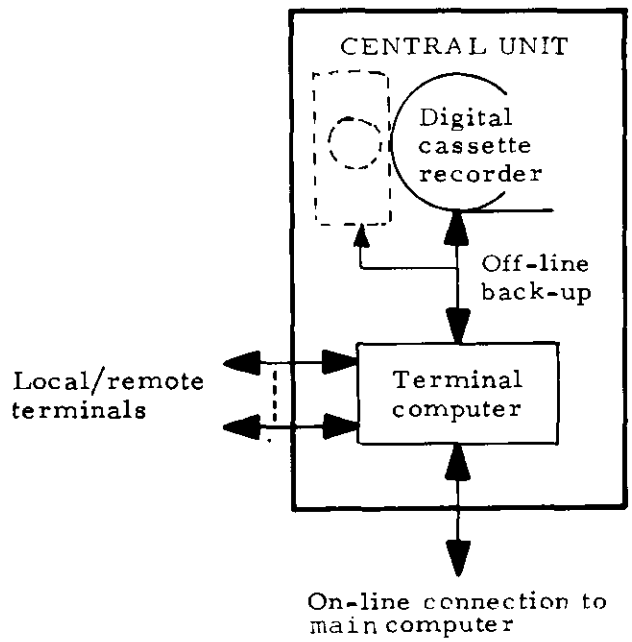
Philips Terminal Computers

The terminal computer is the nerve centre of a bank terminal system. It links together and controls the terminals. It guides the bank's staff through transaction routines and performs the transaction calculations. It also provides the communication link with the bank's main computer.

The terminal computer controls the whole terminal system by means of its program. It guides the bank staff by giving them the right commands at each stage of every transaction and by blocking, or recovering, procedural errors. Even the layout of printed information on passbooks, vouchers, tallyrolls, etc., is included in the software instructions. Code transformation and interrupt handling are, naturally, automatic.

Having been designed specifically for bank terminals, the terminal computers are application oriented: their arithmetic and store capabilities – although very important, are a minor feature compared with their suppleness and their ability to deal with a wide variety of terminals and banking procedures.



The terminal computer also forms the centre of the transmission and reception of data on-line and from the bank's main computer. It incorporates all the circuits and programming required for formatting coding and line procedure. The terminal computer can be connected in point-to-point, multidrop or loop to any main computer. BSC, Uniscope 100, ECMA-16 and many other procedures are applicable and are actually in use.

When local records of transaction data are necessary they can be accommodated on compact magnetic tape cassettes within the terminal computer. This will always be the case with off-line working, and when, for example, decentralised accounting is the rule, or when separate records are required by auditors or comptrollers. The data-recording facility also forms a standby store when working on-line. This is automatically switched in should the transmission line fail, thus ensuring that no transaction data are lost.

The terminal computers are, of course, programmable units, and an extremely important feature of the Philips PTS 6000 system is the wide range of software available. It is this which gives the Philips system much of its power and flexibility.

The software can be divided into two types – that necessary for the general running of the system and that required to generate a particular application. Under the first category is the standard bank terminal software for controlling the terminal devices and peripherals. This attends to the details of printed data layout, data channel routings, priorities, interrupts, etc. Housekeeping programs are also standard. These, for example, cater for the transfer of data from cassette to tape or disk, etc.

The second type comprises the programming tools which allow the simple, rapid build up of the specific application programs required by individual banks. These range from the relatively simple programs for transaction routines via macro assemblers up to high-level language programs which allow the most sophisticated types of banking operations to be automated.

Naturally, all the foregoing are complemented by debugging and test routines which check the terminal system operation before any real transactions are entered.

There is no banking operation which cannot be covered by existing Philips PTS 6000 system programs. For details please see the separate chapters describing the software.

Because it is the control centre of the bank terminal system, the terminal computer must be exceptionally

Philips Terminal Computers

reliable. This means not only reliable in itself – it must also safeguard information from failures of associated equipment and services. The most common types of non-system failures are transmission line breakdown and mains power loss. The Philips terminal computers cater for both. A mains power failure, or a drop below the generous minimum allowed, starts a rapid and automatic power failure sequence. The current program is interrupted and all the relevant data are stored in the core memory. As soon as power is restored, the hardware is reset, the stored data retrieved and the program resumes at the point where it was interrupted. Transmission line failure has already been mentioned – no data are ever lost. An additional problem in modern offices is static electricity – Philips terminal computers are protected against this.

The Philips PTS 6000 Bank Terminal System has many configuration possibilities and so, too, have the terminal computers themselves. Up to 16 terminals and several peripherals may be connected. Computer-sharing is a standard feature – up to 8 of the terminals may be remote, in another branch. Any number of programs can be accommodated. Memory capacity can be varied from 16k to 64k bytes. Standard plug-in units handle all the processing necessary for telephone line transmission and reception of data.

The terminal computers handle day-to-day bank transactions with ease – savings, credit transfers, giro clearance, loans are the most common. But the Philips PTS 6000 system is intended for every type of bank operation and, to maximise its flexibility and scope the terminal computers also allow the use of powerful peripherals to master all banking operations. Local administration of customers' files are accommodated with the disk unit; bulk printing, e.g. giro output, can be performed with the line printer; the cost of telephone line transmission is reduced by transferring data from cassette via the magnetic tape unit or by the concentrator which can channel up to 10 input lines into one output. These, and similar application developments are easily executed. The Philips PTS 6000 system provides standard hardware and software for any application required by a customer.

The terminal computers fit easily into normal bank offices. They are compact (about the size of a normal dish washer), work from normal – even fairly erratic – mains supplies and require no air conditioning. Interconnections with the terminals are by simple cables which require no special ducting or shielding.

They are easy to operate. All that is needed is to switch them on, and from time to time, insert a fresh data storage cassette or to change a program cassette – less complicated than operating a domestic cassette recorder. The memories are non-volatile, so that the terminal computer and the whole bank terminal system is ready to operate as soon as it is switched on or as soon as power is restored after a mains failure.

The capacity, flexibility and adaptability of the terminal computer hardware and software in the Philips PTS 6000 system permit the maximum freedom for the build-up of the bank terminal system most suited for any particular bank application.

Philips Terminal Computers

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When local records of transaction data are necessary they can be accommodated on flexible disk or compact magnetic tape cassettes within the terminal computer. This will always be the case with off-line working, and when, for example, decentralised accounting is the rule, or when separate records are required by auditors or controllers. The data-recording facility also forms a standby store when working on-line. This is automatically switched in should the transmission line fail, thus ensuring that no transaction data are lost.

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The Philips PTS 6000 Bank Terminal System has many configuration possibilities and so, too, have the terminal computers themselves. A number of terminals can be connected locally as well as remotely, in another branch.

Any number of programs can be accommodated. Memory capacity can be varied from 64k to 256k bytes. Standard plug-in units handle all the processing necessary for telephone line transmission and reception of data.

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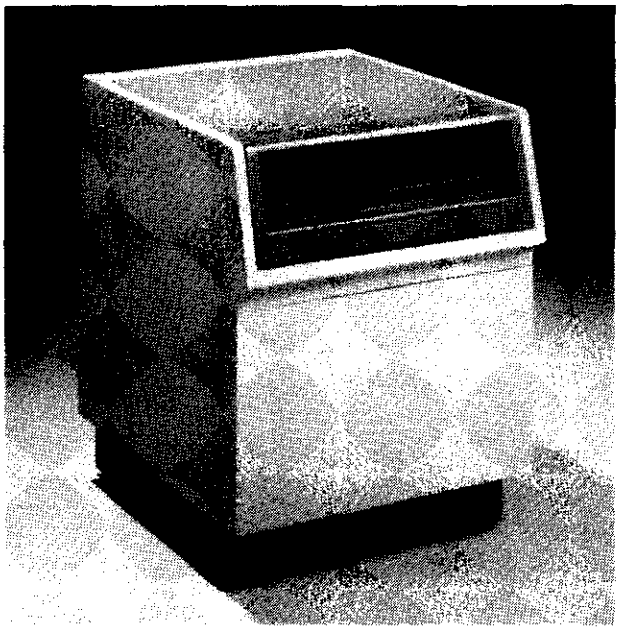
Philips PTS 6805 Terminal Computer



INTRODUCTION AND APPLICATION

The Philips PTS 6805 Terminal Computer is used for control and preprocessing of data in financial systems. It controls all the functional modules of any PTS 6000 terminal. A terminal may be a teller station, a back-office station or a customer operated terminal. This compact computer is designed to work in an office environment. It is very easy to install, and, furthermore, it is highly insensible to static electricity and protected against disruptions to the supply.

The Philips PTS 6805 TC uses flexible disc for program load and as back-up medium. The flexible disc also has the potential for program overlay and limited file handling.

PTS 6805 TC can be used in both off-line and on-line systems. In an off-line system the flexible disc drive, which is housed in the terminal computer cabinet, is used to store all the transaction data. The flexible disc can later on be sent to the EDP centre for processing.

In an on-line system the flexible disc is used as a back-up facility, in case the on-line transmission is interrupted. A terminal computer which is normally used off-line can be converted for on-line operation by the simple addition of a plug-in channel unit for line control and with the addition of the appropriate software.

Each Philips PTS 6805 Terminal Computer can perform up to six terminal stations. Of these, up to four may be remote terminals situated in another branch office(s) and connected to the terminal computer via modems and telephone lines.

PRODUCT DESCRIPTION

The terminal computer Philips PTS 6805 consists basically of:

- a processor, called CPU
- a memory
- channel units

All these units are built into a cabinet, which also provides the power supply and the operator's panel. Apart from the terminal computer itself this cabinet houses 1 or 2 flexible disc drives.

The PTS 6805 Terminal Computer operates with 16-bit parallel words and the processing is controlled by means of 100 basic instructions. The Central Processing Unit, CPU, and a Bootstrap ROM are located on one printed circuit board. The memory is a semiconductor RAM with a capacity of 32K, 16-bit words.

