wide variety of microcoded features and assists have been designed to enhance the performance of the System Control Programs. The modular design of the machine enables users to choose a wide selection of memory and channel configurations within each model.

The **OH 5400 Series**, which consists of four models: the OH 5430, OH 5440, OH 5450, and OH 5460, can accommodate medium users in the areas of business, data base/data communications, interactive and scientific applications. Each of the four models can be upgraded on-site without involving substitutions of equipment or disruption of service to users. ▷

Olivetti's OH 5400, 5480, 5490, and 6480 Series are plug-compatible systems and are manufactured by Hitachi.

MODELS: OH 5400 Series—5430, 5440, 5450, and 5460; OH 5480 Series—5480/4Z, 5480/4V, 5480/4, 5480/6, 5480/8, 5480/10, 5480/8MP, and 5480/10MP; OH 5490 Series—5490/7, 5490/9, 5490/11, 5490/9MP, and 5490/11MP; OH 6480 Series—6480/300, and 6480/600.
CONFIGURATIONS: OH 5400 Series—8M to 16M bytes of main memory, attachment of up to 12 channels; OH 5480 Series—16M to 128M bytes of main memory, attachment of up to 24 channels; OH 5490 Series—8M to 64M bytes of main memory, attachment of up to 48 channels; OH 6480 Series—32M to 256M bytes of main memory, attachment of up to 64 channels.
COMPETITION: OH 5400 Series—IBM processors between the 4341 and 3083; OH 5480 Series—IBM 4381, 3083, 3081; OH 5490/7, 5490/9, and 5490/11 (uniprocessors)—IBM 3083 processors; OH 5490/9MP and 5490/11MP (multiprocessors)—IBM 3081; OH 6480 Series—IBM 3090/200 and 3090/400.

CHARACTERISTICS
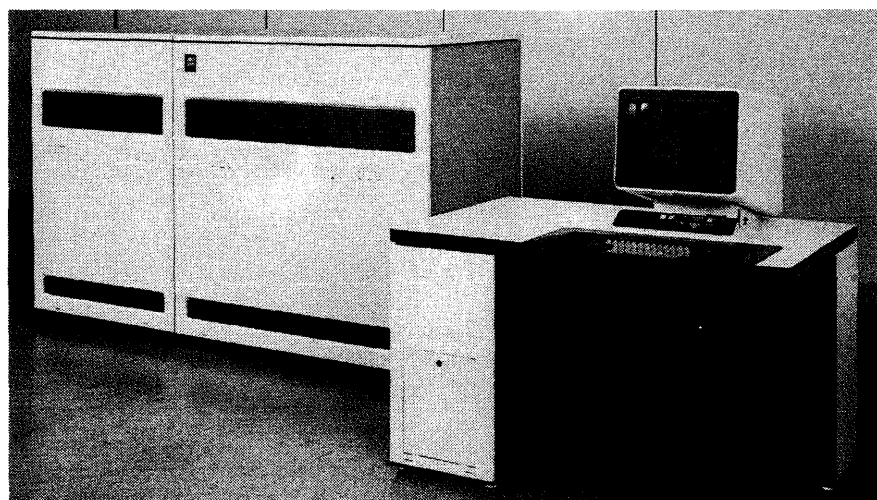
The OH 5460 system is oriented toward medium users in realtime, business and scientific applications.

Olivetti OH 5400, OH 5480, OH 5490, and OH 6480 Series

▷ Through the use of high speed VLSI circuits with densities of up to 1500 gates per chip, compact systems have been created which require less power and less space. For example, configurations of the OH 5440 (up to 16 megabytes) require only 0.96 m² of floor space.

All models within the OH 5400 Series are equipped with a minimum of 8 megabytes of main memory, expandable to 16 megabytes, and can support between 5 and 12 channels.

The **OH 5480 Series** consists of eight models: 5480/4Z, 5480/4V, 5480/4, 5480/6, 5480/8, 5480/10, 5480/8MP, and 5480/10MP. The 5480/8MP and 5480/10MP are dual processor models.

