

QTP PCK

Quick Terminal Panel PC Keyboard

USER MANUAL



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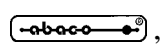
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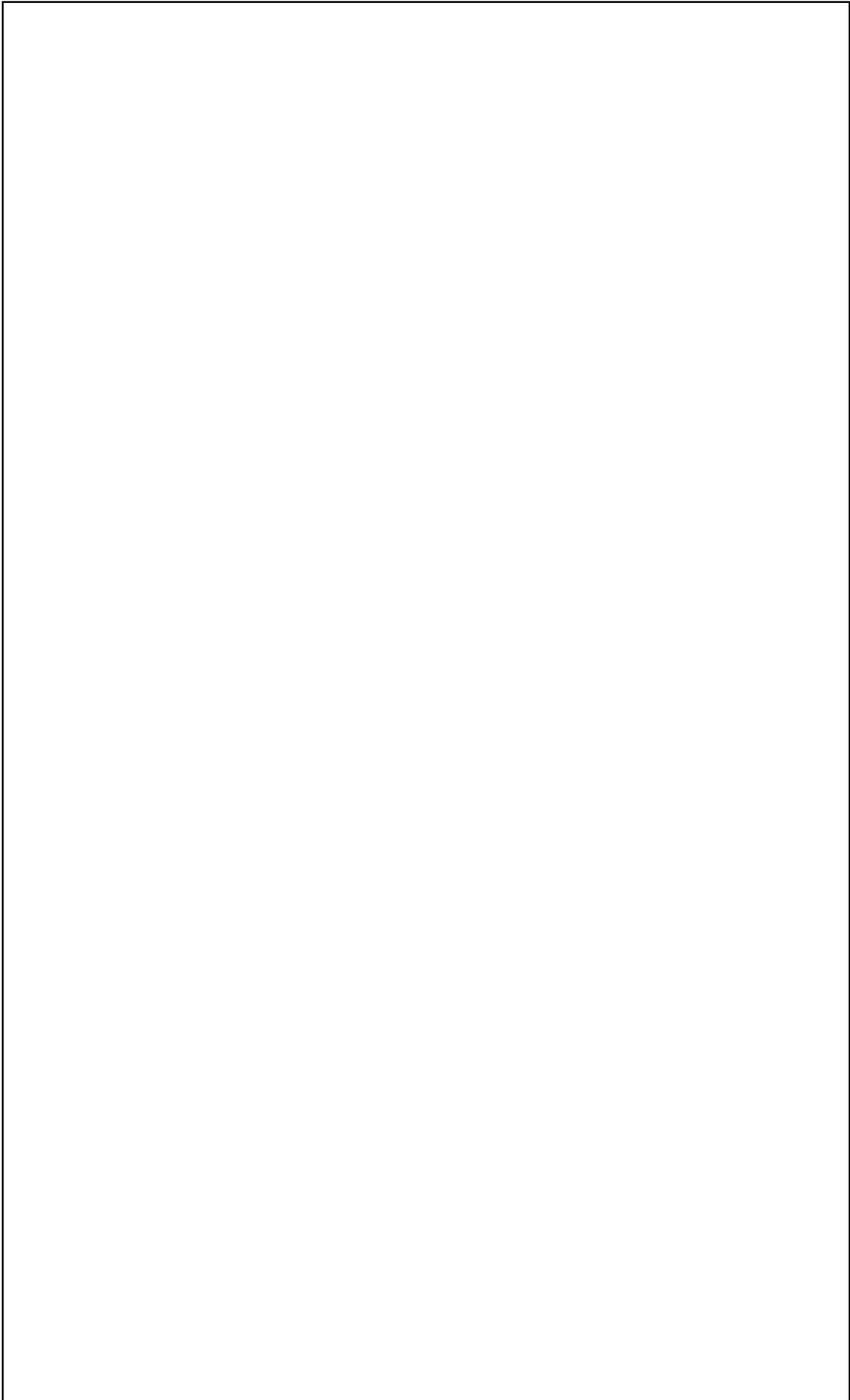


QTP PCK

Rel. 5.00

Edition 07 October 2002

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QTP PCK

Quick Terminal Panel PC Keyboard

USER MANUAL

Complete user panel with two really important features: very low size and a very cheap price; equipped with Fluorescent or LCD display, LEDs backlite, 20x2, 20x4 or 40x2 characters. RS 232 or TTL serial line; EEPROM for set up parameters and messages; full management of PC keyboard (AT or PS2), connected through external wires; buzzer driven by software; autorepeat and keyclick functions; different activation modes for keyboard LEDs; 8 character defined by user; local setup for operating modalities setting; up to 255 different characters can be displayed. Front size equal to used display dimensions; some models can be inserted in proper **QTP 72144** container. Single power supply of +5 Vdc; low consumption. Wide range of available software commands.

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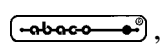
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For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

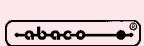


Attention: Generic danger



Attention: High voltage

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INTRODUCTION

The use of these devices has turned - IN EXCLUSIVE WAY - to specialized personnel.

The purpose of this handbook is to give the necessary information to the cognizant and sure use of the products. They are the result of a continual and systematic elaboration of data and technical tests saved and validated from the manufacturer, related to the inside modes of certainty and quality of the information.

The reported data are destined- IN EXCLUSIVE WAY- to specialized users, that can interact with the devices in safety conditions for the persons, for the machine and for the environment, impersonating an elementary diagnostic of breakdowns and of malfunction conditions by performing simple functional verify operations , in the height respect of the actual safety and health norms.

The informations for the installation, the assemblage, the dismantlement, the handling, the adjustment, the reparation and the contingent accessories, devices etc. installation are destined - and then executable - always and in exclusive way from specialized warned and educated personnel, or directly from the TECHNICAL AUTHORIZED ASSISTANCE, in the height respect of the manufacturer recommendations and the actual safety and health norms.

The devices can't be used outside a box. The User must always insert the cards in a container that respect the actual safety normative. The protection of this container is not threshold to the only atmospheric agents, but specially to mechanic, electric, magnetic, etc. ones.

To be on good terms with the products, is necessary guarantee legibility and conservation of the manual, also for future references. In case of deterioration or more easily for technical updates, consult the AUTHORIZED TECHNICAL ASSISTANCE directly.

To prevent problems during card utilization, it is a good practice to read carefully all the informations of this manual. After this reading, the User can use the general index and the alphabetical index, respectly at the begining and at the end of the manual, to find information in a faster and more easy way.

FIRMWARE VERSION

This handbook make reference to firmware version **1.3** and following ones. The validity of the information contained in this manual is subordinated to the firmware release number, so the user must always verify the correct correspondence between the notations. Inside the device, the firmware release number is written on the label stuck on the CPU or it can be obtained by a proper command sent through the serial line.

GENERAL INFORMATION

QTP PCK is a complete low cost operator panel with small overall dimension, specifically designed for industrial use and for direct mounting on automatic machinery. It is a video terminal suitable to be the direct interface between operator and machinery in any of the control, command, visualization operations which could be necessary in many civil and/or industrial applications.

QTP PCK is available with **alphanumeric Fluorescent** or LEDs back lite **LCD** displays, with 20 characters for 2 or 4 lines or with 40 characters for 2 lines. **QTP PCK** is directly connected with the display, so it has an overall frontal dimension equal to the selected display used for visualization. For the mechanic fixing the user must use the onboard displays holes.

Moreover **QTP PCK** is really useful in all those applications where the user requires digits, alphabetical, movement and function keys in fact it manages a **PC keyboard** both in **AT** or **PS2** standard.

QTP PCK allows, with its **EEPROM**, the capability to directly store about **100 messages**. These messages can be recalled by dedicated commands received through the serial line and visualized on the display. With this feature the CPU work time and the program space are optimized, in fact messages must not be sent to the panel every time, they are just stored in EEPROM. Furthermore it is possible to get messages back through the serial line and read them again. So **QTP PCK** can be used as a little mass memory devices where the user can save and read system set up informations, passwords, identification codes, etc.

Some models of **QTP PCK** can be enclosed inside a proper metallic container named **QTP 72144**, obtaining a compact apparatus with **IP 56** frontal protection and with remarkable mounting facilities. The **QTP PCK** is able to execute an entire range of display commands, including clear screen, cursor position, cursor movements, cursor activation, etc., with code compatibility to **ADDS View Point** standard.

Main features of **QTP PCK** are as follows:

- **Small overall dimension**: same of the selected display
- Very low **price**
- **7** different alphanumeric **display** available:
 - QTP PCK-C2**: LCD display, back lighted , with **20** characters for **2** lines
 - QTP PCK-C4**: LCD display, back lighted , with **20** characters for **4** lines
 - QTP PCK-C4B**: LCD display, back lighted , with **20 big** characters for **4** lines
 - QTP PCK-C24**: LCD display, back lighted, with **40** characters for **2** lines
 - QTP PCK-F2**: **Fluorescent** display with **20** characters for **2** lines
 - QTP PCK-F4**: **Fluorescent** display with **20** characters for **4** lines
 - QTP PCK-F24**: **Fluorescent** display with **40** characters for **2** lines
- Complete management of **PC keyboard** (AT or PS2) connected by external wires
- **Autorepeat** and **keyclick** functions on stroked keys
- Different modalities of activation for keyboard **LEDs**
- **Buzzer** programmable as **BELL** or to sound with keystroke
- Serial **EEPROM**, up to 2 Kbyte capacity, for permanent storage of set up, messages, etc.
- Memorization on **EEPROM** and visualization of **98** different **messages**
- **8** characters with user **defined pattern**
- **RS 232** or **TTL** serial line
- **Local set up** for operating modalities (Baud Rate, Stop bits, Keyclick, etc.)
- Up to **255 different characters** predefined on display that can be visualized
- Some models can be ordered already inserted in **QTP 72144** container
- Single **+5 Vdc** power supply

- Low current consumption from **140 to 275 mA** (the current depends on selected display)
- Customized program packages

Here follows a description of the board's functional blocks, with an indication of the operations performed by each one.

SERIAL COMMUNICATION

The communication with remote units is by standard asynchronous serial line that can be configured both in RS 232 or TTL electrical protocol, through jumpers. The physical protocol of the serial line is partly selectable through the proper local set up program, that allows the user to choose between the available values, as described on GENERAL FEATURES and LOCAL SET UP paragraphs, by simply using the keyboard.

BUZZER

QTP PCK has a circuitry that generates a steady sound, based on a capacitive buzzer. The said circuitry can be activated by software through a specific comand for generating a simple beep or it can be linked to a key pressure, just to get the **keyclick** function, or it can signalize possible malfunctions.

In the last case when, after a power on, the card generates an intermittent sound and it doesn't work correctly, there is a wrong condition that must be resolved: please contact **grifo®** technicians.

DISPLAY

QTP PCK is available with **Fluorescent** or backlite **LCD** alphanumeric displays with different characters number and different characters size. In detail the following displays can be mounted: Fluorescent 20x2, Fluorescent 20x4, Fluorescent 40x2, LCD 20x2, LCD 20x4, LCD 20x4 big or LCD 40x2 characters. The LEDs backlight of LCD models ensures a good visibility even when the environmental lighting changes and if it necessary the user can modify the contrast regulation by acting on a specific trimmer. Another important features of **QTP PCK** displays is their wide viewing angle that allows a good visibility from each frontal position. Further information on each display are reported in **TECHICAL FEATURES** chapter.

The user must choose the right display (so the right **QTP PCK** model) that is sufficient for the information to visualize and for his visibility requirements. For specific requirements on current consumption, visibility and price the card can be provided with LCD display **not backlighted**: for detailed information about these options and their availability, please contact directly **grifo®** offices.

KEYBOARD

QTP PCK has three digital I/O lines that can be connected to external PC keyboard either in AT or PS2 standard. The connection between **QTP PCK** and keyboard must be performed by the user through only 5 wires that link two connectors, as described in figure 7. The keyboard management is completely automatic and it provides the classic operations for autorepeat, upper and lower case, function keys, control keys, status LEDs, etc. On the whole 102 keys are managed and 155 different codes are generated, according to contemporaneous stroke of more keys. Furthermore there is the possibility to switch on/off the key click function, i.e the buzzer activation each time a key is pressed, and to set the status LEDs even by software; the last features let the user signalize some conditions (as allarms, errors, settings, etc.) apart from keyboard status.

Thanks to PC keyboard management, the **QTP PCK** can cheaply solve the data exchange problems especially when those data are alphabetic, numerics, mixed and/or complex; by using industrial PC keyboards the problems can be solved even in strong environmental applications and functionality is guaranteed in each operating conditions.

EEPROM

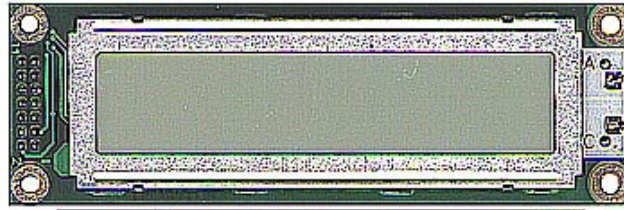
QTP PCK has on board EEPROM (the size vary from 256 Bytes to 2 KBytes) for storing set up, communication protocol, identification name, user defined characters, messages, and so on. Many of the stored data have vital importance so a serial EEPROM has been chosen to obtain the best warranties on validity and maintenance of the saved information, even when power supply is not available.