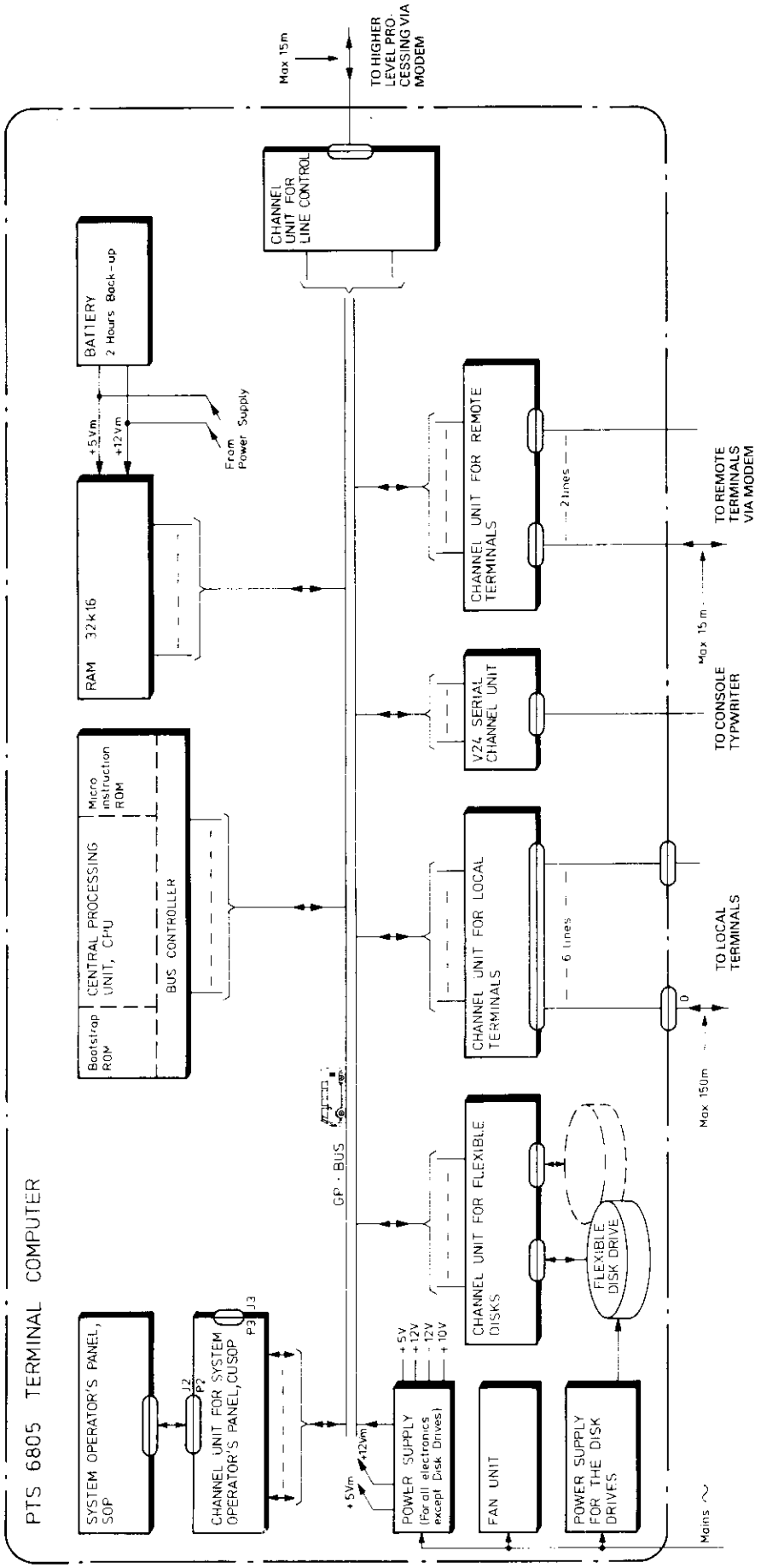
In case of power failure the battery back-up automatically takes over the power distribution to the memory.

A bus system interconnects CPU and memory with the channel units for:

- **System Operator's Panel,** SOP: used for manual control and supervision of flexible disc operations.
- **Flexible Disc:** used for program loading and program overlays as well as back-up, data files or data interchange medium.
- **Terminals** (work stations): up to six local terminals can be connected via a Channel Unit for Local Terminals (CULT) and a maxium of two remote channels can be connected via a Channel Unit for Remote Terminals (CURT). Each of the remote channels can handle two terminals provided that the remote site is equipped with a Transfer Unit.
- **Line control:** the channel unit is available in two versions for different communication procedures, one for HDLC-procedures (CULC/HDLC) and one for BSC-procedures (CULC/BSC).
- **Console Typewriter**

Philips PTS 6805 Terminal Computer

System architecture



Philips PTS 6805 Terminal Computer

Central processing unit (CPU)

The central processing unit of the Philips PTS 6805 computer is a minicomputer, mounted on one single board.

The main features of the architecture of the computer are strongly related to the generalized bidirectional asynchronous I/O-bus, General Purpose bus, GP bus.

Some vital characteristics are:

- CPU timing is independent of memory timing.
- Bus cabling.
- The CPU timing is independent of the channel unit timing.

The architecture of the Central Processing Unit is based on a microprogram store which contains the information to control a series of CPU sequences during the execution of an instruction. The internal and external data path of the computer is 16 bits.

General data

- 16 bits, parallel
- 15 general purpose registers + P register
- General purpose bus 'S'
- 64 I/O-addresses
- 100 basic instructions
- 16 hardware interrupt levels
- Addressing modes: direct, indirect, indexed, indexed indirect
- Up to 256 external registers
- Power failure/Automatic Restart
- Real Time clock
- Automatic IPL-loader (ROM Bootstrap)
- 32 K 16 direct addressable
- Diagnostic Program

Interrupt and stacking system

The interrupt system is used for all peripheral operations and for handling internally generated interrupts. The system will handle up to 64 interrupt levels, 16 accessible from the channel units. Interrupts are handled according to their priority, which is established by pre-wiring on the back panel; the priority interrupt request is accepted and compared with the priority level of the running program. If the priority level of the interrupt is higher than that of the running program, the program is interrupted, if an enable instruction has been given, and the P-register contents (the address of the next program instruction) and the program status word (containing the priority level and information) are stored in a memory stack. A new program is then started by the interrupt and this program runs until stopped by a higher priority interrupt or until it is completed.

A hardware routine is started by the program interrupt signal after the current program instruction is completed. During this routine the P-register contents and the program status word are stacked and the stack pointer (scratch pad register 15) is decremented to point to the next free location in the stack. The 6-bit number from the priority encoder, which is the priority level of the new program register, is loaded into the priority register. This number is also used to select a location in memory which contains the starting address of the new program. The illustration shows, in a simplified form, the operation of the interrupt and stacking system.

The new program started by the interrupt will normally contain routines to save the contents of registers for the old program and may also include an instruction to enable the interrupt system to accept new interrupts requests.

Return to the interrupted program is initiated by a return instruction (RTN) to take the program status word and program address from the stack. The priority level of the program, contained in the status word, is loaded into the priority register and the program address is loaded into the P-register. The program then resumes and continues until completed or until interrupted by a new interrupt signal.

The bus concept

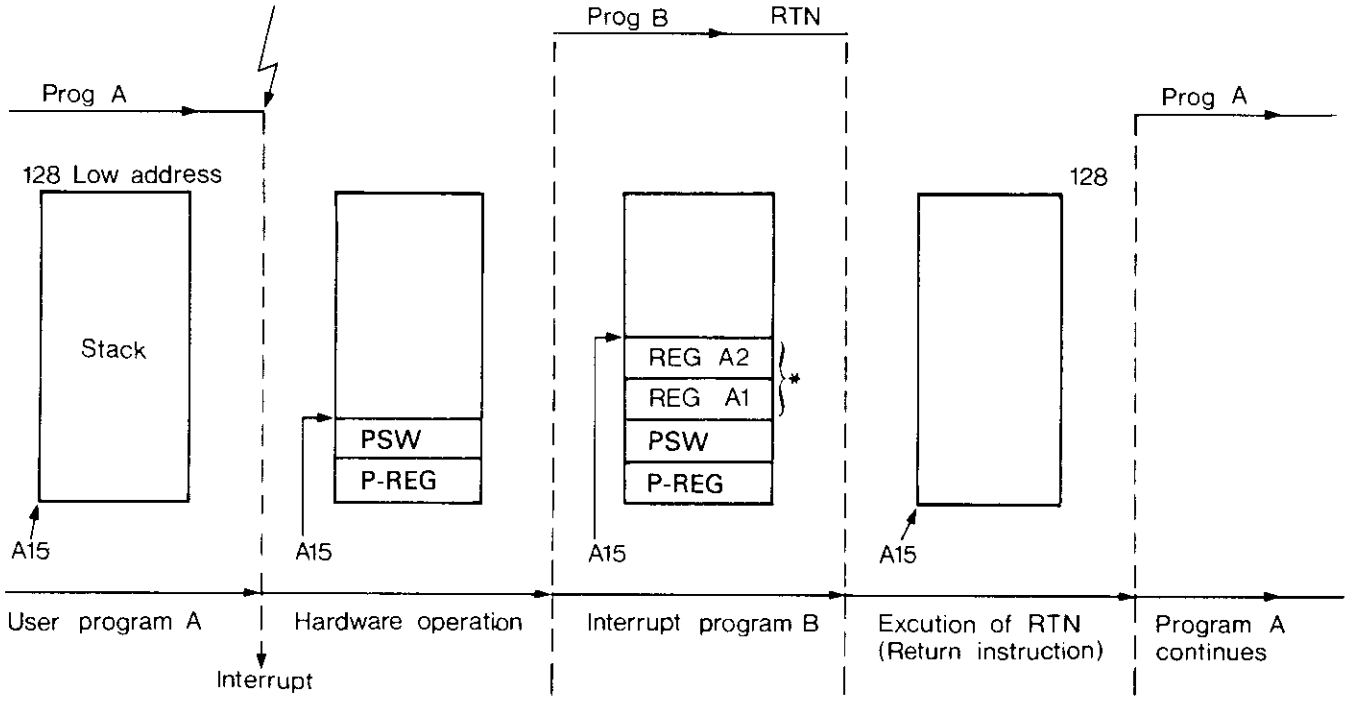
The Philips PTS 6805 Terminal Computer is built up according to the bus concept. Devices which are connected to the bus are divided into master and slaves. The master is:

- CPU

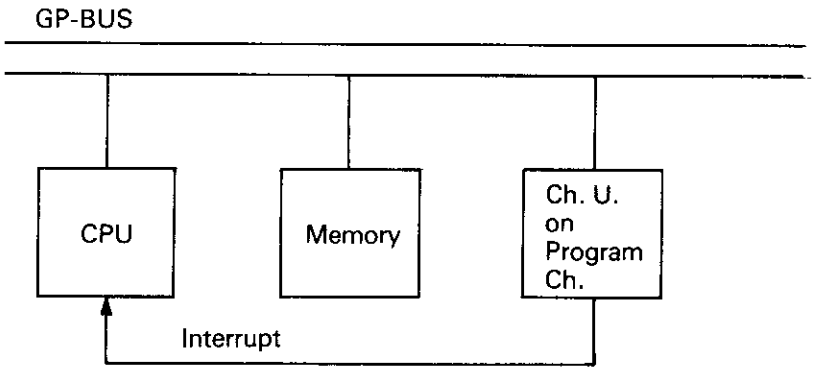
The slaves are:

- Memory Modules
- Program Channel Units

Philips PTS 6805 Terminal Computer



Operation of the interrupt and stacking system



The bus concept

Philips PTS 6805 Terminal Computer

General purpose registers

Register 0:	A 15-bit register (called P-register) used as an instruction counter to contain the address of the next program instruction to be executed.
Registers 1 to 14:	Fourteen 16-bit general purpose registers which can be used as accumulators (to contain the intermediate results of computation), an address or index registers or as I/O registers.
Register 15:	A 16-bit register used as a stack pointer for the interrupt system.

Power failure/automatic restart

This feature provides the means of detecting a power failure and automatically restarting a program, without loss of information.

If the AC power fails or drops below the minimum level of error-free operation, an interrupt is generated after 5 milliseconds. Power for another 2 ms is stored in the power supply. During this time all information relevant to the current program is stored by software in the memory.

The program is automatically restarted when the power is returned, i.e. all the hardware is reset, the stored information is retrieved and the interrupted program is resumed.

Real Time Clock (RTC)

The real time clock gives an interrupt each time a timing signal is received. This signal comes from the interval timer which is tied to the power supply; one RTC-pulse for each 20 ms at 50 Hz and for each 16.67 ms at 60 Hz.

Microdiagnostics

A microprogrammed diagnostic routine, which permits very easy and rapid testing of the main system components, is provided.

Bootstrap

By operating the IPL switch on the SOP (System Operator's Panel), the bootstrap, which is contained in a ROM package is automatically loaded into the memory and then executed. By the bootstrap, loading of the IPL-program from flexible disc is possible. The ROM package is located on the CPU card.

Memory

The memory of the Philips PTS 6805 TC is a semiconductor RAM memory. The memory size is 32 K $_{16}$. The time for a complete read/write cycle is 0.75 μs. The memory board is inserted in a reserved slot in the computer rack.

The semiconductor memory will in case of power failure be supported with power from a battery keeping the memory contents for about two hours. Together with the power failure/automatic restart facility of the CPU, it ensures an immediate restart after a power break without loss of data.

Channel units

The channel units are the interfaces between the processing unit of the terminal computer and the connected devices. The channel units are mounted in dedicated slots in the computer rack.

In the Philips PTS 6805 Terminal Computer system channel units are available for connection

- of a system operator's panel
- of flexible discs
- of local or remote working stations
- to a network
- of a console typewriter

Channel Unit for the System Operator's Panel (CUSOP)

The Channel Unit for the System Operator's Panel is the communication link between the CPU and the System Operator's panel (SOP) which is always included in the Philips PTS 6805 terminal computer.

On this channel unit are located:

- logic for interfacing the SOP to the CPU via the GP-bus
- a relay control for ON and OFF switching of the flexible disc power supply
- three lamps for testing the system (indicates the result of the microdiagnostic test)
- a switch for selecting Normal or Test function

Channel Unit for Flexible Disc (CUFD)

The Channel Unit for Flexible Disc (CUFD) is the communication link between the CPU and one or two flexible disc drives.

Philips PTS 6805 Terminal Computer

Channel Unit for Local Terminals (CULT)

The Channel Unit for Local Terminals (CULT) is the communication link between the CPU and the local terminals. The CULT can handle up to six locally connected terminals, where each terminal is a fully equipped working place with a selector unit. Each selector unit is connected to the CULT through its own line, up to 150 m long (star network). The line is a three pair shielded cable. The procedure is fully controlled by the CULT. Transmission of data is in full duplex and the bit rate is 73 kHz.

The character rate is (approximately):

Number of connected terminals	Character rate
4	285 ch/s
6	190 ch/s

The number of connected lines is selected by means of a strap on the CULT.

Channel Unit for Remote Terminals (CURT)

The Channel Unit for Remote Terminals (CURT) is the communication link between the CPU and the remote terminals.

Up to two remote lines can be connected to this channel unit and one or two fully equipped terminals can be connected to each line. When two terminals share one line they have to be placed on the same office and are connected to the same modem equipment through a Transfer Unit, TFU.

The line procedure is a full duplex procedure, 4-wire connection completely controlled by the channel unit. The channel outputs are connected to modems at a transfer rate of 1200 or 2400 baud. Character rates are given in Tables 1 and 2.

At the terminal end the modem can be connected directly to a selector unit, SUMR, (Selector unit for Remote Terminals) or to a TFU (Transfer Unit) to which one or two SUMRs can be connected. If the modem is not equipped with a line-test switch a TFU must be used also in the case of one SUMR.

Table 1.
Characters rates, single character procedure

1200 bauds	2400 bauds
41 ch/s	70 ch/s

In order to achieve high efficiency on transferring a large amount of information to a device, e.g. a CRT display unit, a block transmission feature is included in addition to the single character transmission normally used. In block transmission the characterwise acknowledgement is suppressed which permits a significantly higher characterrate.

In the block transmission mode an LRC check is always performed. An LRC generator in the Selector Unit is checked by the program after each terminated transmission and gives information about any VRC/LRC errors that may occur.

The LRC check feature can be utilized in single character transmission too.

Table 2.
Character rates, block transmission

Block length	1200 bauds	2400 bauds
8 characters	55 ch/s	90 ch/s
32 characters	65 ch/s	120 ch/s

Channel Unit for Line Control (CULC)

The Channel Unit for Line Control is the communication link between the CPU and the line.

Two different channel units are available, one for HDLC and one for BSC procedures.

The CULC/HDLC supports the hardware features of the High Level Data Link Control protocol. The transmission system is designed under CCITT recommendations (V24, V28).

The CULC/BSC is either an asynchronous or a synchronous line control unit working in half or full duplex mode. The choice between asynchronous and synchronous mode is made by means of a strap on the channel unit.

The CULC/BSC is provided with a V24 interface permitting connection of different kinds of modems.

Both the channel units for line control can be used on general switched network for point to point connection or with leased (or private) lines in point to point or multipoint network.

Channel Unit for Console Typewriter (CUCTW)

The Channel Unit for Console Typewriter is the communication link between the CPU and a console typewriter. It is a V24 serial control unit and allows connection of a Philips PTS 6862 Console Typewriter or a teletype.

Philips PTS 6805 Terminal Computer

Modules of the terminal computer

All the modules of the terminal computer are housed in a computer cabinet. This is a free standing unit containing:

- a computer rack with
  - — 13 slots for the electronic boards (CPU, memory and channel units)
  - — a power supply for all the electronics in the computer rack
  - — a battery as power back-up for the semiconductor memory in case of power failure
- a system operator's panel
- one or two flexible disc drives and power supply for these

The physical location of the modules inside the cabinet is shown in the illustration (front view). The operator's panel and the front covers are in this illustration removed to expose the computer rack.

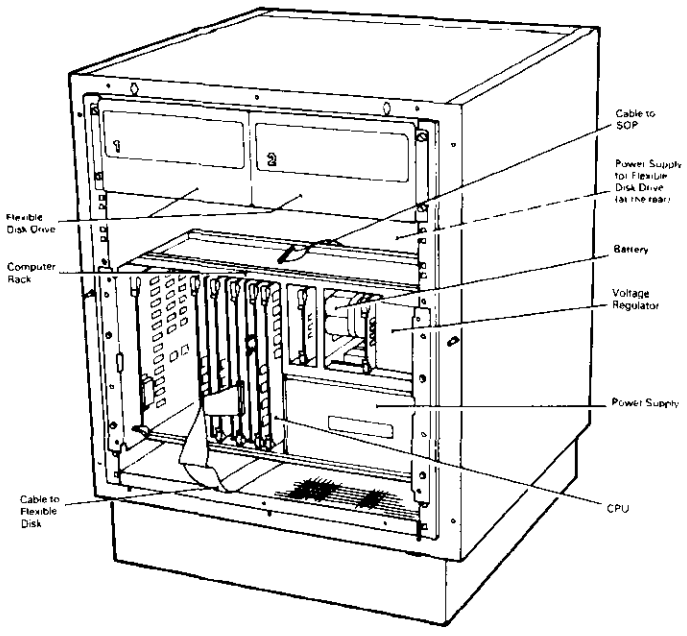
The flexible discs, the operator's panel, the electronic boards, the battery and the power supply for the electronics are accessible from the front. Cables and connectors and the power supply for the flexible disc drives are accessible from the rear. The front and the rear are covered with easy removable plates.