The models differ from one another in the areas of buffer (cache) size, pipeline control, and performance. The OH 5480 is a high-performance, general-purpose processor designed for large-scale on-line processing for business and scientific applications. According to Olivetti, high performance and the improvement of reliability and maintenance have been achieved through advanced logic design and newly developed hardware technology. Future needs of users can be accommodated through the expandability of the system.

Configurations for the OH 5480 Series are as follows: on the single processor systems, the 5480/4Z, 5480/4V, 5480/4, 5480/6, 5480/8, and 5480/10, maximum main memory is 64 megabytes, and the maximum number of channels that can be attached is 24. The 5480/8MP and 5480/10MP dyadic processors can support up to 128 megabytes of main memory and 24 channels in each processor. Model 10 is additionally equipped with 256 kilobytes of buffer store. Models 6 and 8 are equipped with a buffer store of 64 kilobytes, while Models 4Z, 4V, and 4 all have 32 kilobytes of buffer store.

The **OH 5490 Series**, which consists of Models 7, 9, and 11, is a high-performance, general-purpose processor that is appropriate for large-scale, on-line processing for business and scientific applications. The OH 5490 is a high-end successor to the OH 5560 which is no longer being marketed. Allowances have been made in the processor and through optional features for expansion of the system to meet future needs. Models 7, 9, and 11 provide Main Storage capacities of 8, 16, 24, 32, 48, and 64 megabytes. A total of 24 channels can be attached to each of the models in the 5490 Series. The 5490/9 and 5490/11 are available in dual processor configurations, termed the 5490/9MP and 5490/11MP, respectively.

High-density, high-speed LSIs used extensively throughout the major portions of the processor can accommodate a maximum of 550 gates (400 circuits) per chip. The Main Storage in a uniprocessor configuration has an 8-way interleaved structure. In an Attached Processor/Multiprocessor arrangement, Main Storage structure is 16-way interleaved.

The **OH 6480 Series**, which consists of the 6480/300 and 6480/600, are top-of-the-line systems that provide large-scale processing facilities and extensive growth paths. Each of the two models contains a number of processors for different activities, such as Instruction Processor, Input/ ▷

▶ Deutsche Olivetti GmbH, Lyoner Str. 34, 6000 Frankfurt 71. Telephone (069) 66921.

Olivetti also has subsidiaries in the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Finland, Greece, Hong Kong, Japan, Malaysia, Mexico, The Netherlands, Norway, Panama, Peru, Portugal, Puerto Rico, Singapore, South Africa, Spain, Switzerland, Uruguay, USA, and Venezuela.

MODELS: OH 5400 Series—OH 5430, OH 5450, and OH 5460, all of which are plug-compatible with IBM processors between the IBM 4341 and 3083; OH 5480 Series—Models 4Z, 4V, 4, 6, 8, and 10, all of which are compatible with the IBM 3083, and Models 8MP and 10MP which are compatible with the 3081; OH 5490 Series—Models 7, 9, and 11, of which Models 7 and 9 in a uniprocessor configuration are compatible with IBM's processors from the 3083 to 3081G. Models 9 and 11 in multiple processor configuration are compatible with the IBM 3081 and 3084; OH 6480 Series— 6480/300 and 6480/600 which are compatible with the 3090/200 and 3090/400, respectively.

OH 5400 SERIES

Central Processing Unit

The three subelements incorporated into the Central Processing Unit are the Basic Processing Unit, Storage Control Unit, and the Service Unit.

The Basic Processing Unit, the system's Central Processor, provides the functions necessary for high-speed processing and for the system's controls. It is composed of the following major elements: Instruction Unit, Execution Unit, and Reloadable Control Storage. The Instruction Unit handles instruction fetching and decoding for the Execution Unit which carries out instructions at the speed of the processor's cycle time which is 60 nanoseconds for the OH 5430 and 5440, 50 nanoseconds for the 5450, and 47 nanoseconds for the 5460.

The microcoded control programs essential to the control of systems' operation are located in Reloadable Control Storage (RCS). The RCS feature is also used during maintenance and diagnostic execution for holding designated microdiagnostic programs.

The High Speed Arithmetic feature heightens the performance of the Basic Processing Unit during the execution of scientific application programs. The Storage Control Unit regulates the access of data to and from main storage for the BPU and the High Speed Buffer. The required circuitry for interfacing and controlling access to and from the High Speed Buffer is also contained in the Storage Control Unit.