It is possible to memorize up to 98 messages of 20 characters that can be first saved on EEPROM and then read or shown on the display at any moments, just giving a proper command to the terminal, with the right message identification number. For detailed information about messages please read **COMMANDS FOR MESSAGES MANAGEMENT** paragraph.

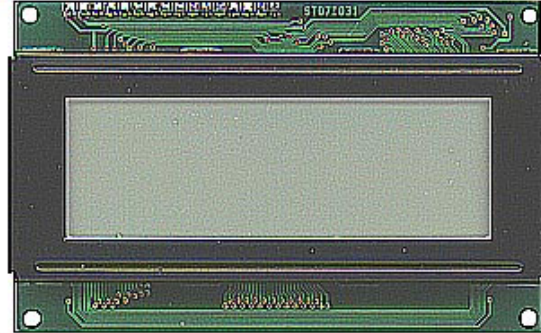
The EEPROM size must be chosen considering the application to realize or the specific requirements of the user. Normally the card is equipped with 512 Bytes of EEPROM and the other configuration must be specified from the user, at the moment of the order, by using the following codes:

2048 Bytes EEPROM -> **.MEX** option

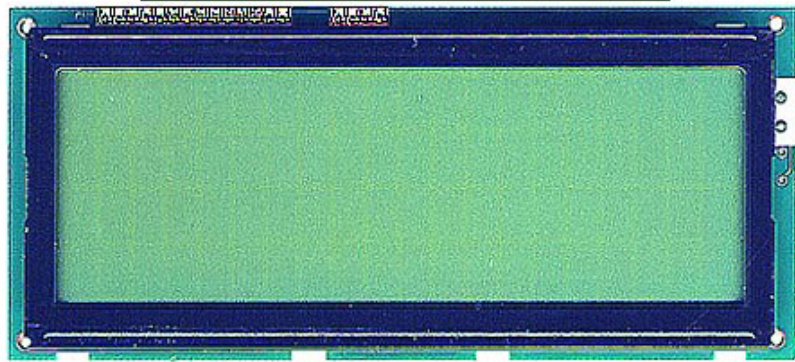
QTP PCK-C2



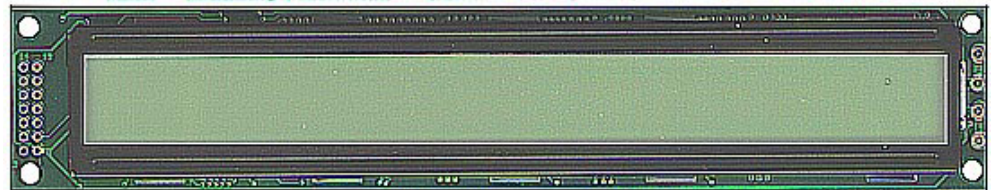
QTP PCK-C4



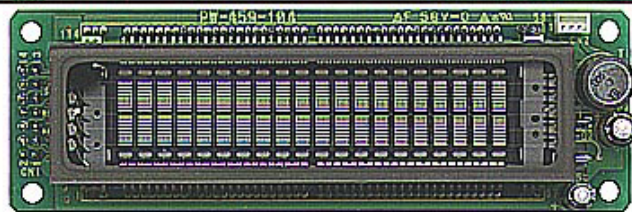
QTP PCK-C4B



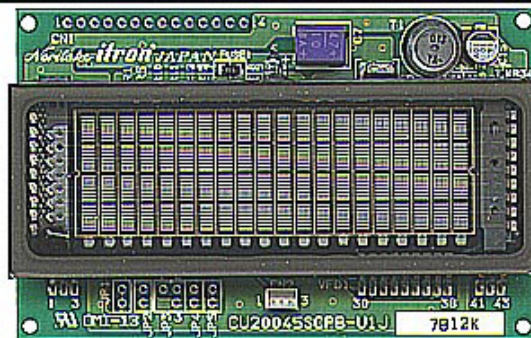
QTP PCK-C24



QTP PCK-F2



QTP PCK-F4



QTP PCK-F24

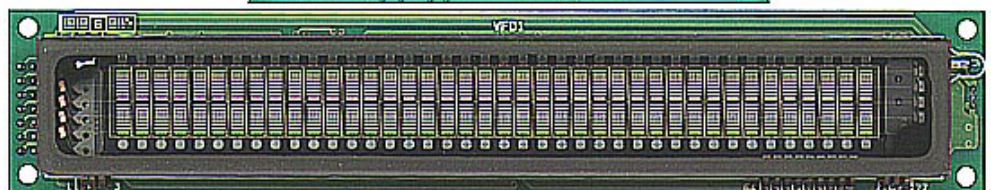


FIGURE 1: QTP PCK PHOTO IN ALL AVAILABLE MODELS

TECHNICAL FEATURES

GENERAL FEATURES

On board resources: Signals for PC keyboard management, AT or PS2 models
Buzzer for BELL and keyclick
Full duplex RS 232 or TTL serial line
EEPROM for set up, messages and so on (2K Bytes max.)
Alphanumeric display in 7 different models
Trimmer for contrast regulation of LCD display

Displays: LCD : 20x2, 20x4, 20x4 big or 40x2, with LEDs
backlite
Fluorescent: 20x2, 20x4 or 40x2

CPU: 89C4051 with 14.7456 MHz Crystal.

Communication protocol: Baud rate: 1200, 2400, 4800, 9600, 19200, 38400
Stop bit: 1 or 2
Parity: none
Bits x chr: 8
Default: 19200 Baud, 1 Stop, No parity, 8 Bits

Receive buffer dimension: 30 characters

PHYSICAL FEATURES

Size: Display 20x2: 116 x 37 x 30 mm (W x H x D)
Display 20x4: 98 x 61 x 30 mm (W x H x D)
Display 20x4 big: 146 x 63 x 28 mm (W x H x D)
Display 40x2: 182 x 34 x 34 mm (W x H x D)
See outline dimension in APPENDIX C

Characters size: LCD 20x2: 5 x 7 dots, 3.20 x 4.85 mm (W x H)
LCD 20x4: 5 x 7 dots, 2.95 x 4.75 mm (W x H)
LCD 20x4 big: 5 x 7 dots, 5.00 x 8.50 mm (W x H)
LCD 40x2: 5 x 7 dots, 3.20 x 5.55 mm (W x H)
Fluorescent 20x2: 5 x 7 dots, 2.40 x 4.70 mm (W x H)
Fluorescent 20x4: 5 x 7 dots, 2.40 x 4.70 mm (W x H)
Fluorescent 40x2: 5 x 7 dots, 2.30 x 4.70 mm (W x H)

Weight: 160 g max.

Mounting: Through display mounting hole (outline dimension in APPENDIX C)

PC keyboard layout:	U.S.A., English
PC keyboard cable length:	150 cm max.
PC keyboard autorepeat:	After 500 ms and then every 80 ms
Temperature range:	From 0 to 50 °C
Relative humidity:	20% up to 90% (without condense)
Connectors:	CN3: 4+4 pins AMP Mod II, 90°, Male The female connector for CN3 can be directly ordered to grifo® with the code CKS.AMP8 (kit composed by a female AMP Mod II 4+4 pins plus 8 contact to crimp), or to AMP dealer by using P/N 280365 and P/N 182206-2

ELECTRIC FEATURES

Power voltage: +5 Vdc \pm 5%

Hereunder is listed the **QTP PCK** power consumption referred to the different display types and without connection to PC keyboard:

<i>DISPLAY model</i>	<i>Current consumption</i>
LCD 20x2 Backlite	180 mA
LCD 20x4 Backlite	140 mA
LCD 20x4 BIG Backlite	160 mA
LCD 40x2 Backlite	170 mA
Fluorescent 20x2	150 mA
Fluorescent 20x4	255 mA
Fluorescent 40x2	275 mA

FIGURE 2: CURRENT CONSUMPTION TABLE

Please remind that to reduce consumption, the **QTP PCK** can be ordered also with LCD display not backlit: whenever necessary please contact directly **grifo®** for price and availability.

INSTALLATION

In this chapter there are the information for a right installation and correct use of the terminal **QTP PCK**. In detail there are the locations and functions of each connector, of the user settable jumpers and of the trimmer. For the connectors it is described the the pin outs, the meaning of the connected signals and some connection examples, that simplify and speed the installation phase.

CN3 - INTERFACE CONNECTOR

The connector named **CN3** is an AMP Mod II 4+4 pins, 90°, male with 2.54 mm pitch. It must be used for all the **QTP PCK** connections in fact it includes the power supply, the serial communication and external PC keyboard signals. Placing of the signals has been designed to reduce interference and electrical noise and to simplify connections with other systems.

The female connector for CN3 can be directly ordered to **grifo**® (code **CKS.AMP8**) or acquired directly from AMP dealer by using P/N 280365 (female AMP Mod II 4+4 pins) and P/N 182206-2 (crimping contact).

In the following figures are described all these signals, divided according with their functionality.

POWER SUPPLY CONNECTION

The below figure shows the CN3 signals used to power supply the **QTP PCK**. Remind that power supply connected to CN3 be the same used for PC keyboard, as described in figure 7, so the necessary current is the sum between the value reported in figure 2 and the PC keyboard consumption (this normally doesn't exceed the 250 mA).

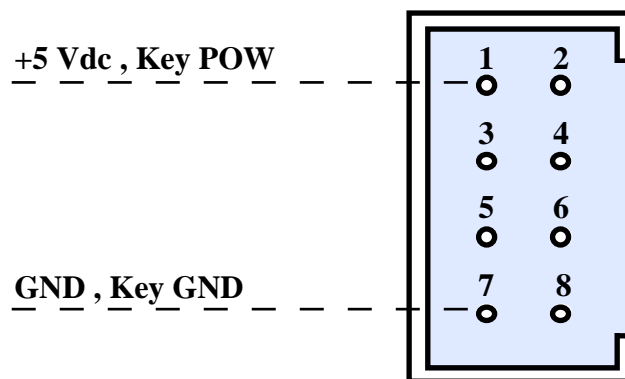


FIGURE 3: CN3 - POWER SUPPLY PINS

Signals description:

+5 Vdc , Key POW = I - +5 Vdc power supply signal for on board logic and PC keyboard.
GND , Key_GND = - Power supply ground signal.

SERIAL LINE CONNECTION

The below figure shows the CN3 signals used to connect a serial line, RS 232 or TTL, to **QTP PCK**. These signals follow the CCITT normative defined for each one of the available electric protocols.

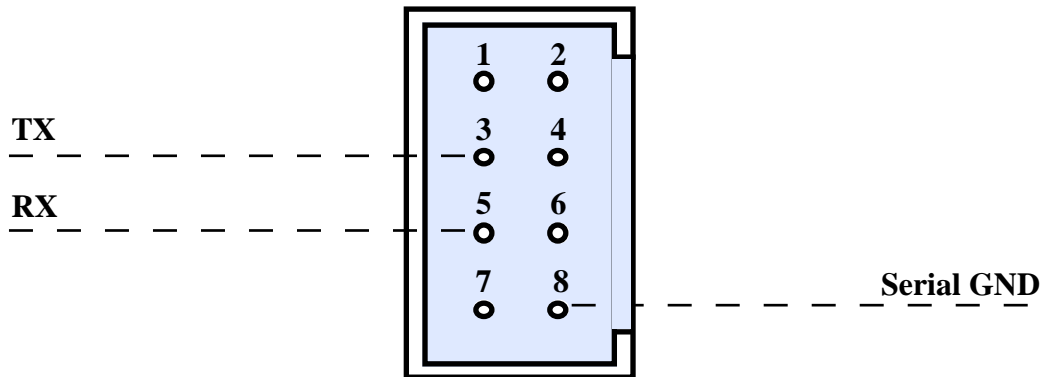


FIGURE 4: CN3 - SERIAL LINE PINS

Signals description:

- RX** = I - RS 323 or TTL serial receive data.
- TX** = O - RS 323 or TTL serial transmit data.
- Serial GND** = - Serial communication ground signal.

The Serial GND signal is physically connected to GND , Key GND signal always on CN3 connector: two separate pins have been provided to facilitate connections.

To avoid wrong connection and possible consequent damages, the selection of **QTP PCK** electric protocol must be performed following the information of SERIAL LINE CONFIGURATION JUMPERS paragraph.