The connector panel (at the rear) allows connections of

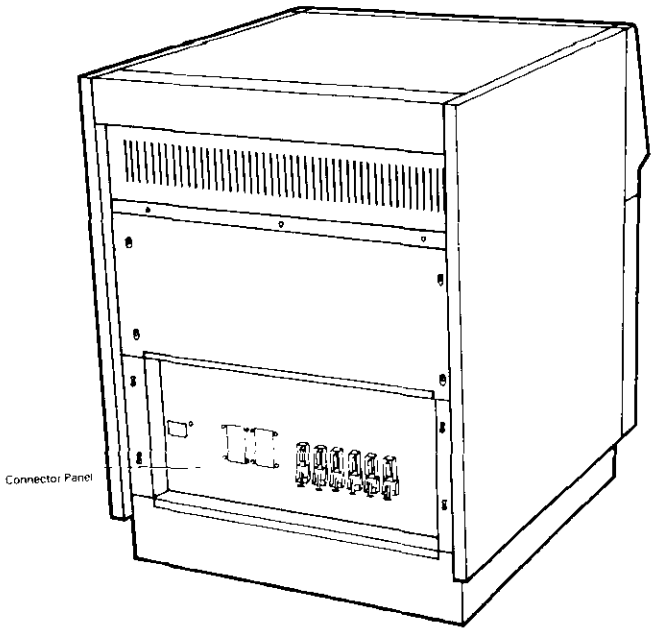
- — six local lines
- — two remote lines
- — one line to public or private network
- — one line to a console typewriter

Computer rack

The computer rack has 13 slots which permits the insertion of 13 printed circuit boards (electronic boards). The electronic boards (CPU, memory and channel units) are built on double-size "Eurocards" of the plug-in type. Each unit (electronic board) has been given a dedicated slot in the computer rack because of the hardwired interrupt (break) system.

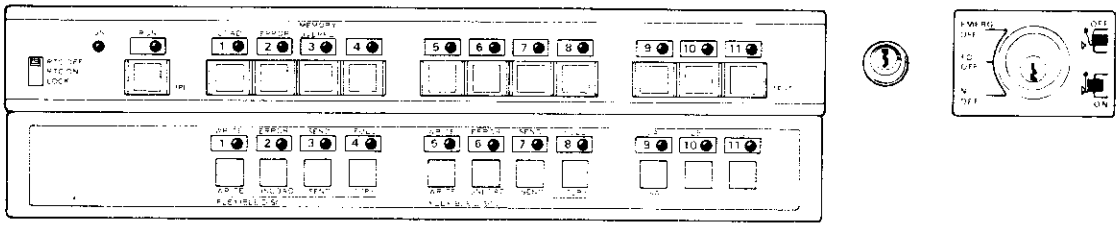


PTS 6805 front view



PTS 6805 rear view

Philips PTS 6805 Terminal Computer



Layout of System Operator's Panel

System Operator's Panel (SOP)

A System Operator's Panel (SOP) is always connected to the computer.

The panel is mounted at the front, and is easily accessed by the operator when the front shelf (the SOP cover flap) is opened.

Via the SOP, the system operator can obtain access to the computer program and gets a visual output from the CPU. The SOP is controlled by the channel unit for system operators panel. The SOP is also used to load the IPL-program.

The SOP has thirteen red indicators of LED-type. The first one indicates power on and the second indicate RUN-status. The remaining eleven indicators are under software control and mainly used for displaying different program status to the operator.

Ten push button switches are available for program and system control. The functions can be defined by the application as the switches are fully software controlled. One switch is for indicator test only.

The slide switch and one push button switch are used for loading of the bootstrap program. Another switch initiates loading of the IPL-program and further programs. The slide switch has three positions:
LOCK, RTC ON, RTC OFF (RTC = Real Time Clock).

The "bootstrap" switch is disabled when the slide switch is in the LOCK position. The real time clock is used for time out and supervisory functions.

The RTC selector governs the operation of the SOP and the functions of the three positions are shown in the following table.

	LOCK	RTC ON	RTC OFF
The system is able to run	Yes	Yes	Yes
The Real Time Clock is	enabled	enabled	inhibited
IPL switch operation	inhibited	enabled	enabled
SOP interrupt switches operation	enabled	enabled	enabled

The text on the System Operator's Panel covers the program loading phase. For guidance in the operational phase a separate sign is provided placed inside the SOP cover flap. This sign is exchangeable and the text can be adapted to special requirements.

Power Supply

There are two power supply units in PTS 6805 TC; one provides power to the flexible disc drives and the other one provides power for all the electronics in the computer rack.

Both the power supply units and the fan unit are connected to mains via a transformer, which is switchable for the following mains voltages: 100V, 110V, 115V, 127V, 200V, 220V, 230V and 240V, 50 or 60 Hz.

The output from the transformer is 220V, which is direct distributed to the power supply for the computer rack but via a relay to the power supply for the flexible disc drives. This relay is controlled by software, allowing the program to put ON/OFF the power for the flexible discs.

The relay function is selected by means of the key-operated mains switch, position FDD OFF, on the System Operator's Panel.

The location of the mains switch is shown in the illustration.

The terminal computer is put ON and OFF by means of the key, which controls the central section of the key knob. The key can be removed in both on- and off position. The outer section of this key knob, which is not key-controlled, has three settings:

- ON
- FDD OFF
- SERVICE/EMERGENCY

The normal position at day-time is position "ON". The position SERVICE/EMERGENCY is only used when service is performed, to ensure that the memory is power supplied from the battery.

Philips PTS 6805 Terminal Computer

The power supply unit for the computer rack is designed with switching technique. This unit also provides the CPU with power failure and restart signals, which are used by the CPU to start up power failure and restart sequences. A Real Time Clock with a period according to the main cycle time is also provided.

Flexible Disc

The Philips PTS 6805 Terminal Computer houses one or two flexible disc drives, one as standard and the second unit as option.

The flexible disc is used for program loading and as back-up medium. It also has the potential for program overlay and limited file handling.

The flexible disc can be used as a medium for data interchange between different systems. On the physical level the flexible disc is compatible to IBM 3740. On the logical level two different labelling systems are available, IBM- and TOSS-labelled discs.

The IBM-label should be chosen when the flexible disc is used as a medium for data interchange especially to and from systems others than PTS, and the TOSS-label when the disc is to be used only within PTS 6000 systems.

Program loading is only available from a TOSS-formated disc.

Performance:	
Capacity, unformatted:	3.2 Mbit
Capacity, formatted:	250 Kbytes
Rotating speed:	360 rev/min
Packing density, outer track:	1836 BPI
Packing density, inner track:	3268 BPI
Track density:	48 tracks/inch
No. of tracks:	77
Sector per track:	26
Sector length:	128 bytes
Head positioning time:	10 x n + 10 ms (n = No. of tracks)
Latency time:	83.3 ms
Average positioning time:	260 ms
Cartridge:	ISO/TC97/SC11 (e.g. IBM diskette)
Transfer rate:	250 K bit/sec

STANDARD/OPTIONS/ADAPTATIONS

The standard version of the Philips PTS 6805 Terminal Computer includes

- CPU
- $32K_{16}$ memory
- System Operator's Panel incl channel unit
- 1 Flexible Disc Drive incl channel unit
- Channel Unit for Local Terminals (for connection of six local lines)

Options

- 2nd Flexible Disc Drive
- Channel Unit for Line Control for HDLC or BSC procedures (two separate units)
- Channel Unit for Remote Terminals
- Channel Unit for Console Typewriter

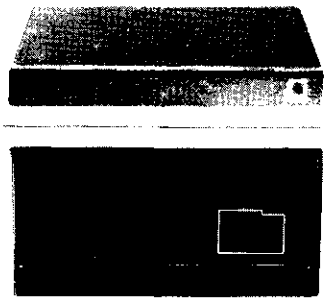
Adaptation of

- mains connection

TECHNICAL SUMMARY

Memory size	32k 16	
Cycle time	0.75 µsec.	
Number of instructions	100	
Interrupt levels	16 (64)	
Number of terminals	6 of which up to 4 may be remote	
Number of I/O addresses	64	
Registers	15 General purpose + 1 P register up to 256 external registers	
Dimensions and weight		
Depth	660 mm	
Height	700 mm	
Width	560 mm	
Weight	85 kg	
Power	100-240V, 50 or 60 Hz	
Environment	in operation	during storage
Temperature	+15 to +35°C	-40 to +70°C
Humidity	20-80%	20-90%

Philips PTS 6812 Terminal Computer



INTRODUCTION AND APPLICATION

The Philips PTS 6812 Terminal Computer is used to perform calculations on transaction information and to control all the functional modules of a Philips PTS 6000 Terminal System. Furthermore, it has the capabilities to perform dedicated applications and network operations. This compact computer is designed to work in an office environment. It is very easy to install, and, furthermore, it is unaffected by static electricity and fully protected against disruptions to the mains supply.

The Philips PTS 6812 TC uses flexible disc or magnetic tape cassette for program load and as back-up medium. The flexible disc also has the potential for program overlay and limitid file handling.

The Philips PTS 6812 TC can be used in both off-line and on-line systems. In an off-line system the flexible disc drive or the magnetic tape cassette recorder, which is housed in the terminal computer cabinet, is used to store all the transaction data. The flexible disc/cassette can later on be sent to the EDP centre for processing.

In an on-line system the disc/cassette is used as a back-up facility, in case the on-line transmission is interrupted. A terminal computer which is normally used off-line can be converted for on-line operation by the simple addition of a plug-in channel unit for line control and with the addition of the appropriate software.

The Philips PTS 6812 computer is planned for connection of up to 16 terminal stations. Of these up to 12 may be remote connected situated in another branch office(s) and connected to the terminal computer via modems and telephone lines. Normally a performance calculation has to be made to determine the maximum number of work stations that PTS 6812 TC can control in an application.

The processing unit of the computer handles the arithmetic and logic operations on submitted data, and also directs the transfer of information between different parts of the coincidenc-type ferrite core memory and the functional modules of the system. Data are processed in parallel form with a 16-bit basic word length.

All operations are controlled by the terminal computer program which can be tailored to the user's requirements. Each transaction routine is software controlled; if the terminal operator makes an error during the transaction procedure, or inadvertently tries to use the wrong procedure, an immediate warning is given to the operator and the routine is stopped until the correct procedure is carried out.