Main Storage

The Main Storage (MS) consists of high-speed monolithic 256KB N-MOS chips with a read/write cycle time of 150 nanoseconds. Data access is improved through the use of 2-way interleaving techniques and an access width of 8 bytes. System Control Programs with virtual memory capabilities of up to 16 megabytes can be supported by the OH 5400 Series. The management of virtual addresses is implemented either by the Dynamic Address Translation feature or by the microcode residing within the Reloadable Control Storage in ECPS:VSE mode.

High Speed Buffer

The High Speed Buffer consists of high-speed bipolar memory elements, an address array, and a replacement array. Each of the four models in the OH 5400 Series is equipped with a high-speed buffer capacity of 64KB.

Input/Output Channels

Two types of input/output channels are provided. The first, the Byte Multiplexer Channel, exists for the most part for ▶

▷ Output Processor, and Service Processor. Model 300 is a single processor system, while Model 600 is a dual processor system. The 6480 can support between 32 megabytes and 256 megabytes of main memory and up to 64 channels.

COMPETITIVE POSITION

The OH 5430, OH 5440, OH 5450, and OH 5460 compete with IBM processors within the range of the 4341 and 3083, as well as with comparable models from other plug-compatible vendors.

The OH 5480/4Z, 5480/4V, 5480/4, OH 5480/6, OH 5480/8 and 5480/10 compete with the IBM 3083, as well as with comparable models from other plug-compatible vendors. The OH 5480/8MP and 5480/10MP multiprocessor configurations compete with the IBM 3081.

The OH 5490/7, OH 5490/9 and OH 5490/11 in a uniprocessor configuration compete with IBM 3083 processors. In multiple processor configurations, the OH 5490/9 and 5490/11 compete with the IBM 3081.

The OH 6480/300 and OH 6480/600 compete with IBM's most recent large processor systems, the 3090 Model 200 and Model 400. These machines were launched in February 1985.

Each of these models also competes with comparable offerings from other plug-compatible vendors.

The Olivetti OH 5400, OH 5480, OH 5490, and the OH 6480 series compete with IBM models ranging from the 4341 all the way to the IBM 3090/400. This extremely large range of machines, therefore, offers competition to IBM's entire mainframe line. Olivetti's four central processors operate under IBM System Control Programs: DOS/VSE; MVS/SP; and VM/SP and incorporate microcoded features that enhance performance of the System Control Programs. They offer a wide variety of memory and channel configurations and some of the models can be supplied as single-, dual-, and multiprocessor arrangements to even further expand the configuration possibilities. And, because they use high-speed VLSI technology, the Olivetti systems are compact requiring less space and less power. They also provide the advantage of easy upgradability between systems. Most models can be upgraded on-site without equipment substitution or disruption of service. □

▶ the attachment of slow speed peripheral devices and can operate at a speed up to 100KB per second. The second type of channel, the Block Multiplexer Channel, is designed for the attachment of fast I/O peripherals and can operate at a speed of up to 3 megabytes per second.

The basic channel configuration of one Byte Multiplexer Channel and four Block Multiplexer channels can be extended up to two Byte Multiplexer Channels and six Block Multiplexer Channels. A high throughput rate is effected by the system's aggregate data rate of 22 megabytes per second.

Peripheral devices operating in accordance with IBM channel specifications can be connected to the channels of the OH 5400 Series. IBM disk units, such as the 3370, 3375, and 3380, can be accommodated by the input/output channels.

Service Unit

Located within the CPU of the OH 5400 Series, the Service Unit consists of an independent microprocessor capable of interfacing with the Basic Processing Unit and controlling a peripheral subsystem set which consists of a video and keyboard, two floppy disks, and an optional printer. To avoid interfering with the system's operation during complex functions, the Service Unit is equipped with dedicated Reloadable Control Storage. The console service processor performs error detection and error log-out functions. For the convenience of operators and maintenance personnel, error codes are displayed on the console.

OH 5480 SERIES

Central Processing Unit

The Central Processing Unit includes the Main Storage, a Power Distribution Unit, and the Basic Processing Unit (BPU). The BPU consists of the Execution Unit, Instruction Unit, Storage Control Unit, Service Unit, and one Input/Output Processor which includes a total of 8 channels (up to 2 Byte Multiplexer Channels and up to 8 Block Multiplexer Channels).