The following figure shows an RS 232 connection example diagram with a generic master unit:

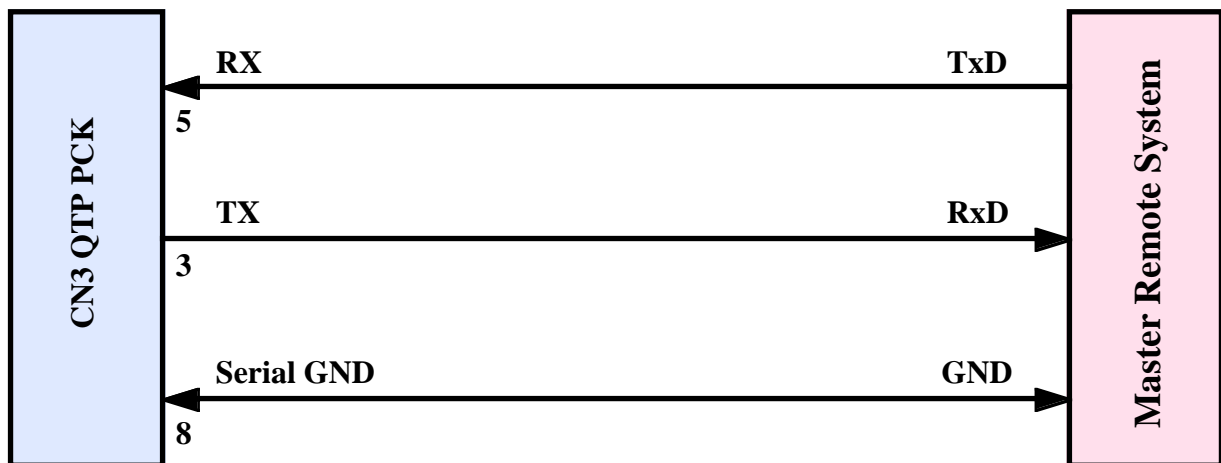


FIGURE 5: RS 232 SERIAL CONNECTION EXAMPLE

PC KEYBOARD CONNECTION

The below figure shows the CN3 signals used to connect the external PC keyboard. These are TTL signals and they can be connected to any AT or PS2 keyboard by interposing the connection cable described on figure 7. The maximum length of this connection cable is 20 cm to obtain a total 150 cm length, when keyboard cable is included.

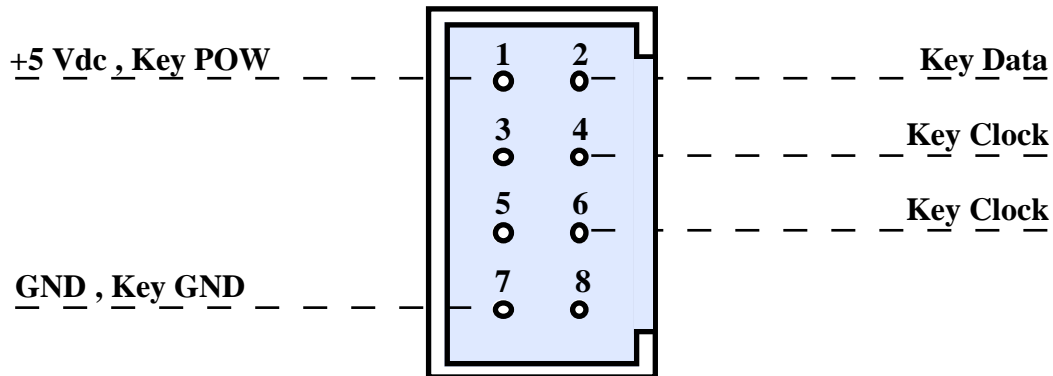


FIGURE 6: CN3 - PC KEYBOARD PINS

Signals description:

- Key Data** = I/O - Data line of PC keyboard.
- Key Clock** = I/O - Clock line of PC keyboard.
- +5 Vdc , Key POW** = I - +5 Vdc power supply signal for on board logic and PC keyboard.
- GND , Key GND** = - Power supply ground signal.

All the PC keyboard that follow AT or PS2 standards are provided of a DIN, male connector with 5 or 6 pins respectively, where the four signal necessary for its functionality (Key Data, Key Clock, Key POW and Key GND) are connected.

The following figure shows a connection diagram between CN3 of **QTP PCK** and DIN connector of the keyboard. For the last one it is also described the female connector lay out (those connected at the cable to realize) both in contact and wires view, to facilitate the cable realization.

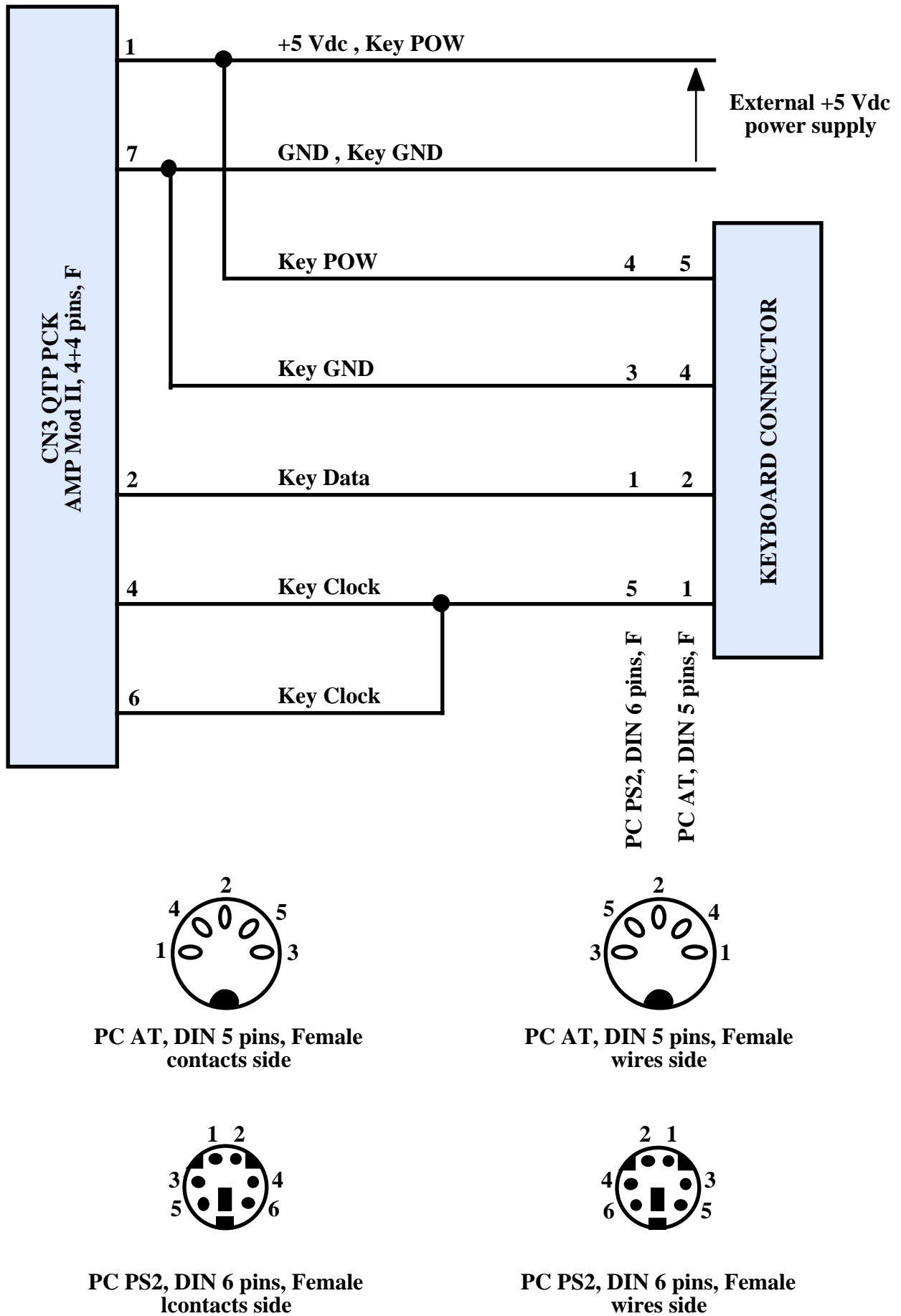


FIGURE 7: PC KEYBOARD CONNECTION DIAGRAM

SERIAL LINE CONFIGURATION JUMPERS

The **QTP PCK** terminal has a communication serial line that can be electrically configured in **RS 232** or **TTL**, through the configuration of two jumpers named **J1** and **J2**.

The following table describes all the right connections of these jumpers with their respective functions. To recognize the valid connections, please refer to the board printed diagram (serigraph) or to figure 11 of this manual, where the pins numeration is listed; for recognizing jumpers location, please refer to figure 9.

JUMPERS	CONNESSIONE	UTILIZZO	DEF.
J1	Posizione 1-2	Configura la linea seriale di trasmissione TX, in RS 232	*
	Posizione 2-3	Configura la linea seriale di trasmissione TX, in TTL	
J2	Posizione 1-2	Configura la linea seriale di ricezione RX, in RS 232	*
	Posizione 2-3	Configura la linea seriale di ricezione RX, in TTL	

FIGURE 8: SERIAL LINE CONFIGURATION JUMPERS

The "*" denotes the default connection, or on the other hand the connection set up at the end of testing phase, that is the configuration the user receives.

The two electric protocols RS 232 and TTL are incompatible, so we suggest to configure them taking many care and to always check the electric protocol used by the external system that must be connected to **QTP PCK**.

If you are not sure, please remind that the connection of an external system in RS 232 to **QTP PCK** configured in TTL (J1 and J2 in position 2-3), can damage the on board electronic circuit.

CONTRAST REGULATION TRIMMER

On **QTP PCK** board there is a trimmer that defines the contrast on LCD displays. This trimmer, named RV1 is setted by **grifo**® to obtain the best display visibility in each working conditions and normally the user must not change its position. In case of specific requirements, as external light very low or very high, RV1 can be changed by little rotation in both directions until the visibility is improved. For recognizing the location of contrast regulation trimmer, please refer to figure 9.

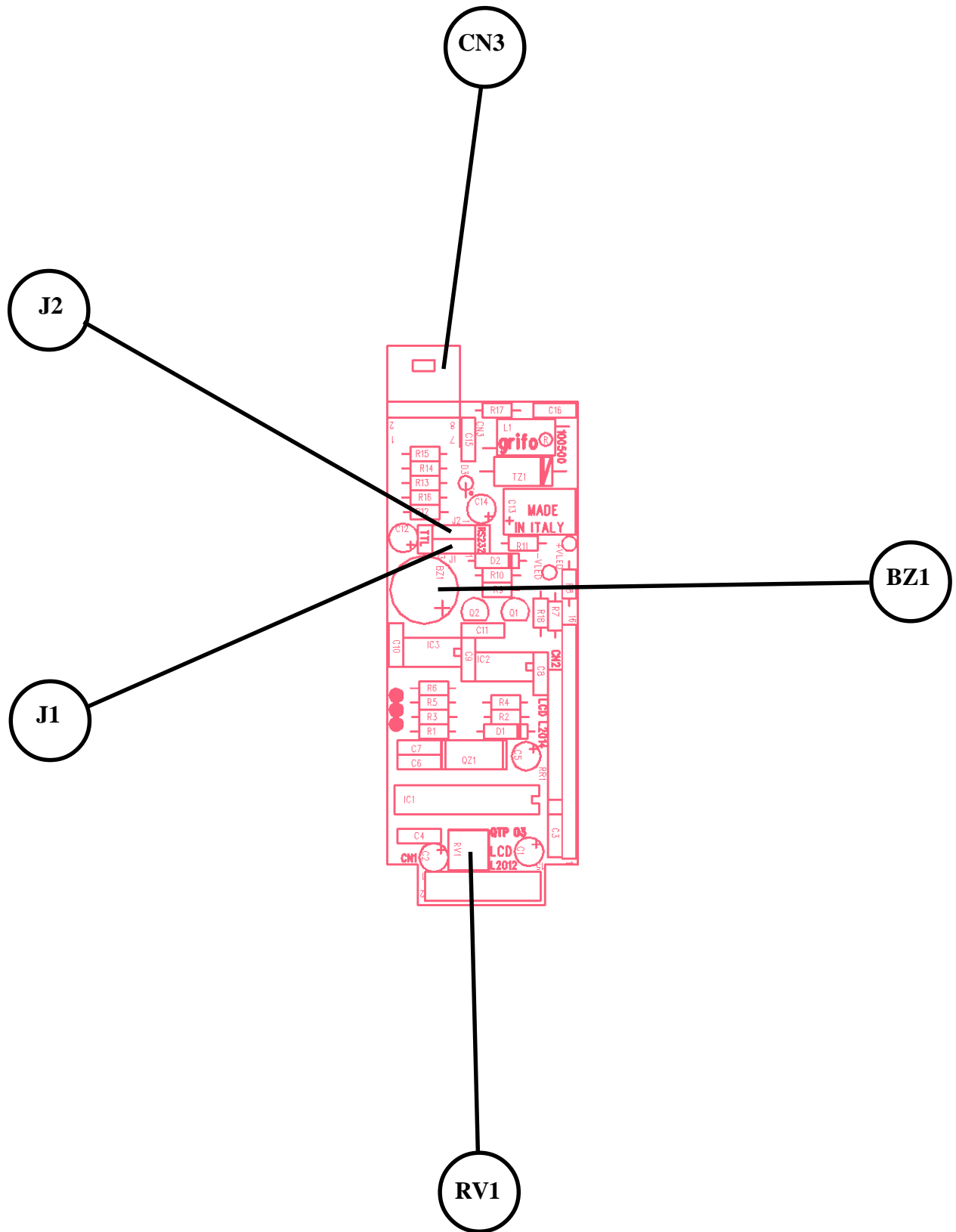


FIGURE 9: JUMPERS, CONNECTOR, TRIMMER LOCATION

SOFTWARE DESCRIPTION

As already said **QTP PCK** terminal is a complete video terminal and for this reason any characters received from serial line, if it is not a command, is shown on the display and codes of any pressed keys of the external keyboard, are transmitted to the control master unit. These operations are automatically performed by on board firmware that is programmed and executed by the **QTP PCK** CPU. The on board firmware manages also a local set up which allows to set the communication protocols by using the PC keyboard and the display. This manual contains, in addition to the description of the different functions, a complete list of the recognized command sequences, to be used to benefit of the main features of **QTP PCK**. For each code or codes sequence, there is a double description i.e: the mnemonic one through the ASCII characters and the numerical one under decimal and hexadecimal form.