The functions of all the terminal modules are fully controlled by the terminal computer; even the layout of printed information can be incorporated within the program. And to decrease the chance of errors being made at the keyboard, those keys not required for a particular operation can be disabled.

Weighting techniques are used to supplement data stored in the registers and allow check digit verification further to reduce the risk of errors. Before information is forwarded to the central computer, it is automatically edited and arranged into a suitable format for subsequent processing.

The adaptability of the computer software, combined with a choice of memory capacity plus the range of peripherals, and the ease of converting it from off-line to on-line working, make the computer suitable for use in different types of decentralized and centralized enterprises. Its functional possibilities include local management of files, print-out of table data and network control.

PRODUCT DESCRIPTION

The terminal computer Philips PTS 6812 consists basically of:

- a processor, called CPU
- a memory
- channel units
- an input/output (multiplex) processor.

All these units are built into a cabinet, which also provides the power supply and the operator's panel. Apart from the terminal computer itself this cabinet houses 1 or 2 flexible disc drives or/and 1 or 2 digital cassette recorders.

Philips PTS 6812 Terminal Computer

Central Processing Unit (CPU)

The central processing unit of the Philips PTS 6812 computer is a minicomputer mounted on one single board.

The main features of the architecture of the computer are strongly related to the generalized bidirectional asynchronous I/O-bus, General Purpose bus, GP-bus.

Some vital characteristics are:

- CPU timing is independent of memory timing
- Possibility of using an input/output (multiplex) processor which gives high throughput rate
- Bus cabling
- The CPU timing is independent of the channel unit timing.

The architecture of the Central Processing Unit is based on a microprogram store which contains the information to control a series of CPU sequences during the execution of an instruction. The internal and external data path of the computer is 16 bits.

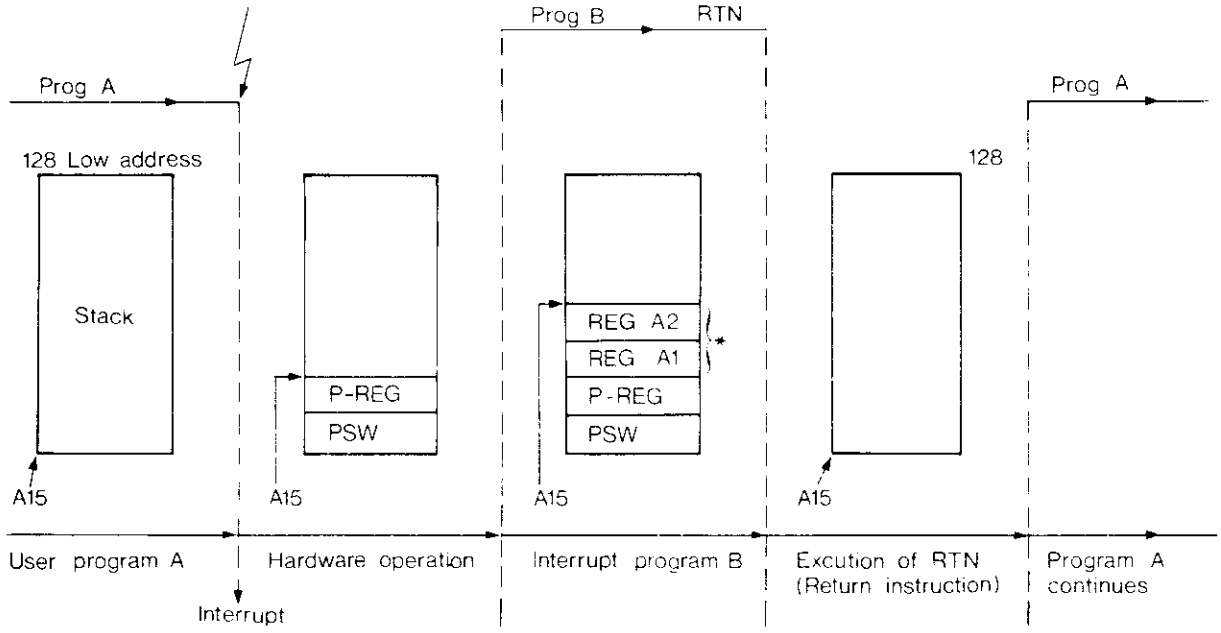
General data

16 bits, parallel transfer
15 general purpose registers + P register
64 I/O addresses
Microprogrammed
74 instructions
47 (63) interrupt levels
Addressing: direct; indirect; indexed; indexed indirect
Up to 256 external registers
Power Failure/Automatic Restart and Real Time Clock
Automatic IPL-loader
32K/16 memory direct addressable

Interrupt and stacking system

The interrupt system is used for all peripheral operations and for handling internally generated interrupts. The system will handle up to 64 interrupt levels. Interrupts are handled according to their priority, which is established by pre-wiring on the channel units; the priority interrupt request is accepted and compared with the

Philips PTS 6810 Terminal Computer



Operation of the interrupt and stacking system

Philips PTS 6812 Terminal Computer

priority level of the running program. If the priority level of the interrupt is higher than that of the running program, the program is interrupted, if an enable instruction has been given, and the P-register contents (the address of the next program instruction) and the program status word (containing the priority level and information) are stored in a memory stack. A new program is then started by the interrupt and this program runs until stopped by a higher priority interrupt or until it is completed.

A hardware routine is started by the program interrupt signal after the current program instruction is completed. During this routine the P-register contents and the program status word are stacked and the stack pointer (scratch pad register 15) is decremented to point to the next free location in the stack. The 6-bit number from the priority encoder, which is the priority level of the new program register, is loaded into the priority register. This number is also used to select a location in memory which contains the starting address of the new program. The illustration shows, in a simplified form, the operation of the interrupt and stacking system.

The new pogram started by the interrupt will normally contain routines to save the contents of registers for the old program and may also include an instruction to enable the interrupt system to accept new interrupt requests.

Return to the interrupted program is initiated by a return instruction (RTN) to take the program status word and program address from the stack. The priority level of the program, contained in the status word, is loaded into the priority register and the program address is loaded into the P-register. The program then resumes and continues until completed or until interrupted by a new interrupt signal.

The bus concept

The Philips PTS 6812 terminal computer is built up according to the bus concept. Devices which are connected to the bus are divided into masters and slaves. The types of master are:

- CPU
- Input/Output (Multiplex) Processor

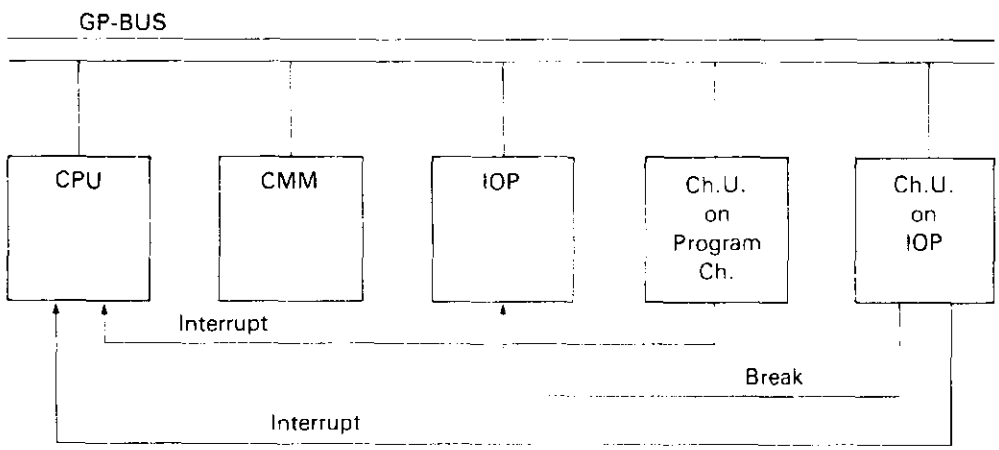
The slaves are:

- Memory Module
- Input/Output Channel Units
- Program Channel Units

The Input/Output Processor may itself be slave when it is receiving or transferring control information from the CPU.

The bus masters may acquire control of the bus by putting a request to the bus control. The bus control is a piece of logic situated in the CPU. Whenever a master requires control of the bus it sends a bus request and the bus control logic grants the bus to the master. The priority of the masters with respect to this control is a kind of daisy chain in which the actual position of the master in the chain determines its bus priority.

Once the master has control of the bus it sends a timing signal together with an address of a slave on the bus. The slave recognizes its address and sends a control signal back to the master. The master or the slave then sends the information and the master removes the control signal. After that, the control signal from the slave is removed and this is the end of the bus cycle.



The bus concept

Philips PTS 6812 Terminal Computer

General purpose registers

P-register: A 15-bit register (register 0) used as an instruction counter to contain the address of the next program instruction to be executed.

Register 1 to 14: Fourteen 16-bit general purpose registers which can be used as accumulators (to contain the intermediate results of computation), as addresses or index registers or as I/O-registers.

Register 15: A 16-bit register used as a stack pointer for the interrupt system.

Power Failure/Automatic Restart

This feature provides the means of detecting a power failure and automatically restarting a program, without loss of information.

If the AC power fails or drops below the minimum level of error-free operation an interrupt is generated after 5 milliseconds. Power for another 2 ms is stored in the power supply. During this time all information relevant to the current program is stored by software in the core memory.

The program is automatically restarted when the power is returned, i.e. all the hardware is reset, the stored information is retrieved and the interrupted program is resumed.

Real Time Clock (RTC)

The real time clock gives an interrupt each time a timing signal is received. This signal comes from the interval timer which is tied to the power supply: one RTC-pulse for each 20 ms at 50 Hz and for each 16.67 ms at 60 Hz.

Bootstrap

By operating the key switch on the SOP (System Operator's Panel), the bootstrap, which is contained in a ROM package is automatically loaded into the main core memory and then executed. By the bootstrap, loading of the IPL-program from flexible disc or magnetic tape cassette is possible. The ROM package is located on the CPU card.

Console Typewriter interface

The console typewriter interface is a standard feature which is mounted on the CPU-card. It allows connection of a Philips PTS 6862 Console Typewriter or a teletype.