Main Storage

For the purpose of processing requests from multiple units, the Storage Control Unit (SCU) contains data buffer registers, request and address stacks, and priority logic which dynamically manages priority among the requests. Additional functions offered by the SCU include: high-speed data transfer from main storage into buffer storage; storage protection key and compare logic; dedicated address array; and floating address facility for rearranging main storage addressing in units of 16 megabytes. The Address Translation Unit converts the logical address of a request from the Instruction Unit or the Execution Unit to a real address. Subsequently, the real address is sent to the Storage Control Unit where it is converted by the floating address facility to the physical address of the main storage module. A Storage Protection facility protects the contents of main storage from erroneous access attempts by hardware or software.

Buffer Storage

Conceptually, Buffer Storage is a copy of main storage and increases performance by raising the access speed of main storage. The user does not become involved with the similarity of the contents between buffer storage and main storage because this coincidence of contents is handled by the hardware. The capacity of Buffer Storage is 256KB, 64KB, or 32KB. The 256KB buffer storage is divided into 4096 blocks, arranged in 64 columns and 64 rows. The 64KB buffer storage is divided into 1024 blocks, arranged in 64 columns and 16 rows when the page size is 4KB, or in 32 columns and 32 rows when the page size is 2KB. The 32KB buffer storage is divided into 512 blocks, arranged in 64 columns and 8 rows when the page size is 4KB, or in 32 columns and 16 rows when the page size is 2KB.

Input/Output Channels

In the OH 5480 Series, communication between central storage and input/output devices is regulated by the Input/Output Processor (IOPX) which consists of a CH-common control and up to 8 channel I/O-interface controls (CH). The CH-common control is divided into two subcontrol units: Channel Construction Control and Channel Data Control. Byte-interleaving, direct-current block interleaving, and data streaming modes are supported by a CH. The ▶

Olivetti OH 5400, OH 5480, OH 5490, and OH 6480 Series

▶ maximum number of channels per Input/Output Processor is 8. The IOPX can support up to 8 1-Block Multiplexer Channels and up to two 2-Byte Multiplexer Channels. In a Block Multiplexer Channel data streaming mode, the maximum data transfer rate is 3.0MB.

Any channel can be configured as either a block-multiplexer channel or a byte-multiplexer channel. Up to three Input/Output processors can be configured in a single system. Both Byte and Block Multiplexer Channels are designed with 256 subchannels which support I/O operations. Each subchannel has a one-unit control word assigned to it, and the unit control words are stored into Subchannel Storage.

Service Unit

A request from the Execution Unit or from the Service Processor, with which it interfaces, activates the Service Unit. Incorporating a fault location capability, the Service Unit automatically displays on the console a reference code which indicates the nature and area of the failure. The Service Processor contains a microprogram which controls maintenance and diagnostic functions. The Stage Tracer feature traces and records the internal state of the Basic Processing Unit for use in fault analysis. Along with one or two console displays, the Service Processor provides system control functions and acts as the human interface to the processor complex.

OH 5490 SERIES

Central Processing Unit

OH 5490/7

The Central Processing Unit consists of the Main Storage, two Power Distribution Units, the Basic Processing Unit (which also contains the general arithmetic unit, floating point arithmetic unit, instruction unit, storage control unit, IOP adapter, and service unit) and the first Input/Output Processor which includes a total of 8 channels. The 5490-7 can be field-upgraded to a Model 9 Central Processing Unit by installing a Model 7-to-Model 9 BPU Upgrade.

OH 5490/9

In the OH 5490-9, the Central Processing Unit includes the Main Storage, two Power Distribution Units, the Basic Processing Unit (which also contains the general arithmetic unit, floating point arithmetic unit, instruction unit, storage control unit, IOP adapter, and service unit), and the first Input/Output Processor which includes a total of 8 channels. The OH 5490-9 can be field-upgraded to an OH 5490-11 Central Processing Unit via a Model 9-to-Model 11 BPU Upgrade.