The said commands respect the **ADDS View Point** standard so all the sequences begin with **ESC** character corresponding to the **27** decimal code (**1B Hex**).

LOCAL SET UP

Thanks to a proper local set up mode, some parameters of communication protocol and the key click mode can be set by the user with the simple use of some external keys.

To enter set up mode the user must power on the **QTP PCK** and simultaneously he must press the **SHIFT** and **S** keys for at least 2 seconds.

When the set up mode is entered, on the display appears the "**-Setup-**" string and with two keys the configuration parameters shall be changed as below described:

DOWN ARROW:	It changes the current menu, recognized by the following messages:
"BAUD"	-> to change the communication baud rate
"STOP"	-> to change the stop bit number
"BEEP"	-> to change the key click mode
RIGHT ARROW:	It changes the current value of the selected menu:
BAUD	-> 38400, 19200, 9600, 4800, 2400 or 1200 baud
STOP	-> 1 or 2
BEEP	-> ON or OFF

When all parameters have been correctly set the user can exit set up mode and return to normal functionality by pressing simultaneously the **CTRL SHIFT S** keys. At this point the selected parameters are saved on EEPROM and they are maintained until another local set up is executed.

NOTE

Please remind that set up mode can be entered only during power up, when previously described conditions are recognized in fact if **SHIFT** and **S** keys are pressed at the same time during normal operation the set up mode will not start and the code of the pressed keys will be transmitted on the serial line.

CHARACTERS VISUALIZATION ON THE DISPLAY

QTP PCK shows on his display all the received characters having a code included in the range **0÷255 (00÷FF Hex)** except those that are used for commands or command sequences. The character is visualized on the current cursor position and this latter will go to the next position; if it is placed on the last character of the display (right down corner), it will be placed on home position (left up corner). The cursor position automatic increment really simplifies the representation, especially when long strings or messages must be displayed; moreover a powerfull command set makes easier each type of operation, as described in the following paragraphs. The corrispondence between codes and displayed characters is defined by the following rules:

Codes	Characters
0 ÷ 15 (00÷0F Hex)	User defined
16 ÷ 32 (10÷1F Hex)	Special and different according with installed display
27 (1B Hex)	Not shown
32 ÷ 127 (20÷7F Hex)	Standard ASCII
128 ÷ 255 (80÷FF Hex)	Special and different according with installed display

To allow representation of user defined and special characters, that have same codes of some one character commands, a specific command has been provided that selects the operating mode of **QTP PCK** among the two available:

- *command*: the double function characters are not displayed and the relative commands are executed;
- *representation*: the double function characters are displayed.

After a power on it is automatically selected the command mode to make immediately utilizable each functionality. The commands composed by a sequence of two or more characters, that always start with ESC = 27 = 1BH, are anyhow interpreted and executed independently from the selected operating mode.

Each models of **QTP PCK** have 8 user defined characters that can be setted and/or saved, according to user requirements, and then displayed as minutely described in following **COMMANDS FOR USER CHARACTERS** paragraph.

About special characters please refer to **APPENDIX B** and remind that it is possible to get different display models, provided of different special characters, but everything must be directly arranged with **grifo®**.

RECEIVE BUFFER

QTP PCK is provided of a receive buffer that simplify the management, in fact it reduces the waiting time of the connected master unit. Each received characters is immediately saved inside this buffer (30 bytes long) and after processed at the end of the currently executed operation.

Naturally when commands that requires a long execution time (delete commands, EEPROM management commands, etc.) are continuously received, the buffer will become full and it overflows. When overflow occurs last location of the buffer is overwritten by each next received characters, and these are defenitively lost.

The master unit must stop the transmission until the **QTP PCK** has emptied the receive buffer and it is still ready to receive other data. In practice the user must insert suitable delays between the commands transmission, to leave sufficient time to **QTP** for executing the required operations and to avoid the complete filling of the receive buffer.

KEYBOARD ACQUISITION

When **QTP PCK** recognizes a key pressure on the external PC keyboard, it translate it and then transmits the determinate code on serial line, by using the following modalities:

- An **auto repeat** function of the stroked key is implemented so when **QTP PCK** recognizes the pressure on a key for a time grater than **0.5 sec.** it will start the serial transmission of its code about each **0.08 sec.** and it lasts until that specific key is released.
- The **Shift** and **Ctrl** keys don't transmit any code because they must be pressed contemporaneously with other keys, obtaining a different code as below described.
- The **Caps Lock**, **Scroll Lock**, **Num Lock** keys transmit a code but without autorepeat.
- By pressing **Scroll Lock** key the homonymous LED is activated in bistable modality, or in other words the LED status is changed every time the key is stroked.
- By pressing **Caps Lock** key the homonymous LED is activated and then for the alphabetical keys it is transmitted the upper case code. When the same key is pressed again the LED and the upper case are disabled, in bistable mode.
- When the **Shift** key is pressed contemporaneously with alphabetical keys it is transmitted the upper case code if Caps Lock is disabled and viceversa the lower case code if Caps Lock is enabled; for the double character keys, except numeric pad keys, it is transmitted the code of the on top character.
- By pressing **Num Lock** key the homonymous LED is activated and then for the double character keys placed in numeric pad, it is transmitted the numeric code. When the same key is pressed again the LED and the described modality are disabled, in bistable mode, and for the numeric pad keys are transmitted the not ASCII characters codes described on figure 10.
- When the **Ctrl** key is pressed contemporaneously with another key, or keys combination, it is transmitted the **unchanged code** when the key is not alphabetic or it is transmitted the code decreased of **64 = 40H** when the key is alphabetic.
- Only PC keyboards with **USA** or **English** layout are correctly managed.
- For the not ASCII keys it is transmitted an high code ($> 128 = 80H$) reported in figure 10; in this table the codes are noted in decimal, hexadecimal and mnemonic format, if available. Thanks to this feature the number of transmitted codes is higher in fact there are **155 codes** for 102 physical keys.
- While a key is pressed and the possible relative code is transmitted, it is also generated a loud beep if the **keyclick** function is enabled.

Below are reported some example that better explain the functionalities just described; in detail are listed the code transmitted by **QTP PCK** for some keys or some keys combinations pressure:

Ctrl	Shift	Caps Lock	Num Lock	Key	Code
Not pressed	Not pressed	Disabled	Don't care	A	97 = 61H
Not pressed	Pressed	Disabled	Don't care	A	65 = 41H
Not pressed	Not pressed	Enabled	Don't care	A	65 = 41H
Not pressed	Pressed	Enabled	Don't care	A	97 = 61H
Pressed	Not pressed	Enabled	Don't care	A	01 = 01H
Don't care	Not pressed	Don't care	Don't care	1 !	49 = 31H
Don't care	Pressed	Don't care	Don't care	1 !	33 = 21H
Don't care	Not pressed	Don't care	Don't care	1 !	49 = 31H
Don't care	Don't care	Don't care	Disabled	1 Fine	167 = A7H
Don't care	Don't care	Don't care	Enabled	1 Fine	49 = 31H
Don't care	Don't care	Don't care	Don't care	F10	137 = 89H

KEY	CODE	HEX CODE	MNEMONIC
Back Space	8	8	BS
Tab	9	9	TAB
Enter	13	D	CR
Esc	27	1B	ESC
Delete	127	7F	DEL
F1	128	80	-
F2	129	81	-
F3	130	82	-
F4	131	83	-
F5	132	84	-
F6	133	85	-
F7	134	86	-
F8	135	87	-
F9	136	88	-
F10	137	89	-
F11	138	8A	-
F12	139	8B	-
Caps Lock	144	90	-
Num Lock	145	91	-
Scroll Lock	146	92	-
Alt	147	93	-
Pause | Break	148	94	-
PrintScreen | SysRq	149	95	-
Up arrow	160	A0	-
Left arrow	161	A1	-
Right arrow	162	A2	-
Down arrow	163	A3	-
Page Up	164	A4	-
Page Down	165	A5	-
Home	166	A6	-
End	167	A7	-
Insert	168	A8	-

FIGURE 10: CODES OF NOT ASCII KEYS

The following figure shows the typical layout of USA and English keyboard that is the only one correctly managed by QTPCK; by using PC keyboard with different arrangement, the correspondence between keys and transmitted codes is not always right.

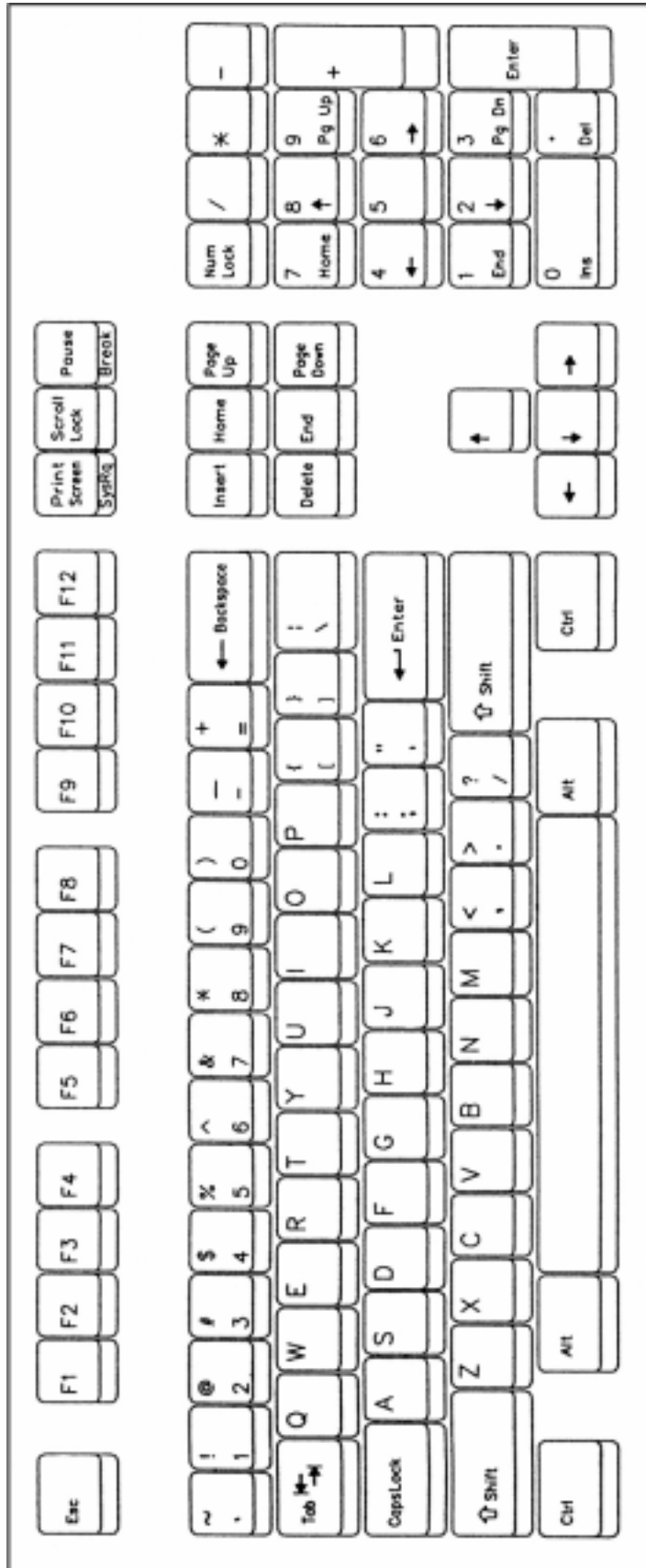


FIGURE 11: PC KEYBOARD LAYOUT



COMMANDS FOR CHARACTERS ERASURE

Below are described all the commands that deletes one or more characters from the display.

BACKSPACE

Code: 8
Hex code: 8
Mnemonic: BS

This command moves the cursor one character position to the left and it erase the contents of the reached cell.

If the cursor is in Home position, it will be erased the last character of the last row of the display.

CLEAR PAGE

Code: 12
Hex code: C
Mnemonic: FF

This command clears all data on the display and it moves the cursor to Home position.

CLEAR LINE

Code: 25
Hex code: 19
Mnemonic: EM

This command erases all characters displayed on the current line and it moves the cursor to the first column of the said line.

CLEAR END OF LINE

Code: 27 75
Hex code: 1B 4B
Mnemonic: ESC K

This command erases all characters displayed from the current cursor position to the end of line inclusive. The cursor mantains the previous position.

If, for example, the cursor is at the beginning of a display line, the complete line will be erased.