Memory

The memory of the Philips PTS 6812 TC is of the core type. Together with the power failure/automatic restart facility of the CPU, it ensures an immediate restart after a power break without loss of data.

The memory consists of one 32K 16 bits module, which is inserted in a reserved slot in the CPU cabinet. The time for a complete read/write cycle is 1.2 μsec.

Channel Units

A channel unit is the interface between the processing unit of the terminal computer and the devices. Channel units can logically be mounted in any slot intended for channel units. If, however, they are used on multiplex channels or have device connectors on the bus side (e.g. CHCR) the position has to be fixed in each configuration.

Channel units are available for local or remote connection of working stations, for data communication interfaces for on-line network, and for all the supported peripherals like magnetic tape cassette recorder, flexible disc, magnetic tape, cartridge disc, line printer and card reader.

Input/Output (Multiplex) Processor (IOP)

The IOP is used for two main purposes:

- to achieve a high transfer rate between channel units and the memory
- to unload the program from I/O-transfers.

The IOP provides for the control and automatic execution of direct transfers of variable length blocks of data between channel units of peripherals and the memory. Up to eight channel units can be handled by the IOP, each having its own hardwired priority. The IOP is inserted in a reserved slot in the computer rack.

The parameters of each block to be transferred – maximum length of transfer, type of transfer (output or input), transfer mode (character or word) and starting address – are loaded by the program into registers in the IOP, corresponding to the channel unit concerned, before each transfer commences. The IOP contains 16 program addressable working registers for this purpose.

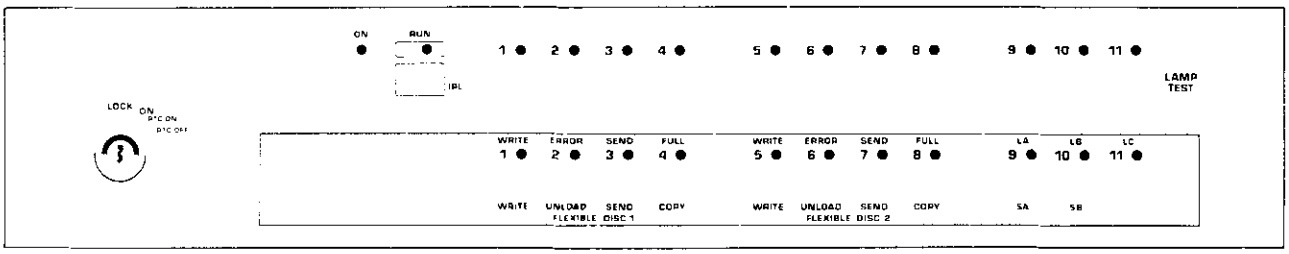
For each data transfer, the IOP occupies the bus just once and uses one single memory cycle (cycle-stealing). The transfer takes place on break request from the channel units.

The maximum transfer rate is around 600 K word/sec. In that case no time is left for normal CPU activities.

MODULES OF THE TERMINAL COMPUTER

All the modules of the terminal computer are housed in a computer cabinet. This is a free standing unit containing:

- mounting shelves for up to two flexible disc drives and two digital cassette recorders
- system operator's panel
- a power supply
- a 10 slot rack, in which the CPU, the memory unit and channel units are mounted. Each of these units is built on a printed circuit board.



Layout of System Operator's Panel with a text sign

Philips PTS 6812 Terminal Computer

The cassette recorders, the discs and the system operator's panel are accessible from the front and power supply unit and computer rack are accessible from the rear.

The front is covered by a door equipped with a unique lock. The rear is covered by an easy removable plate. All empty spaces are covered with inlet covers.

The fan unit is located at the bottom of the cabinet. It is provided with an easily exchangeable dust filter.

The cabinet is made of steel and has a colour conforming to the PTS 6000 series. The external dimensions of the cabinet are:

- Height: 995 mm
- Depth: 635 mm
- Width: 520 mm

Flexible Disc

The Philips PTS 6812 Terminal Computer houses one or two Flexible Disc Drives. They are placed in the upper part of the cabinet and connected to the CPU via the Channel Unit for Flexible Disc, Philips PTS 6848 CHFD, located in the rack compartment of the terminal computer. PTS 6848 can handle up to four daisy chained disc drives. Thus two drives inside the terminal computer cabinet and two drives in a free-standing unit, PTS 6879 FDU.

The flexible disc is used for program loading and as back-up medium. It also has the potential for program overlay and limited file handling.

The flexible disc can be used as a medium for data interchange between different systems. On the physical level the flexible disc is compatible to IBM 3740. On the logical level two different labelling systems are available, IBM- and TOSS-labelled discs.

The IBM-label should be chosen when the flexible disc is used as a medium for data interchange especially to and from systems others than PTS, and the TOSS-label when the disc is to be used only within PTS 6000 systems. Program loading is only available from a TOSS-formatted disc.

Digital Cassette Recorder

As an alternative to flexible disc the digital cassette recorder can be used for program loading and as back-up medium. The terminal computer can house one or two recorders (the Philips professional recorder) in the upper part of the cabinet, and connected to the CPU through the Channel Unit for Cassette Recorder and SOP (CHCR) located in the rack compartment of the terminal computer.

The recorder uses ECMA-34 cassettes. The tape length is 86 m and the tape width is 3.81 mm.

System Operator's Panel (SOP)

The panel is mounted at the front, and is easily accessed by the operator when the front door is opened.

Via the SOP the system operator can obtain access to the computer program and gets a visual output from the CPU. This part of the SOP is controlled by the CHCR (Channel Unit for SOP and Cassette Recorder), which must be inserted in the computer rack. The SOP is also used to load the IPL-program.

The SOP has thirteen red indicators of LED-type. The first one indicates power on and the second indicates RUN-status. The remaining eleven indicators are under software control and mainly used for displaying different program status to the operator.

Ten push button switches are available for program and system control. The functions can be defined by the application as the switches are fully software controlled. One switch is for indicator test only (LAMP TEST).

The key switch and one push-button switch are used for loading of the bootstrap program. Another switch initiates loading of the IPL-program and further programs. The key switch has three positions: LOCK, RTC ON, RTC OFF (RTC = Real Time Clock).

The RTC selector governs the operation of the SOP and the functions of the three positions are shown in the following table.

	LOCK	RTC ON	RTC OFF
The system is able to run	Yes	Yes	Yes
The Real Time Clock is	enabled	enabled	inhibited
IPL switch operation	inhibited	enabled	enabled
SOP interrupt switches operation	enabled	enabled	enabled

Below the push-button switches on the SOP there is a space to place a text sign for guidance in the operation of the SOP. The picture showing the layout of the SOP also shows an example of a text sign (a self-adhesive tape) placed in this space.

Power Supply Unit (PSU)

The power supply unit is positioned alongside the computer rack. It converts the main AC voltage into different levels of DC voltage. Overvoltage and overload protection are both provided and a thermo-switch disconnects the mains in case of overheating.

The power supply is designed with switching technique and the input voltage can be in the range of 100-127 V ± 10% or 200-240 V ± 10%, 50 or 60 Hz.

The PSU provides the CPU with a Power Failure Signal which is used by the CPU to start up power failure and restart sequences. A reset signal resets the CPU after a power failure. A Real Time Clock with a period according to the main cycle time is also provided.

Identical power supply units are used in the basic cabinet and the extension unit. The PSU provides approximately 43 A on + 5 V, which covers the powers requirements of almost any configuration.

Philips PTS 6812 Terminal Computer

Computer rack

The computer rack has 10 slots which permit the insertion of 10 printed circuit boards. Some of the slots are reserved for mandatory boards and for boards which require pre-wiring of the rack or must have special connectors in the rack, for instance

- Central Processing Unit (CPU) mandatory
- Core Memory Module (CMM) mandatory
- Channel Unit for SOP mandatory
- Input/Output Processor (IOP)

The remaining slots are shared between different channel units. For larger configurations an Extension Unit, Philips PTS 6864 EXU, is used.

STANDARD/OPTIONS/ADAPTATIONS

The standard version of the Philips PTS 6812 Terminal Computer includes

- CPU
- 32K 16 memory module
- System Operator's Panel including channel unit (CHCR)
- 1 Flexible Disc Drive including channel unit (CHFD) or 1 Digital Cassette Recorder
- 1 Channel Unit for Local Terminals

Options are

- 2nd Flexible Disc Drive or 2nd Digital Cassette Recorder
- Input Output Processor
- 2nd Channel Unit for Local Terminals
- Channel Units for Remote Terminals
- Channel Units for Line Control
- Channel Units for peripherals

Adaptation of

- mains connection

TECHNICAL SUMMARY

Memory size	32K 16
Memory module	32K 16
Cycle time	1.2 μsec
Number of instructions	74
Interrupt levels	47 (63)
Max. number of terminals	16 local and remote
Number of I/O addresses	64
Registers	15 General purpose + 1 P-register up to 256 external registers
I/O transfer rate	up to 600 000 word/sec
Dimensions and weight	
Depth	635 mm
Height	995 mm
Width	520 mm
Weight	100 kg appr.
Power	100-127 V, 200-240 V ± 10% 50 or 60 Hz ± 2%
Power consumption	Typical 500 W
Environment	in operation during storage
Temperature	+ 15 to + 35°C − 40 to + 70°C
Humidity	20 to 80% 20 to 90%

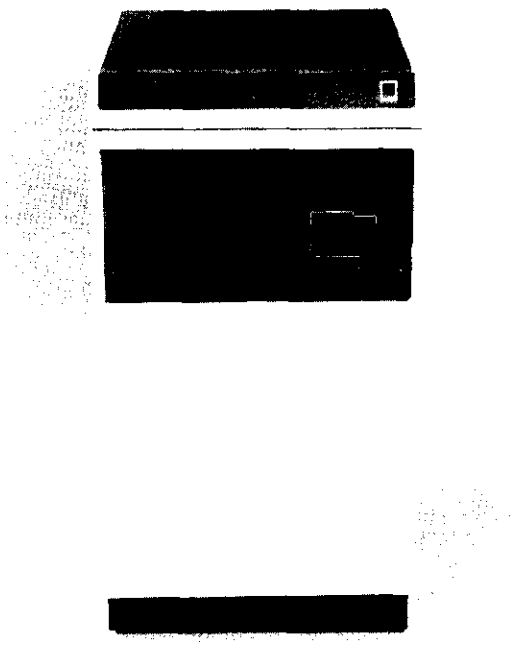
Flexible disc performance:

Capacity, unformatted	3.2 M bit
Capacity, formatted	250 K bytes
Rotating speed	360 rev/min
Packing density	
outer track	1836 BPI
inner track	3268 BPI
Track density	48 tracks/inch
No. of tracks	77
Sector per track	26
Sector length	128 bytes
Head positioning time	10 + n + 10 ms (n = No. of tracks)
Latency time	83.3 ms
Average positioning time	260 ms
Cartridge	ISO TC97 SC11 (e.g. IBM diskette)
Transfer rate	250 K bits/sec

Digital Cassette Recorder performance:

Data registration	Blocks of 256 characters max.
Cassettes	According to ECMA-34
Block gap	20 mm
Packing density	800 bits/inch
Tape length	86 m
Tape width	3.81 mm
Head type	Ferrite write/read head combined in one housing
Read procedure	Read after write with parity check for each block
Recording technique	Character serial, bit serial, phase encoded
Data transfer rate	64 K bits/sec at 19 cm/s
Write/read speed	19 cm/s
Average rewind speed	2 m/s
Data capacity	2.8 million bits per track at 100% utilization

Philips PTS 6813 Terminal Computer



INTRODUCTION AND APPLICATION

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The Philips PTS 6813 computer is planned for connection of up to 32 terminal stations. Of these up to 16 may be remote connected situated in another branch office(s) and connected to the terminal computer via modems and telephone lines. Normally a performance calculation has to be made to determine the maximum number of work stations that PTS 6813 TC can control in an application.

Philips PTS 6813 TC can also be used as a line concentrator. Its processing capacity can also be used for file management.

The processing unit of the computer handles the arithmetic and logic operations on submitted data, and also directs the transfer of information between different parts of the coincidenc-type ferrite core memory and the functional modules of the system. Data are processed in parallel form with a 16-bit basic word length.

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- a memory, including a memory management unit
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- an input/output (multiplex) processor.

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Philips PTS 6813 Terminal Computer

the power supply and the operator's panel. Apart from the terminal computer itself this cabinet houses 1 or 2 flexible disc drives or and 1 or 2 digital cassette recorders.

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General data

16 bits, parallel transfer
15 general purpose registers + P register
64 I/O addresses
Microprogrammed
148 instructions
47 (63) interrupt levels
Addressing: direct; indirect; indexed; indexed indirect
Up to 256 external registers
Power Failure Automatic Restart and Real Time Clock
Automatic IPL-loader
32K 16 memory direct addressable
Up to 128K 16 memory addressable by means of a Memory Management Unit (MMU)

Interrupt and stacking system

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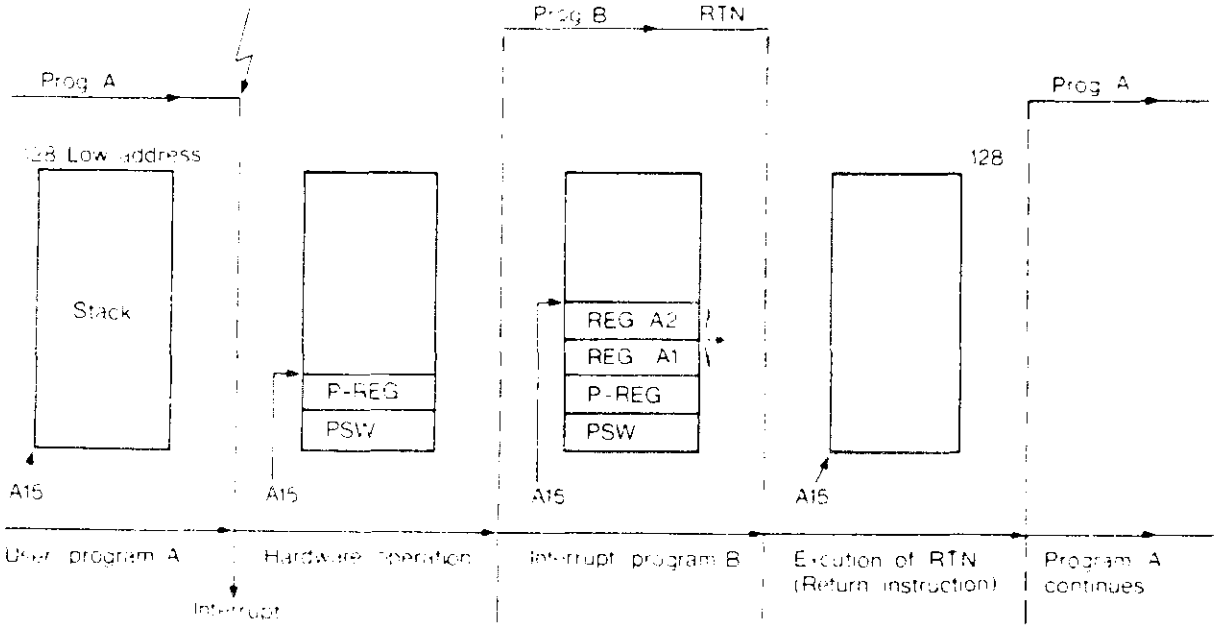

Operation of the interrupt and stacking system

Philips PTS 6813 Terminal Computer

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Return to the interrupted program is initiated by a return instruction (RTN) to take the program status word and program address from the stack. The priority level of the program, contained in the status word, is loaded into the priority register and the program address is loaded into the P-register. The program then resumes and continues until completed or until interrupted by a new interrupt signal.

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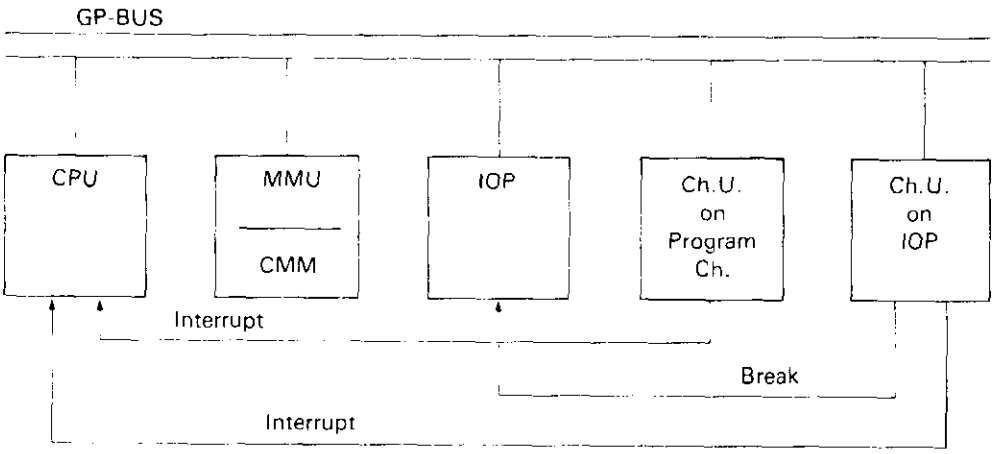

The bus concept

Philips PTS 6813 Terminal Computer

General purpose registers

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Power Failure/Automatic Restart

This feature provides the means of detecting a power failure and automatically restarting a program, without loss of information.

If the AC power fails or drops below the minimum level of error-free operation, an interrupt is generated after 5 milliseconds. Power for another 2 ms is stored in the power supply. During this time all information relevant to the current program is stored by software in the core memory.

The program is automatically restarted when the power is returned, i.e. all the hardware is reset, the stored information is retrieved and the interrupted program is resumed.

Real Time Clock (RTC)

The real time clock gives an interrupt each time a timing signal is received. This signal comes from the interval timer which is tied to the power supply; one RTC-pulse for each 20 ms at 50 Hz and for each 16.67 ms at 60 Hz.

Bootstrap

By operating the key switch on the SOP (System Operator's Panel), the bootstrap, which is contained in a ROM package is automatically loaded into the main core memory and then executed. By the bootstrap, loading of the IPL-program from flexible disc or magnetic tape cassette is possible. The ROM package is located on the CPU card.

Console Typewriter interface

The console typewriter interface is a standard feature which is mounted on the CPU-card. It allows connection of a Philips PTS 6862 Console Typewriter or a teletype. (Speed: 50 char/sec)

Memory and Memory Management Unit

The memory of the Philips PTS 6813 TC is of the core type. Together with the power failure/automatic restart facility of the CPU, it ensures an immediate restart after a power break without loss of data.

The memory consists of one up to four 32K*16 modules, PTS 6825 CMM, which are inserted in reserved slots in the CPU cabinet. The time for a complete read/write cycle is 0.7 μsec. This memory module can work in interleaving mode.

The Memory Management Unit (MMU) card, which is a mandatory unit, is needed when more than 32K*16 main core memory is used in a system. The MMU card provides memory addressing and protection facilities for the system. The MMU operates under CPU bus control. The main feature is address translation which extends the main core memory up to 128K*16.

Channel Units

A channel unit is the interface between the processing unit of the terminal computer and the devices. Channel units can logically be mounted in any slot intended for channel units. If, however, they are used on multiplex channels or have device connectors on the bus side (e.g. CHCR) the position has to be fixed in each configuration.

Channel units are available for local or remote connection of working stations, for data communication interfaces for on line network, and for all the supported peripherals like magnetic tape cassette recorder, flexible disc, magnetic tape, cartridge disc, line printer and card reader.

Input/Output (Multiplex) Processor (IOP)

The IOP is used for two main purposes:

- to achieve a high transfer rate between channel units and the memory
- to unload the program from I/O-transfers.