OH 5490/9MP

This unit differs from the OH 5490 in that it is deprived of the Main Storage, IOP adapter and the first IOP. The OH 5490-9 is necessary for the configuration of a multiprocessor complex.

OH 5490/11

The Central Processing Unit of the OH 5490-11 consists of Main Storage (up to 64 megabytes), two power Distribution Units, the Basic Processing Unit (which is also composed of general arithmetic unit, floating point arithmetic unit, instruction unit, storage control unit, IOP adapter, and service unit), and the first Input/Output Processor which includes a total of 8 channels.

OH 5490/11MP

This unit differs from the OH 5490-11 in that it is deprived of the Main Storage, IOP adapter and the first IOP. The

OH 5490-11 Attached Processor is necessary for the configuration of a multiprocessor complex.

Multiprocessor (applicable to 5490/9 and 5490/11)

The OH 5490 Multiprocessor Complex offers greater internal performance than the single processor because each processor, the CPU and the Attached Processor, can concurrently execute its own instruction stream. In the Multiprocessor environment, all addresses of Main Storage are dynamically shared and accessed under a single operating system by both processors. IOPs are also shared dynamically under program control in this type of configuration. If a hardware failure within the CPU should occur, the other attached Processor can assume the management of the IOPs to return to system operation.

Main Storage

Main Storage, consisting of high-speed MOS memory chips, offers capacities ranging from 8 megabytes to 64 megabytes. Within each module are 8 banks, each with a capacity of 1 megabyte and a data depth of 8 bytes. Each bank can be accessed independently.

In Main Storage of two or more modules, the banks of the same bank number in all modules are combined to form an 8-bank organization. In a uniprocessor configuration, Main Storage makes use of 8-way interleaving, allowing 8 banks to be accessed independently of the another.

In a multiprocessor configuration, Main Storage makes use of 16-way interleaving, allowing 16 banks to be accessed independently of one another. In the 16-way interleaving arrangement, two 8-megabyte modules are set in a parallel manner to form a 16-bank organization, allowing memory capacities to range from 16 megabytes to 64 megabytes in increments of 16 megabytes.

The Storage Control Unit provides high-speed data transfer from Main Storage into Buffer Storage. This unit also offers the following functions: storage protection key and compare logic; dedicated address array; and floating point address facility.

Buffer Storage

The CPU provides Buffer Storage, which is basically a copy of Main Storage, to increase performance by accelerating the access speed of Main Storage. The similarities between the contents of Buffer Storage and Main Storage are handled by the hardware. Buffer Storage capacities can range from 64KB to 256KB.

The Address Array function of Buffer Storage enables the block address of each block of Buffer Storage to be stored in its corresponding entry of the address array. The Replacement Array function in a 64KB arrangement uses two-level hierarchy control to divide 8 blocks within the column into 4 blocks. This function also registers the least recently used block within each group as well as within the 4 groups. In a 256KB buffer storage arrangement, the Replacement Array uses three-level hierarchy control to divide 32 blocks within the column into 4 groups. It also registers the least recently used block within each group, as well as within the four 2nd level groups, and the least recently used group within the four 1st level groups.

Input/Output Channels

The first Input/Output Processor is a standard feature in the OH 5490 CPU. Up to two more IOPs can be attached to an OH 5490 CPU. ▶

The first IOP accommodates channel addresses 0 through 7; the second IOP accommodates channel addresses 8 through 15; the third IOP accommodates channel addresses 16 through 23. Six or seven Block Multiplexers are included in the CPU of an OH 5490. The following are standard features of the block multiplexers: Fast Release, Clear I/O, Channel Indirect Data Addressing, Command Retry, Limited Channel Logout, I/O Extended Logout, and Clear Channel Instruction.

A Byte Multiplexer is capable of concurrently operating a number of byte multiplexing mode input/output devices and allowing the attachment of eight control units. One or two Byte Multiplexers are included in the CPUs of the OH 5490. The following are standard features of the Byte Multiplexers: Clear I/O, Channel Indirect Data Addressing, Limited Channel Logout, I/O Extended Logout, and Clear Channel Instruction.

The Extended Channels (ECH) feature provides an additional group of 4 channels (0-1 Byte Multiplexer and 3-4 Block Multiplexers) for the second or third IOP.