CLEAR END OF PAGE

Code: 27 107
Hex code: 1B 6B
Mnemonic: ESC k

This command erases all characters displayed from the current cursor position to the end of display inclusive. The cursor mantains the previous position.

If, for example, the cursor is at Home position, the complete display will be erased.

COMMANDS FOR CURSOR POSITION

Here follows the list of the cursor positioning commands.

CURSOR LEFT

Code: 21
Hex code: 15
Mnemonic: NACK

The cursor is shifted of one position to the left without modifying the display contents. If the cursor is in Home position, it will be placed in the last position of the last row of the display.

CURSOR RIGHT

Code: 6
Hex code: 6
Mnemonic: ACK

The cursor is shifted of one position to the right. If the cursor is placed in the last position of the last row, it will be moved to the Home position.

CURSOR DOWN

Code: 10
Hex code: A
Mnemonic: LF

The cursor will be moved to the line below but it will remain in the same column. If the cursor is in the last display line, it will be moved to the first display line.

CURSOR UP

Code: 26
Hex code: 1A
Mnemonic: SUB

The cursor will be moved to the line above but it will remain in the same column. If the cursor is in the first display line, it will be moved to the last display line.

HOME

Code: 1
Hex code: 1
Mnemonic: SOH

The cursor is moved to Home position i.e first line, first column of the display, or on the other hand the up, left corner

CARRIAGE RETURN

Code: 13
Hex code: D
Mnemonic: CR

The cursor is moved to the beginning of the line where it was located.

CARRIAGE RETURN+LINE FEED

Code: 29
Hex code: 1D
Mnemonic: GS

The cursor is moved to the beginning of line above the one where it was located. If the cursor is at the last display line, it will be moved to the beginning of the first line i.e Home position.

ABSOLUTE CURSOR PLACEMENT

Code: 27 89 r c
Hex code: 1B 59 r c
Mnemonic: ESC Y ASCII(r) ASCII(c)

The cursor is moved to the absolute position indicated by "r" and "c".

These codes are the row and column values of the position, plus a constant offset of **32 (20 Hex)**.

If, for example, the user wants to place the cursor at Home position (line 0, column 0), the following byte sequence must be sent:

27 89 32 32.

If row and/or column values are not compatible to the installed display, the command is ignored.

COMMANDS FOR CURSOR ATTRIBUTES MANAGEMENT

Below are listed the command that define the possible cursor attribute.

CURSOR OFF

Code: 27 80
Hex code: 1B 50
Mnemonic: ESC P

The cursor is not active and it is not more visible.

STEADY STATIC CURSOR ON

Code: 27 79
Hex code: 1B 4F
Mnemonic: ESC O

The cursor is activated so it is visible. Now it is a not blinking line placed under the current position character.

NOTE: This command is not available if **QTP PCK-F4**, with fluorescent 20x4 display, is installed.

BLINKING BLOCK CURSOR ON

Code: 27 81
Hex code: 1B 51
Mnemonic: ESC Q

The cursor is enabled and it is visible. The selected cursor type is a blinking rectangular block that is alternatively visualized with the character displayed on the current cursor position.

COMMANDS FOR EEPROM

In the following paragraphs are described all the commands that manage the data saved on **QTP PCK** on board EEPROM; there are other commands that use indirectly EEPROM but they are described in next paragraphs.

REQUEST FOR EEPROM WRITING POSSIBILITY

Code: 27 51
Hex code: 1B 33
Mnemonic: ESC 3

This command checks if the **QTP PCK** is ready for writing data on its on board **EEPROM**. This command must be executed any time there are data to be saved on this type of memory.

When **QTP PCK** receives this command, it answers with the following codes:

6	(06 Hex)	(ACK)	->	QTP PCK ready
21	(15 Hex)	(NACK)	->	QTP PCK not ready

If the **QTP PCK** sends back the NACK code, it is not yet possible to memorize a new data on EEPROM.

WRITING OF PRESENCE BYTE

Code: 27 33 78 byte
Hex code: 1B 21 4E byte
Mnemonic: ESC ! N ASCII(byte)

This command sets the card "Presence Byte" with the value indicated in the **byte** parameter that must be included in **0÷255** range.

This byte has a reserved allocation on the on board EEPROM that, once it is set with the desired value, it allows for example, to verify that **QTP PCK** runs correctly, or if there are some communication problems on the serial line.

NOTE: This command writes data on the on board EEPROM, so before executing it is better to check the EEPROM writing possibility through the proper command; in fact if it is not ready the command is ignored.

READING OF PRESENCE BYTE

Code: 27 33 110
Hex code: 1B 21 6E
Mnemonic: ESC ! n

The **QTP PCK** sends back on the serial line the value of its "Presence Byte".

For example, this command can be useful to verify the presence or the correct running of the terminal.

COMMANDS FOR GENERAL FUNCTIONS

In the following paragraphs are described all the general purpose commands that manage some of the **QTP PCK** features.

READING OF VERSION NUMBER

Code: 27 86
Hex code: 1B 56
Mnemonic: ESC V

On the primary serial line is returned a string of 3 chars containing the program managing version that is resident and executed by **QTP PCK**.

BEEP

Code: 7
Hex code: 7
Menomonic: BEL

The buzzer is enabled for a time of 0.1 second.

OPERATING MODE SELECTION

Code: 27 65 mode
Hex code: 1B 41 mode
Mnemonic: ESC A ASCII(mode)

It defines the operating mode for the special characters (provided of code less than 32 = 20H) and the single character command. The selected modality is defined by mode value, with the following correspondence:

0	(00 Hex)	->	Command mode
255	(FF Hex)	->	Representation mode

If mode value is not one of the above described, the command is ignored. Further information about operating mode are available inside **CHARACTER VISUALIZATION ON THE DISPLAY** paragraph.

COMMANDS FOR KEYBOARD MANAGEMENT

Below are described the commands that can be used to manage the PC keyboard, connected to **QTP PCK**. Detailed information about keyboard management and codes transmitted by the terminal when keys are pressed, are available in **KEYBOARD ACQUISITION** paragraph. Please remind that **QTP PCK** drives autonomously the three visualization LEDs available on keyboard, to signalize the Caps Lock, Num Lock and Scroll Lock status; moreover the user can drive the same LEDs according with his requirements, through three specific commands.

READING OF PC KEYBOARD ERROR

Code: **27 48**
Hex code: **1B 30**
Mnemonic: **ESC 0**

This command let the user acquire the errors status recognized during the PC keyboard initialization phase, that is always executed after a power on. In this way the user can check if the keyboard is connected and if it is correctly running, directly from his application program without any operator intervent.

When **QTP PCK** receives this command, it answers with one of the following codes:

<i>0</i>	<i>(00 Hex)</i>	<i>(NUL)</i>	->	<i>No errors on PC keyboard</i>
<i>1</i>	<i>(01 Hex)</i>	<i>(SOH)</i>	->	<i>Diagnostic errors on PC keyboard</i>
<i>2</i>	<i>(02 Hex)</i>	<i>(STX)</i>	->	<i>PC keyboard not available or damaged</i>

If the **QTP PCK** sends back code that signalize errors ($\neq 0$), all the following keyboard command are ignored.

KEYCLICK ON WITHOUT MEMORIZATION

Code: **27 53**
Hex code: **1B 35**
Mnemonic: **ESC 5**

The **keyclick** function is switched on so there is a sound feedback when a key is pressed. This setting is not saved inside the on board EEPROM so if the terminal is powered off and on it goes back to the previous condition, defined and saved in local set up mode.

KEYCLICK OFF WITHOUT MEMORIZATION

Code: **27 54**
Hex code: **1B 36**
Mnemonic: **ESC 6**

The **keyclick** function is disabled so there is not sound feedback when a key is pressed. This setting is not saved inside the on board EEPROM so if the terminal is powered off and on it goes back to the previous condition, defined and saved in local set up mode.

ACTIVATION OF PC KEYBOARD LED

Code: 27 50 *n.LED Attr.*
Hex code: 1B 32 *n.LED Attr.*
Mnemonic: ESC 2 ASCII(*n.LED*) ASCII(*Attr.*)

The LED referenced by "n.LED" is setted with the attribute specified in "Attr.". The LEDs numbers are associated with the following correspondence:

0	(00 Hex)	->	Scroll Lock LED
1	(01 Hex)	->	Num Lock LED
2	(02 Hex)	->	Caps Lock LED

The available attributes are as follows:

0	(00 Hex)	->	Disabled LED
255	(FF Hex)	->	Enabled LED

If the parameters LED number or attribute are not valid, the command is ignored.
For example if you wish to enable Scroll Lock LED, the following sequence has to be sent:

27 50 0 255

ACTIVATION OF PC KEYBOARD LEDS WITH MASK

Code: 27 52 *mask1 mask2 mask3*
Hex code: 1B 34 *mask1 mask2 mask3*
Mnemonic: ESC 4 ASCII(*mask1*) ASCII(*mask2*) ASCII(*mask3*)

All the LEDs available on PC keyboard are contemporarily managed as indicated in "mask1", "mask2" and "mask3" with the following correspondence:

<i>mask1 (bit 0)</i>	->	<i>Defines status of Scroll Lock LED</i>
<i>mask1 (bit 1)</i>	->	<i>Defines status of Num Lock LED</i>
<i>mask1 (bit 2)</i>	->	<i>Defines status of Caps Lock LED</i>
<i>mask2</i>	->	<i>No function (manteined for compatibility)</i>
<i>mask3</i>	->	<i>No function (manteined for compatibility)</i>

If a bit is placed at 0 logic state, the correpondent LED is turned off (disabled), viceversa it will be turned on (enabled) if the correspondent bit is at 1 state.

For example if you wish to enable all LED, the following sequence has to be sent:

27 52 7 0 0

NOTE: The "mask2" and "mask3" must be always sent even if it has no meaning, for a correct management of the 3 keyboard's LEDs.

READING OF PC KEYBOARD LEDS MASK

Code: 27 49
Hex code: 1B 31
Menemonic: ESC 1

Through this command it is possible to acquire the current status of the three LEDs available on PC keyboard that, as already stated, are driven either autonomously by firmware or by commands sent by the user.

When **QTP PCK** receives this command, it answers with one byte that has the following meaning:

- byte (bit 0)* -> *Defines status of Scroll Lock LED*
- byte (bit 1)* -> *Defines status of Num Lock LED*
- byte (bit 2)* -> *Defines status of Caps Lock LED*

If a bit is returned at 0 logic state, the correpodent LED is turned off (disabled), viceversa it will be turned on (enabled) if the correspondent bit is at 1 state.

For example if it is returned the byte 1, only the Scroll Lock LED is enabled.

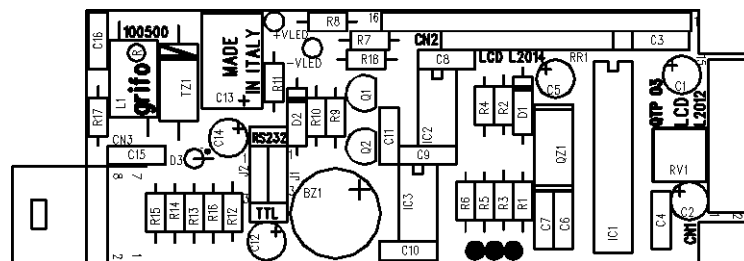


FIGURE 12: QTP PCK COMPONENTS SIDE MAP

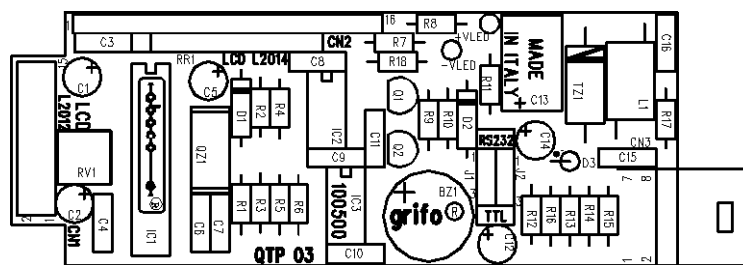


FIGURE 13: QTP PCK SOLDER SIDE MAP

COMMANDS FOR USER CHARACTERS

QTP PCK let the user define and show up to 8 user characters; those characters can be used to represent on display special characters, pseudo graphic characters, special symbols, etc. that are not still available in the same display (please refer to table in appendix B). The user characters can be defined and saved with a pattern equal to a 5 x 8 pixels matrix, so organized:

		<i>Pixel columns</i>				
<i>Pixel rows</i>	Pat 0.4	Pat 0.3	Pat 0.2	Pat 0.1	Pat 0.0	
	Pat 1.4	Pat 1.3	Pat 1.2	Pat 1.1	Pat 1.0	
	Pat 2.4	Pat 2.3	Pat 2.2	Pat 2.1	Pat 2.0	
	Pat 3.4	Pat 3.3	Pat 3.2	Pat 3.1	Pat 3.0	
	Pat 4.4	Pat 4.3	Pat 4.2	Pat 4.1	Pat 4.0	
	Pat 5.4	Pat 5.3	Pat 5.2	Pat 5.1	Pat 5.0	
	Pat 6.4	Pat 6.3	Pat 6.2	Pat 6.1	Pat 6.0	
	Pat 7.4	Pat 7.3	Pat 7.2	Pat 7.1	Pat 7.0	

FIGURE 14: USER CHARACTERS MODEL

The user characters representation is really simple in fact it is sufficient to send the proper code (0 to 7 or 8 to 15) with a possible previous setting of representation mode, through OPERATING MODE SELECTION command.