The IOP provides for the control and automatic execution of direct transfers of variable length blocks of data between channel units of peripherals and the memory. Up to eight channel units can be handled by the IOP, each having its own hardwired priority. The PTS 6813 system can handle up to two IOP's, which are inserted in reserved slots in the computer rack.

The parameters of each block to be transferred — maximum length of transfer, type of transfer (output or input), transfer mode (character or word) and starting address — are loaded by the program into registers in the IOP, corresponding to the channel unit concerned, before each transfer commences. The IOP contains 16 program addressable working registers for this purpose.

For each data transfer, the IOP occupies the bus just once and uses one single memory cycle (cycle stealing). The transfer takes place on break request from the channel units.

The maximum transfer rate is around 1200 K word/sec. In that case no time is left for normal CPU activities.

Philips PTS 6813 Terminal Computer

MODULES OF THE TERMINAL COMPUTER

All the modules of the terminal computer are housed in a computer cabinet. This is a free standing unit containing:

- mounting shelves for up to two flexible disc drives and two digital cassette recorders
- system operator's panel
- space for an extended computer full panel
- a power supply
- a 10 slot rack, in which the CPU, the memory units and channel units are mounted. Each of these units is built on a printed circuit board.

The cassette recorders, the discs and the system operator's panel are accessible from the front and power supply unit and computer rack are accessible from the rear.

The front is covered by a door equipped with a unique lock. The rear is covered by an easy removable plate. All empty spaces are covered with inlet covers.

The fan unit is located at the bottom of the cabinet. It is provided with an easily exchangeable dust filter.

The cabinet is made of steel and has a colour conforming to the PTS 6000 series. The external dimensions of the cabinet are:

- Height: 995 mm
- Depth: 635 mm
- Width: 520 mm

Flexible Disc

The Philips PTS 6813 Terminal Computer houses one or two Flexible Disc Drives. They are placed in the upper part of the cabinet and connected to the CPU via the Channel Unit for Flexible Disc, Philips PTS 6848 CHFD, located in the rack compartment of the terminal computer. PTS 6848 can handle up to four daisy chained disc drives. Thus two drives inside the terminal computer cabinet and two drives in a free-standing unit, PTS 6879 FDU.

The flexible disc is used for program loading and as back-up medium. It also has the potential for program overlay and limited file handling.

The flexible disc can be used as a medium for data interchange between different systems. On the physical level the flexible disc is compatible to IBM 3740. On the logical level two different labelling systems are available, IBM- and TOSS-labelled discs.

The IBM-label should be chosen when the flexible disc is used as a medium for data interchange especially to and from systems others than PTS, and the TOSS-label when the disc is to be used only within PTS 6000 systems. Program loading is only available from a TOSS-formatted disc.

Digital Cassette Recorder

As an alternative to flexible disc the digital cassette recorder can be used for program loading and as back-up medium. The terminal computer can house one or two recorders (the Philips professional recorder) in the upper part of the cabinet, and connected to the CPU through the Channel Unit for Cassette Recorder and SOP (CHCR) located in the rack compartment of the terminal computer.

The recorder uses ECMA-34 cassettes. The tape length is 86 m and the tape width is 3.81 mm.

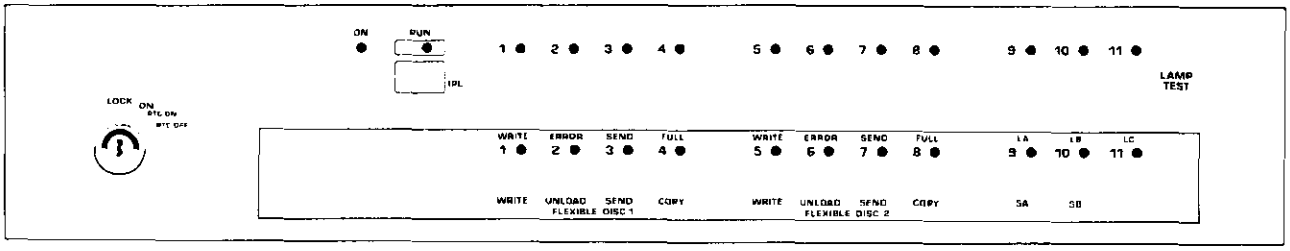
Control Panels

A System Operator's Panel is always connected to the computer. In addition, an Extended Computer Full Panel can be connected.

System Operator's Panel (SOP)

The panel is mounted at the front, and is easily accessed by the operator when the front door is opened.

Via the SOP the system operator can obtain access to the computer program and gets a visual output from the CPU. This



Layout of System Operator's Panel with a text sign

Philips PTS 6813 Terminal Computer

part of the SOP is controlled by the CHCR (Channel Unit for SOP and Cassette Recorder), which must be inserted in the computer rack. The SOP is also used to load the IPL-program.

The SOP has thirteen red indicators of LED-type. The first one indicates power on and the second indicates RUN-status. The remaining eleven indicators are under software control and mainly used for displaying different program status to the operator.

Ten push button switches are available for program and system control. The functions can be defined by the application as the switches are fully software controlled. One switch is for indicator test only (LAMP TEST).

The key switch and one push-button switch are used for loading of the bootstrap program. Another switch initiates loading of the IPL-program and further programs. The key switch has three positions: LOCK, RTC ON, RTC OFF (RTC = Real Time Clock).

The RTC selector governs the operation of the SOP and the functions of the three positions are shown in the following table.

	LOCK	RTC ON	RTC OFF
The system is able to run	Yes	Yes	Yes
The Real Time Clock is	enabled	enabled	inhibited
IPL switch operation	inhibited	enabled	enabled
Full panel switches operation	inhibited	enabled	enabled
SOP interrupt switches operation	enabled	enabled	enabled

Below the push-button switches on the SOP there is a space to place a text sign for guidance in the operation of the SOP. The picture showing the layout of the SOP also shows an example of a text sign (a self-adhesive tape) placed in this space.

Extended Full Panel

The Extended Full Panel is an element which allows the operator to dialogue with the central processing unit specially for test and debugging purposes. This panel is a separate module with its own product number, PTS 6817 EFP. When the full panel is conntected, the "bootstrap" switch of the SOP is disabled. The full panel is mounted below the SOP and used in parallel with SOP.

Power Supply Unit (PSU)

The power supply unit is positioned alongside the computer rack. It converts the main AC voltage into different levels of DC voltage. Overvoltage and overload protection are both provided and a thermo-switch disconnects the mains in case of overheating.

The power supply is designed with switching technique and the input voltage can be in the range of 100-127 V ± 10% or 200-240 V ± 10%, 50 or 60 Hz.

The PSU provides the CPU with a Power Failure Signal which is used by the CPU to start up power failure and restart sequences. A reset signal resets the CPU after a power failure. A Real Time Clock with a period according to the main cycle time is also provided.

Identical power supply units are used in the basic cabinet and the extension unit. The PSU provides approximately 43 A on + 5 V, which covers the powers requirements of almost any configuration.

Computer rack

The computer rack has 10 slots which permit the insertion of 10 printed circuit boards. Some of the slots are reserved for mandatory boards and for boards which require pre-wiring of the rack or must have special connectors in the rack, for instance

- Central Processing Unit (CPU) mandatory
- Core Memory Module (CMM) 1 unit mandatory
- Channel Unit for SOP mandatory
- Memory Management Unit (MMU)
- Input/Output Processor (IOP)

The remaining slots are shared between different channel units. For larger configurations an Extension Unit, Philips PTS 6864 EXU, is used.

Philips PTS 6813 Terminal Computer

STANDARD/OPTIONS/ADAPTATIONS

The standard version of the Philips PTS 6813 Terminal Computer includes

- CPU
- 32K16 memory module
- Memory Management Unit (MMU)
- System Operator's Panel including channel unit (CHCR)
- 1 Flexible Disc Drive including channel unit (CHFD) or 1 Digital Cassette Recorder
- 1 Channel Unit for Local Terminals

Options are

- 2nd Flexible Disc Drive or 2nd Digital Cassette Recorder
- Up to three additional 32K16 memory modules
- Input/Output Processor
- Additional Channel Units for Local Terminals
- Channel Units for Remote Terminals
- Channel Units for Line Control
- Channel Units for peripherals
- Extended Full Panel

Adaptation of

- mains connection

TECHNICAL SUMMARY

Memory size	up to 128K/16
Memory modules	32K/16
Cycle time	0.7 μsec
Number of instructions	148
Interrupt levels	47 (63)
Max. number of terminals	32 of which up to 16 may be remote
Number of I/O addresses	64
Registers	15 General purpose + 1 P-register up to 256 external registers
I/O transfer rate	up to 600 000 word/sec
Dimensions and weight	
Depth	635 mm
Height	995 mm
Width	520 mm
Weight	100 kg appr.
Power	100-127 V, 200-240 V±10% 50 or 60 Hz ± 2%
Power consumption	Typical 500 W
Environment	in operation during storage
Temperature	+ 15 to + 35°C − 40 to + 70°C
Humidity	20 to 80% 20 to 90%

Flexible disc performance:

Capacity, unformatted	3.2 M bit
Capacity, formatted	250 K bytes
Rotating speed	360 rev/min
Packing density	
outer track	1836 BPI
inner track	3268 BPI
Track density	48 tracks/inch
No. of tracks	77
Sector per track	26
Sector length	128 bytes
Head positioning time	10 × n + 10 ms (n = No. of tracks)
Latency time	83.3 ms
Average positioning time	260 ms
Cartridge	ISO/TC97/SC11 (e.g. IBM diskette)
Transfer rate	250 K bits/sec

Digital Cassette Recorder performance:

Data registration	Blocks of 256 characters max.
Cassettes	According to ECMA-34
Block gap	20 mm
Packing density	800 bits/inch
Tape length	86 m
Tape width	3.81 mm
Head type	Ferrite write/read head combined in one housing
Read procedure	Read after write with parity check for each block
Recording technique	Character serial, bit serial, phase encoded
Data transfer rate	64 K bits/sec at 19 cm/s
Write/read speed	19 cm/s
Average rewind speed	2 m/s
Data capacity	2.8 million bits per track at 100% utilization