Service Unit

Serving as the interface with the Console Service Processor, the Service Unit undertakes diagnostic maintenance operations. Activated by a request from the General Arithmetic Unit or the Console Service Processor, the Service Unit performs maintenance/diagnostics under the control of the Console Service Processor's microprogram. The microinstructions in the General Arithmetic Unit initiate the microprogram in the Service Unit's control storage for the performance of diagnostic operations such as scan in, scan out, and clock advance control.

The Stage Tracer, a part of the Service Unit, traces and records the internal state of the Basic Processing Unit for use in fault analysis. The initial set-up and the read-out of trace data can be effected from the Console Service Processor. The Stage Tracer accumulates the information required for the maintenance of the Basic Processing Unit hardware and information necessary for trouble-shooting in the event of a system-related failure.

Features exist for the modification of the standard United States keyboard on the Console Service Processor to British, French, German, Italian, Belgian, or Swedish layouts.

OH 6480 SERIES

Central Processing Unit

The OH 6480/300 Processor Complex includes one Instruction Processor (IP), one Storage Control (SC), one Main Storage (MS), one or two Input/Output Processors (IOP),

and one Service Processor (SVP). The OH 6480/300 can be field-upgraded to an OH 6480/600 via a Model 300-to-Model 600 upgrade. The OH 6480/600 Dyadic Processor Complex includes two IPs, one MS, one SC, one or two IOPs, and one SVP.

Instruction Processor

The IP includes one General Arithmetic Unit (GU), one Floating Point Unit (FU), the Instruction Unit (IU), and the Buffer Control Unit (BU). The BU consists of buffer storage, the Dynamic Address Translation feature (which performs address translation at high speeds), the Translation Lookaside Buffer, and associated logic. These four units can operate independently of each other. In addition, one Integrated Array Processor (IAP) for engineering/scientific configurations can be attached to the IP as an optional feature. The high performances of the IP have been achieved through the use of pipeline techniques.

Main Storage

Main storage consists of high-speed 256K-bit MOS chips. The capacity varies from 32MB to 256MB in the 6480/300, and from 64MB to 256MB in the 6840/600. Data is transferred from main storage to storage control one line (256 bytes) at a time. The storage control uses one work storage area to maximize the performance of the entire processor complex. For performance purposes, two mutually independent paths are provided between the work storage and main storage; one is for line data fetch and the other for data store operations.

Input/Output Processor (IOP)

The IOP controls 16, 24, or 32 channels. One or two IOPs can be configured, giving a maximum of 64 channels. The IOP has three levels of hierarchy: the channels; the channel control (CHC) which controls up to 16 channels; and the channel processor (CHP) which controls two CHCs in a time-shared manner. The IOP can operate either in 370 mode or in XA mode.

Service Unit

The Service Unit (SVU), in combination with the Service Processor (SVP) attached to it, performs maintenance functions. The SVU has its own Control Storage and the SVU operation is controlled by the microprogram stored in it. Maintenance functions are activated and controlled by the operation of the Service Frames on the Console; the SVU interprets the commands given through the Console and generates and sends internal orders to the processors, both IPs and IOPs, or gathers maintenance information from within the processors.

EQUIPMENT PRICES

OH 5400 SERIES	Purchase Price*	1-Year Rental*	3-Year Rental*	Annual Maint.*
CENTRAL UNITS				
OH 5430-2MB, 5CH, Console	354.144	15.174	13.281	1.715.000
OH 5430-8MB, 5CH, Console	427.257	18.306	16.023	1.871.000
OH 5440-2MB, 5CH, Console	463.053	19.840	17.365	1.865.000
OH 5440-8MB, 5CH, Console	536.166	22.972	20.107	2.021.000
OH 5450-4MB, 5CH, Console	596.333	25.547	22.470	2.273.000
OH 5460-8MB, 5CH, Console	654.976	28.060	24.400	2.482.000

*In thousand Italian Lire.