When the user character are saved their pixels patterns are written on EEPROM and then they are reloaded on display any time the terminal is powered on.

NOTE: On **QTP PCK-F2** and **QTP PCK-F24** the value of Pat 7.0 pixel defines the status of all the five pixels Pat 7.4÷Pat 7.0, or in other words it defines the status of underline attribute of the defined character.

DEFINITION OF USER CHARACTER

Code: 27 66 *nchr* *Pat 0 ... Pat 7*
Hex code: 1B 42 *nchr* *Pat 0 ... Pat 7*
Mnemonic: ESC B ASCII(*nchr*) ASCII(*Pat 0*) ... ASCII(*Pat 7*)

After the two command identification codes, other 9 bytes must be sent to **QTP PCK** with the following meaning:

<i>nchr</i>	(0÷7)	(00÷7 Hex)	->	<i>Number of user character to define</i>
<i>Pat 0</i>	(0÷31)	(00÷1F Hex)	->	<i>Firs byte of pattern equal to first high row of character.</i>
:	:		->	: : : :
<i>Pat 7</i>	(0÷31)	(00÷1F Hex)	->	<i>Seventh byte of pattern equal to last low row of character.</i>

This command load on the display the pattern of the user character *nchr* with the value placed in the eight byte *Pat 0 ÷ Pat 7*, as described in figure 14; the pattern is only defined but not saved, so if **QTP PCK** is turned off and on the user character *nchr* doesn't maintain the supplied pattern.

For example if you wish to define the user character 5 as an empty rectangle with maximum dimension, the following sequence has to be sent:

27 66 5 31 17 17 17 17 17 17 31.

DEFINITION AND MEMORIZATION OF USER CHARACTER

Code: 27 33 66 *nchr* *Pat 0 ... Pat 7*
Hex code: 1B 21 42 *nchr* *Pat 0 ... Pat 7*
Mnemonic: ESC ! B ASCII(*nchr*) ASCII(*Pat 0*) ... ASCII(*Pat 7*)

After the three command identification codes, other 9 bytes must be sent to **QTP PCK** with the following meaning:

<i>nchr</i>	(0÷7)	(00÷7 Hex)	->	<i>Number of user character to define and save</i>
<i>Pat 0</i>	(0÷31)	(00÷1F Hex)	->	<i>Firs byte of pattern equal to first high row of character.</i>
:	:		->	: : : :
<i>Pat 7</i>	(0÷31)	(00÷1F Hex)	->	<i>Seventh byte of pattern equal to last low row of character.</i>

This command load on the display the pattern of the user character *nchr* with the value placed in the eight byte *Pat 0 ÷ Pat 7*, as described in figure 14; moreover the pattern is also saved on EEPROM, so if **QTP PCK** is turned off and on the user character *nchr* maintain the supplied pattern.

NOTE: This command writes data on the on board EEPROM, so before executing it is better to check the EEPROM writing possibility through the proper command; in fact if it is not ready the command is ignored.

COMMANDS FOR MESSAGE MANAGEMENT

In the following paragraphs are described all the commands that manage messages on **QTP PCK**. The messages are 20 characters sequence that can be saved on board EEPROM and then reloaded or represented on display, simply by supplying the same message identification number. The most important function of messages is the possibility to show constant information on the display (i.e. alarms, equipment status, etc.) without the transmission of the numerous characters of this information but only the few characters of the commands. Furthermore a comfortable program for PC, named **QTP EDIT**, allows any user to edit the messages, save and load them on PC disks and transmit/receive them directly to/from **QTP** serially connected to PC.

QTP PCK can accept one EEPROM with two different size: 512 bytes in base version and 2048 bytes in **.MEX** version. This last is an option that must be specified in the order.

READING OF THE LAST STORAGED MESSAGE NUMBER

Code: **27 110**
Hex code: **1B 6E**
Mnemonic: **ESC n**

This comand returns on the serial line the number of the last messages that can be saved on EEPROM. It varies in compliance with the size of the EEPROM installed on the card, as reported in the below table:

<i>Version</i>	<i>EEPROM size</i>	<i>Last message n^o</i>
	512 Bytes	20 (14 Hex)
.MEX	2048 Bytes	97 (61 Hex)

FIGURE 15: NUMBER OF MESSAGES STORAGEABLE ON EEPROM

MESSAGE STORAGE

Code: **27 33 67 n.mes. chr. 0... chr.19**
Hex code: **1B 21 43 n.mes. chr. 0... chr.13 Hex**
Mnemonic: **ESC ! C ASCII(n.mes.) ASCII(chr.0)...ASCII(chr.19)**

This command stores the 20 characters message, with number indicated as **n.mes.**, on the on board EEPROM. The 20 chars which form the message must be visualizable on the display so they must be included in the range **0÷255 (00÷FF Hex)**. The message number must be included in the range of **0÷max. n.**, where max.n. is the number of the last stored message just previously described in figure 15.

NOTE: This command writes data on the on board EEPROM, so before executing it is better to check the EEPROM writing possibility through the proper command; in fact if it is not ready the command is ignored.

MESSAGE READING

Code: 27 33 69 *n.mes.*
Hex code: 1B 21 45 *n.mes.*
Mnemonic: ESC ! E ASCII(*n.mes.*)

This command reads the 20 characters message corresponding to **n.mes.** by the EEPROM and it send this message on serial line, beginning from the first char of the string. At the end of the message, the **CR+LF** codes are sent, too.

The message number must be included in the range of **0÷max.no.**, where max.no. is the number of the last stored message just previously described in figure 15. If this number is not compatible with the **QTP PCK** installed EEPROM size, this command is ignored.

MESSAGE VISUALIZATION

Code: 27 33 68 *n.mes. n*
Hex code: 1B 21 44 *n.mes. n*
Mnemonic : ESC ! D ASCII(*n.mes.*) ASCII(*n*)

This command visualizes **n** 20 characters messages on the display, beginning from current cursor position.

The first of the **n** messages is that one having the number corresponding to **n.mes.** while the remaining messages are those ones immediately subsequents in EEPROM.

The message number must be included in the range **0÷max.no.**, where max.no. is the value described in figure 15. If this number is not compatible with the **QTP PCK** installed EEPROM size, this command is ignored.

The **n** quantity of messages to be visualized depends only on the model of the display and it is included in these ranges:

20x2 display	n between 1÷2
20x4 or 40x2 display	n between 1÷4

If the **n** value is not compatible with the installed display model, the command is ignored. The cursor is placed in the next position of the last character visualized; if the last character of the said message occupies the last position of the display, the cursor will be placed in home position.

For example; if you wish to visualize the messages number 10 and 11, it will be necessary to send the following sequence:

27 33 68 10 2

EXTERNAL CARDS

The typical application of **QTP PCK** are those that requires interaction between operator and controlled machine for data, status, measures, information exchanges. The card can be connected to a wide range of programmable devices provided of one serial communication line produced by **grifo**[®], or to many system of other companies.

Hereunder some of these cards are briefly described; ask the detailed information directly to **grifo**[®], or search it on **grifo**[®] CD or web site, if required.

GPC[®] 553

General Purpose Controller 80C552

80C552 μ P, 22÷33 MHz; 1 RS 232 line (software); 1 RS 232 or RS 422-485 or Current Loop line; 16 TTL I/O lines; 8 A/D 10 bits lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM and RTC backed; 32K DIL EEPROM; 8K serial EEPROM; 2 PWM lines; 1 Activity LED; Watch dog; 5 readable DIPs; LCD Interface.

GPC[®] 323

General Purpose Controller 51 family

80C32 μ P, 14 MHz; Full CMOS; 1 RS 232 line (software); 1 RS 232 or RS 422-485 or Current Loop line; 24 TTL I/O lines; 11 A/D 12 bits lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM and RTC backed; 32K DIL EEPROM; 8K serial EEPROM; Buzzer; 2 Activity LED; Watch dog; 5 readable DIPs; LCD Interface.

GPC[®] 153

General Purpose Controller Z80

84C15 μ P, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 16 TTL I/O lines; 8 A/D 12 bits lines; 2÷4 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; Buzzer; 1 Activity LED; Watch dog; 8 readable DIPs; LCD Interface.

GPC[®] 184

General Purpose Controller Z80195

Microprocessor Z80195 at 22 MHz; implementation completely CMOS; 512K EPROM or FLASH; 512K RAM; Back-Up with Lithium battery internal or external; 1 serial line RS 232 + 1 RS 232 or RS 422-485 or current loop + 1 TTL; 18 I/O TTL; 4 timer/counter 8 bits; 2 timer 16 bits; Watch Dog; Real Time Clock; activity LED; EEPROM; interface for **ABACO**[®] I/O BUS.

GPC[®] 154

“4” Type General Purpose Controller Z80

84C15 μ P, 10÷16 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 line; 16 TTL I/O lines; 2÷4 Timers Counters; 512K EPROM or FLASH; 512K RAM and RTC backed; 8K serial EEPROM; Watch dog; 2 readable DIPs; LCD Interface; Abaco[®] I/O BUS; 5Vdc Power supply. Size 100x50 mm.

GPC[®] 324/D

“4” Type General Purpose Controller 80C32/320

80C32 or 80C320 μ P, 14÷22 MHz; Full CMOS; 1 RS 232 line; 1 RS 232 or RS 422-485 or Current Loop line; 4÷16 TTL I/O lines; 3 Timers Counters; 64K EPROM; 64K RAM; 32K RAM backed; 32K DIL E2; 8K serial EEPROM; Watch dog; 1 readable DIP; LCD Interface; Abaco[®] I/O BUS; 5Vdc Power supply; Size: 100x50 mm.

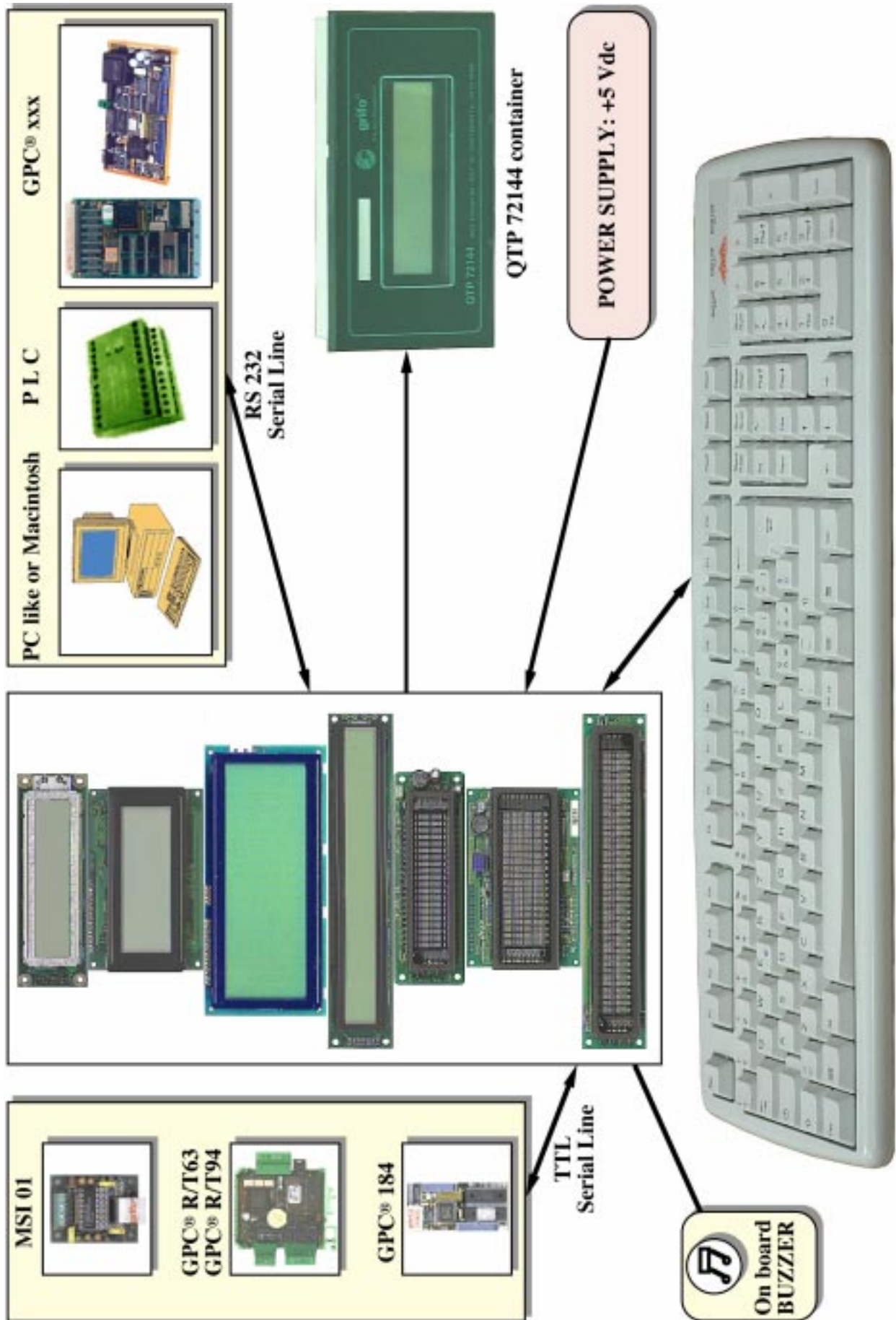


FIGURE 16: AVAILABLE CONNECTIONS DIAGRAM

GPC® 884

General Purpose Controller Am188ES

Microprocessor AMD Am188ES up to 40 MHz 16 bits; implementation completely CMOS; serie 4 format; 512K EPROM or FLASH; 512K SRAM backed with Lithium battery; RTC; 1 RS 232 serial line + 1 RS 232 or RS 422-485 or current loop; 16 I/O TTL; 3 timer/counter; watch dog; EEPROM; 11 signals A/D converter with 12 bit resolution; interface for **ABACO®** I/O BUS.

GPC® 114

General Purpose Controller 68HC11

Microprocessor 68HC11A1 at 8 MHz; type 4 format; 32K EPROM; 32K SRAM backed with Lithium battery; 32K EPROM, SRAM, EEPROM; RTC; 1 serial line RS 232, RS 422 or RS 485; 10 TTL I/O lines; 3 timers/counters; watch dog; 8 A/D converter signals with 8 bits resolution; 1 synchronous serial line; extremely low power consumption; interface for **ABACO®** I/O BUS.

GPC® AM4

General Purpose Controller ATmega103

Microprocessor ATmega103 at 5.5 MHz; CMOS implementation; 128K internal FLASH; 32K SRAM; Back-Up with Lithium battery internal or external; 4K internal EEPROM; 1 serial line RS 232, RS 422, RS 485 or current loop; 16 I/O TTL; 8 line A/D resolution 10 bits; 3 timers/counters; Watch Dog; Real Time Clock; **ABACO®** I/O BUS expansion. Interface for ISP programming.

MSI 01

Multi Serial Interface 1 line

Interface card for TTL serial line that is buffered in RS 232, RS 422, RS 485, or current loop line. The TTL line is on a mini screw connector and the buffered one is on standard plug connector.

IBC 01

Interface Block Communication

Conversion card for serial communication, 2 RS 232 lines; 1 RS 422 or RS 485 line; 1 optical fibre line; selectable DTE/DCE interface; quick connection for DIN 46277-1 and 3 rails.

GPC® 188F

General Purpose Controller 80C188

80C188 μ P 20MHz; 1 RS 232 line; 1 RS 232, RS 422-485 or Current Loop line; 24 TTL I/O lines; 1M EPROM or 512K FLASH; 1M SRAM Lithium battery backed; 8K serial EEPROM; RTC; watch dog; 8 dip switch; 3 timer counter; 8 13 bit A/D lines; Power failure; activity LEDs.

GPC® 15A

General Purpose Controller 84C15

Full CMOS card, 10÷20 MHz 84C15 CPU; 512K EPROM or FLASH EPROM; 128K RAM; 2K or 8K backed RAM+RTC; 8K serial EEPROM; 1 RS 232 serial line; 1 RS 232, RS 422, RS 485 or current loop line; 40 TTL I/O lines; 2 counters timers; 2 watch dogs; 2 dip switches, buzzer.

GPC® R/T94

General Purpose Relays/transistors 9 inputs 4 outputs

CMOS card, 14 MHz 89C4051 CPU; 4K FLASH; 128 byte RAM; 256 byte SRAM+RTC backed through battery; 1K serial EEPROM; 1 RS 232, RS 422, RS 485 or current loop line; 9 optocoupled NPN inputs; 4 relays outputs (5 A) or transistor (4A 45 Vdc) optocoupled; I/O lines displayed by LEDs; 1 counter timer.+5 Vdc power supply or 8÷24 Vac wide range; plastic container for Ω rails.

APPENDIX A: COMMAND CODES SUMMARY TABLES

The tables of this appendix list a summary of all the command sequences recognized by QTP PCK.

<i>COMMAND</i>	<i>CODE</i>	<i>HEX CODE</i>	<i>MNEMONIC</i>
Home	01	01	SOH
Cursor left	21	15	NACK
Cursor right	06	06	ACK
Cursor down	10	0A	LF
Cursor up	26	1A	SUB
Carriage return	13	0D	CR
Carriage return+line feed	29	1D	GS
Absolute cursor position	27 89 r c	1B 59 r c	ESC Y ASCII(r) ASCII(c)
Back space	08	08	BS
Clear page	12	0C	FF
Clear line	25	19	EM
Clear end of line	27 75	1B 4B	ESC K
Clear end of page	27 107	1B 6B	ESC k
Cursor off	27 80	1B 50	ESC P
Steady cursor on	27 79	1B 4F	ESC O
Blinking block cursor on	27 81	1B 51	ESC Q
Beep	07	07	BEL
Reading of version number	27 86	1B 56	ESC V
Operating mode selection	27 65 mode	1B 41 mode	ESC A ASCII(mode)

FIGURE A1: COMMAND CODES SUMMARY TABLE (1 OF 2)

<i>COMMAND</i>	<i>CODE</i>	<i>HEX CODE</i>	<i>MNEMONIC</i>
Request for EEPROM writing	27 51	1B 33	ESC 3
presence byte	27 33 78 byte	1B 21 4E byte	ESC ! N ASCII(byte)
Reading of presence byte	27 33 110	1B 21 6E	ESC ! n
Reading of PC keyboard error	27 48	1B 30	ESC 0
Keyclick on without memorization	27 53	1B 35	ESC 5
Keyclick off without memorization	27 54	1B 36	ESC 6
Activation of PC keyboard LED	27 50 n.LED attr	1B 32 n.LED attr	ESC 2 ASCII(n.LED) ASCII(attr)
Activation of PC keyboard LEDs mask	27 52 mask1 mask2 mask3	1B 34 mask1 mask2 mask3	ESC 4 ASCII(mask1) ASCII(mask2) ASCII(mask3)
Reading of PC keyboard LEDs mask	27 49	1B 31	ESC 1
Definition of user character	27 66 ncar Pat0...Pat7	1B 42 ncar Pat0...Pat7	ESC B ASCII(ncar) ASCII(Pat0)...ASCII(Pat7)
Definition and memorization of user character	27 33 66 nchr Pat0...Pat7	1B 21 42 nchr Pat0...Pat7	ESC ! B ASCII(nchr) ASCII(Pat0)...ASCII(Pat7)
Reading of max message number	27 110	1B 6E	ESC n
Message storage	27 33 67 n.mess. chr.0...chr.19	1B 21 43 n.mess. chr.0...chr.13	ESC ! C ASCII(n.mess.) ASCII(chr.0)...ASCII(chr.19)
Message reading	27 33 69 n.mess.	1B 21 45 n.mess.	ESC ! E ASCII(n.mess.)
Visualization of n messages	27 33 68 n.mess. n	1B 21 44 n.mess. n	ESC ! D ASCII(n.mess.) ASCII(n)

FIGURE A2: COMMAND CODES SUMMARY TABLE (2 OF 2)

APPENDIX B: DISPLAY CHARACTERS

The following tables shows the characters sets displayed on QTP PCK for all the possible received characters, according with order display and model.

Even the not ASCII characters (or special characters) change when the display type changes and if the user requires a character set different from those described in the following figures, he can take a direct contact with grifo®.

		D7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
		D6	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	
		D5	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	
		D4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	
32-0 0000			0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	User chr 0	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
0001	1	User chr 1	!	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0010	2	User chr 2	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0011	3	User chr 3	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0100	4	User chr 4	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0101	5	User chr 5	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0110	6	User chr 6	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
0111	7	User chr 7	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1000	8	User chr 0	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
1001	9	User chr 1	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1010	A	User chr 2	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1011	B	User chr 3	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1100	C	User chr 4	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1101	D	User chr 5	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1110	E	User chr 6	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	
1111	F	User chr 7	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	!"	

FIGURE B1: QTP 03-F2, F4, F24 CHARACTERS TABLE

		D7	D6	D5	D4	3	2	1	0								
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
		0	0	1	1	0	0	1	1	0	0	1	0	0	1	1	1
		0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
32	10	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	User chr 0			0	a	P	`	P			-	9	E	o	P	
0001	1	User chr 1		!	1	A	Q	a	4			=	7	7	4	4	4
0010	2	User chr 2		"	2	B	R	b	r			7	7	7	7	7	7
0011	3	User chr 3		#	3	C	S	c	s			7	7	7	7	7	7
0100	4	User chr 4		\$	4	D	T	d	t			7	7	7	7	7	7
0101	5	User chr 5		%	5	E	U	e	u			=	7	7	7	7	7
0110	6	User chr 6		&	6	F	V	f	v			7	7	7	7	7	7
0111	7	User chr 7		'	7	G	W	g	w			7	7	7	7	7	7
1000	8	User chr 0		(	8	H	X	h	x			7	7	7	7	7	7
1001	9	User chr 1		)	9	I	Y	i	y			7	7	7	7	7	7
1010	A	User chr 2		*	:	J	Z	j	z			7	7	7	7	7	7
1011	B	User chr 3		+	:	K	L	k	l			7	7	7	7	7	7
1100	C	User chr 4		,	<	L	#	l	l			7	7	7	7	7	7
1101	D	User chr 5		-	=	M	I	m	i			7	7	7	7	7	7
1110	E	User chr 6		.	>	N	^	n	+			7	7	7	7	7	7
1111	F	User chr 7		/	?	O	_	o	+			7	7	7	7	7	7

FIGURE B2: QTP 03-C4B, C24 CHARACTERS TABLE



		Higher 4-bit (D4 to D7) of Character Code (Hexadecimal)																	
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
Lower 4-bit (D0 to D3) of Character Code (Hexadecimal)	0	User chr 0	!	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	1	User chr 1	!	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
	2	User chr 2	!	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
	3	User chr 3	!	3	4	5	6	7	8	9	A	B	C	D	E	F			
	4	User chr 4	!	4	5	6	7	8	9	A	B	C	D	E	F				
	5	User chr 5	!	5	6	7	8	9	A	B	C	D	E	F					
	6	User chr 6	!	6	7	8	9	A	B	C	D	E	F						
	7	User chr 7	!	7	8	9	A	B	C	D	E	F							
	8	User chr 0	!	8	9	A	B	C	D	E	F								
	9	User chr 1	!	9	A	B	C	D	E	F									
	A	User chr 2	!	A	B	C	D	E	F										
	B	User chr 3	!	B	C	D	E	F											
	C	User chr 4	!	C	D	E	F												
	D	User chr 5	!	D	E	F													
	E	User chr 6	!	E	F														
	F	User chr 7	!	F															