Olivetti OH 5400, OH 5480, OH 5490, and OH 6480 Series

EQUIPMENT PRICES

	Purchase Price*	1-Year Rental*	3-Year Rental*	Annual Maint.*
OPTIONAL FEATURES				
Direct Control Feature	6.854	294	257	5.000
Integrated diskette controller	20.944	897	785	74.000
1 channel byte MPX	10.662	457	400	5.000
2 channel block MPX	34.272	1.468	1.285	10.000
Add'l. frame 1	38.080	1.632	1.428	NA
Add'l. frame 2 + first CICA	21.896	938	821	42.000
Second CTCA	12.376	530	464	21.000
24 PCI position add'l.	3.998	171	150	5.000
UPGRADE KITS				
OH 5430 to OH 5440	108.909	4.666	4.084	150.000
OH 5440 to OH 5450	95.208	4.079	3.677	408.000
OH 5440 to OH 5460	127.607	5.088	4.293	461.00
OH 5450 to OH 5460	96.723	4.144	3.358	209.000

OH 5480 SERIES

	Purchase Price*	1-Year Rental*	3-Year Rental*	Annual Maint.*
CENTRAL UNITS				
OH 5480/4Z-16MB, 8CH, 1 IOP, Console	1.207.000	54.627	49.531	4.522.000
OH 5480/4V-16MB, 5CH, 1 IOP, Console	1.431.000	63.971	58.035	5.422.000
OH 5480/4-16MB, 8CH, 1 IOP, Console	1.665.000	75.485	69.065	7.674.000
OH 5480/6-16MB, 8CH, 1 IOP, Console	2.293.000	93.989	86.435	9.102.000
OH 5480/8-16MB, 8CH, 1 IOP, Console	2.800.000	113.332	103.676	10.142.000
OH 5480/8MP-32MB, 16CH, Console	4.950.000	204.000	186.620	18.255.000
OPTIONAL FEATURES				
Additional console	75.000	2.627	2.285	79.000
HSA	200.000	8.328	7.241	280.000
4 additional CHs	69.000	2.692	2.439	112.000
Second IOP with 4CHs	105.000	5.220	4.540	258.000
Third IOP with 4 CHs	180.000	6.583	5.724	258.000
CTCA	20.000	801	721	95.000
24 PCI positions add'l.	10.000	302	263	34.000
Add'l. power unit	45.000	1.458	1.278	125.000
UPGRADE KITS				
OH 5480/4Z to OH 5480/4V	224.000	9.344	8.504	900.000
OH 5480/4V to OH 5480/4	234.000	11.514	11.030	2.252.000
OH 5480/4 to OH 5480/6	628.000	18.504	17.370	1.428.000
OH 5480/16 to OH 5480/8	507.000	19.343	17.241	1.040.000
OH 5480/8 to OH 5480/8MP	2.150.000	90.668	82.944	8.113.000

OH 5490 SERIES

	Purchase Price*	1-Year Rental*	3-Year Rental*	Annual Maint.*
CENTRAL UNITS				
OH 5490/7-8MB, 8CH, 1 IOP, Console	2.569.067	101.314	91.792	8.937.000
OH 5490/9-8MB, 8CH, 1 IOP, Console	3.151.710	124.291	112.610	10.436.000
OH 5490/11-8MB, 8CH, 1 IOP, Console	3.711.347	148.453	133.600	12.236.000
OH 5490/9MP-16MB, 16CH	6.252.623	246.580	223.404	19.704.000
OH 5490/11MP-16MB, 16CH	7.050.641	278.050	251.917	22.245.000
OPTIONAL FEATURES				
4 additional CHs	68.250	2.692	2.439	112.000
Second IOP with 4CHs	197.330	7.782	7.050	257.000
Third IOP with 4 CHs	248.853	9.814	8.891	308.000
8MB main memory	199.389	8.783	8.300	392.000
CTCA	4.322	193	174	35.000
Additional CTCA	4.093	183	165	35.000
Additional power unit	7.102	288	254	25.000
UPGRADE KIT				
OH 5490/7 to OH 5490/9	582.643	22.977	20.818	1.499.000
OH 5490/9 to OH 5490/11	559.637	24.162	20.990	1.800.000
OH 5490/9 to OH 5490/9MP	2.901.524	113.506	102.486	9.268.000
OH 5490/11 to OH 5490/11MP	3.139.905	120.814	110.001	10.009.000

*In thousand Italian Lire. ∎