FIGURE B3: QTP 03-C2, C4 CHARACTERS TABLE



APPENDIX C: MOUNTING OUTLINE DIMENSIONS

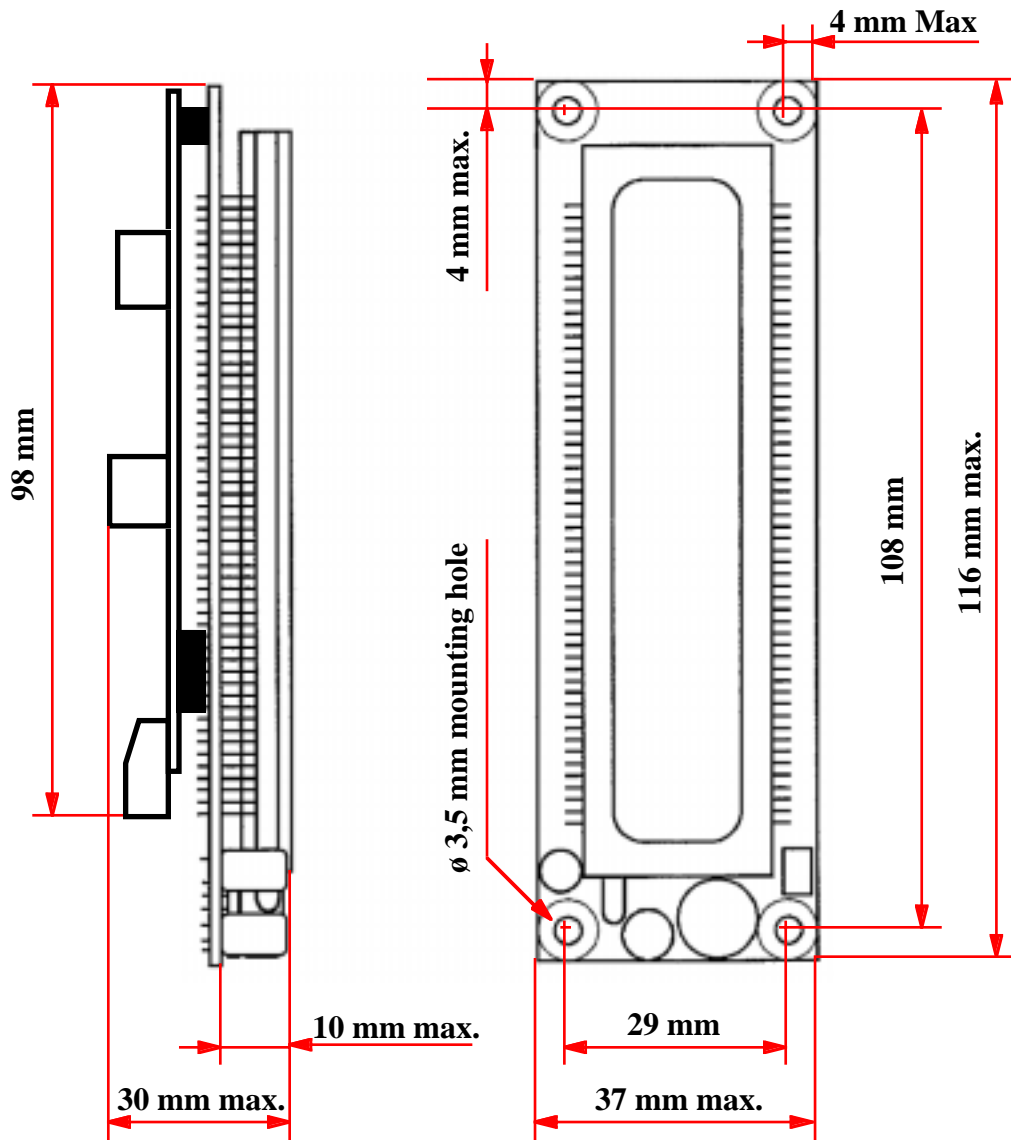


FIGURE C1: QTP PCK-C2, F2 DIMENSIONS

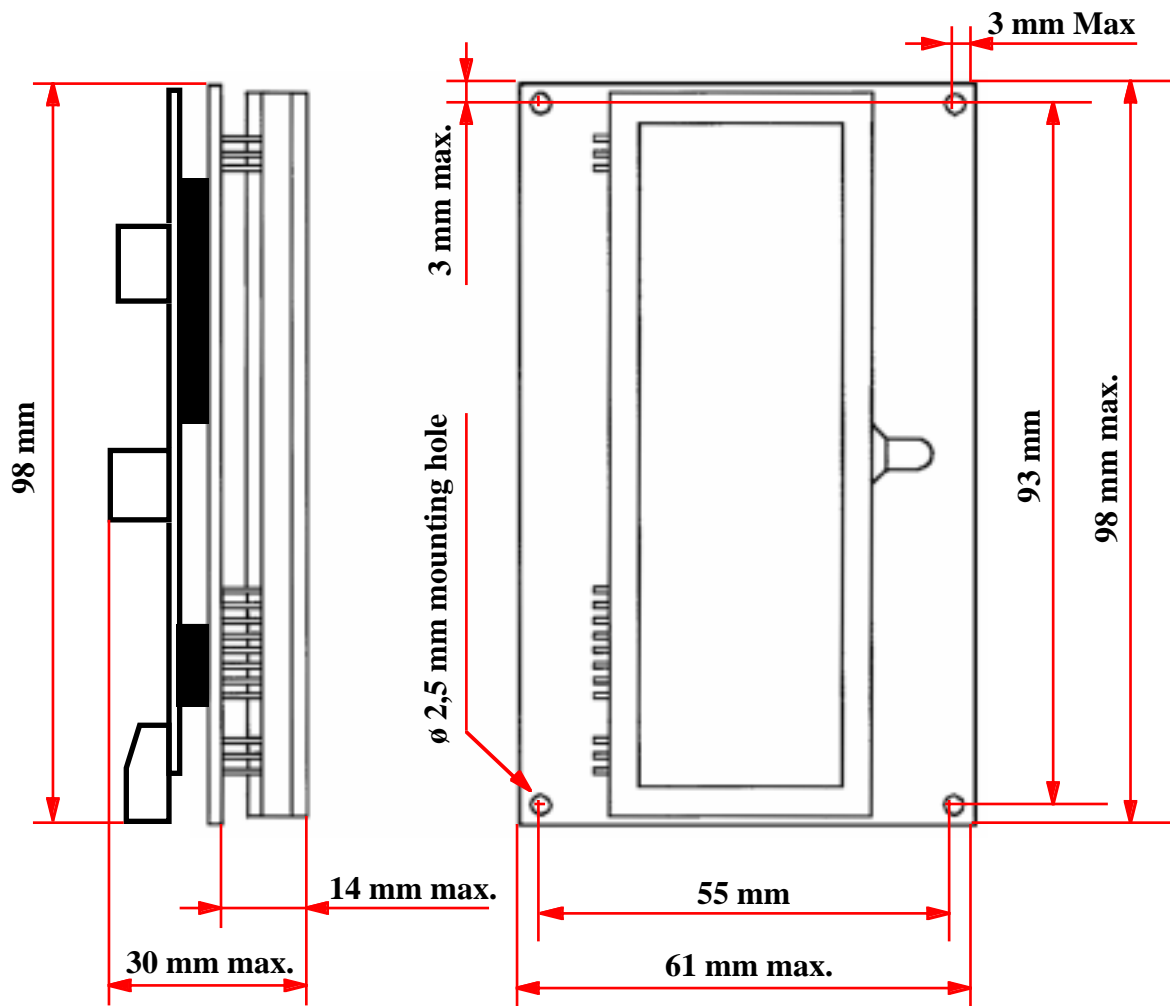


FIGURE C2: QTP PCK-C4, F4 DIMENSIONS

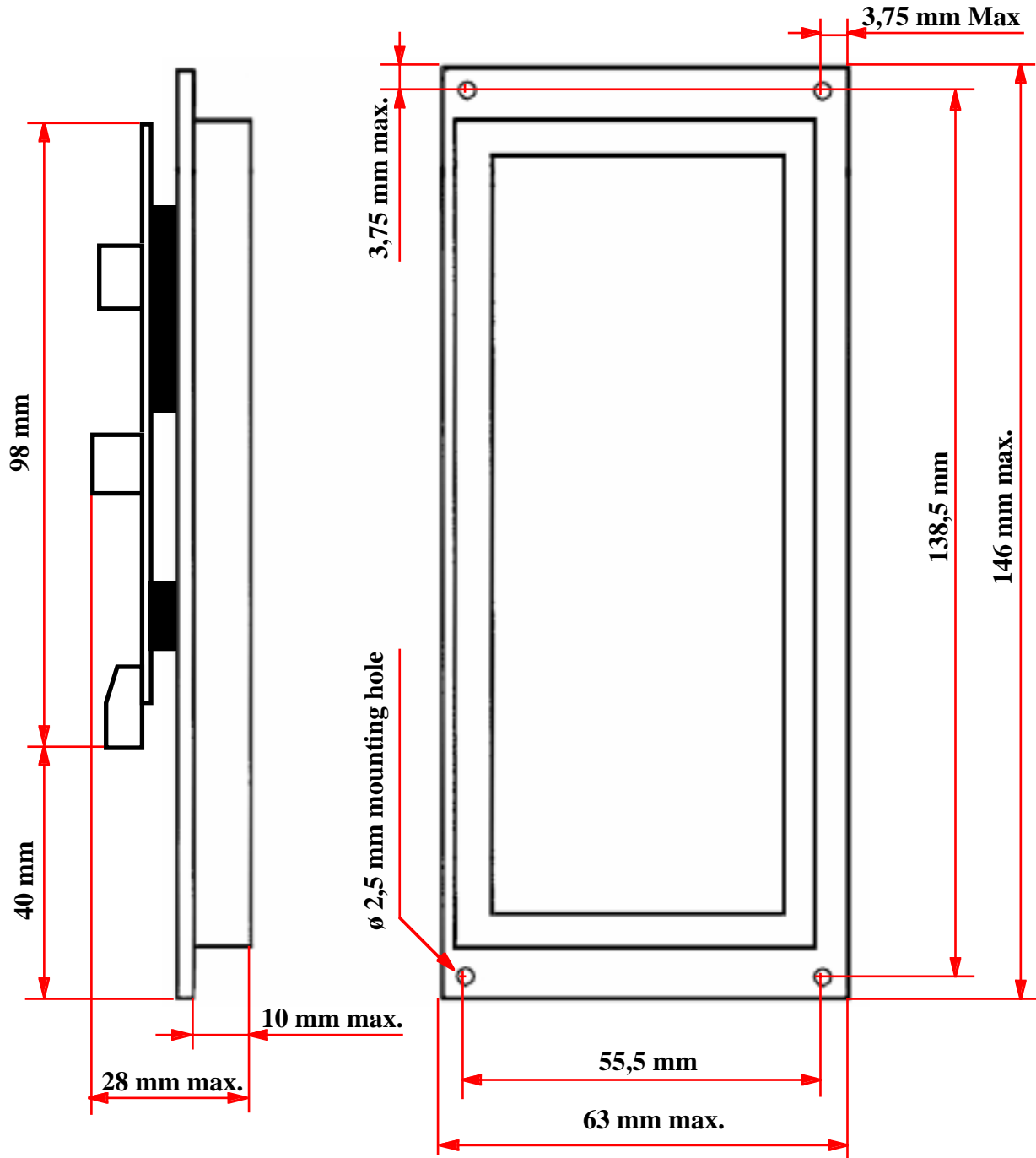


FIGURE C3: QTP PCK-C4B DIMENSIONS

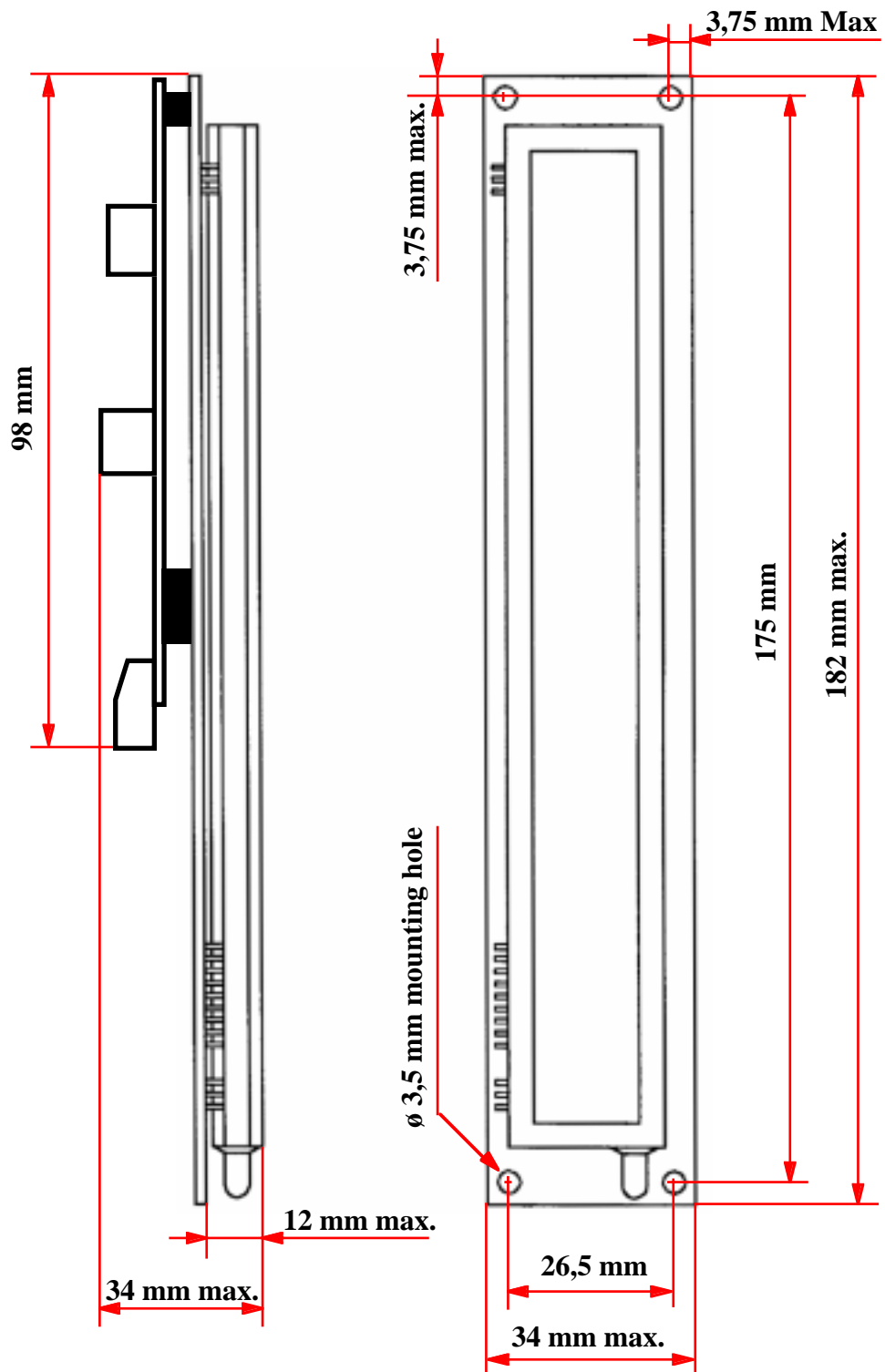


FIGURE C4: QTP PCK-C24, F24 DIMENSIONS

APPENDIX D: ALPHABETICAL INDEX

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