PALOMAR

DESCRIPTION

PALOMAR is the name of an advanced control system for equatorial mounts through the use of stepper motors with micro-stepping.

It is a stand-alone system for which we used a new 32-bit RISC processor with an operating frequency of 72 MHz.

The PALOMAR requires two stepper motors, bipolar type with an operating current up to 2 amperes.

It doesn't need a PC to operate or to be configured and it is thought to work on the field: where a PC crashes, PALOMAR still works.

Despite the small size, the PALOMAR is able to drive motors with a torque of over 1N/m with currents over 2A RMS per phase with peaks up to 2.8A, while maintaining a very low dissipation.

The Palomar employs a hardware platform capable of coping well with the future development that this device should have.

In fact, it is based on a very powerful CPU board, which among other functions provides a great expansion of the memory and the use of mass storage.

Optionally with the system, there is a development system for those who wants, starting from the current program, to make changes to the system software.

In the development system in addition to being provided with all the sources, it is also provided a work environment (IDE) that, in addition to the compiler and the linker, includes a text editor for C sources, the program for the binary download and so on.

KEY FEATURES

- It runs from 12 to 30 volts in DC with an absorption current up to 5 amps. It is protected against reverse polarity, short circuits on the phases of the motors and from overheating. For this latter, it is also used a small fan for which you can handle the action by setting a temperature threshold.
- It has a large 20 characters by 4 rows backlit LCD display and a backlit keyboard with 25 keys from where you can easily access the many functions of PALOMAR (backlight intensity is adjustable and it uses white LEDs).
- With its large display, an extended keyboard and an implementation of the program where the display is a window to slide on a more great content, it is very easy to manage the Palomar and if something needs to be changed, you can simply press a button to change everything you see without having to resort to tedious sequential menus.
- It is possible to control the PALOMAR by remote via RS232 or USB and it accepts LX200 commands (it works with the most common programs on astronomy) as well as its own more advanced proprietary protocol.
- It performs simultaneous commands by serial and keyboard and control of motion by joystick or autoguide.
- It will be shortly available the marketing of an integrated autoguide allowing to make corrections up to 5 per second using a hybrid silicon sensor of 1 cm square.
- It is completely remotely controllable via modem (without PC) or via a network interface through the CONSOLE mode that allows a complete management of the instrument via serial channel.
- Input for autoguide, joystick or external keypad. These inputs are opto-isolated and apart from make PALOMAR immune to interferences allow to use long cables.
- Handling of the periodic error of the worm in the synchronized or free-wheel mode, with very high precision of movement detected. Moreover, in the case of synchronized mode you can save the acquisition for later use.
- Phase motor current and micro-step are fully programmable from 0 to 2A and from 400 to 200000 steps in 500 possible fractioning. The current phases of the motors can be set with different values for the slewing and tracking to reduce consumption. Also it is possible to choose a different motor fractioning per tracking and for slewing.
- It allows you to use up to 4 complete settings stored in memory; it means to work with four different telescopes with a single instrument, without having to reconfigure it each time.
- Opto-isolated inputs for encoders that can be used to verify the positioning and other applications such as control of the dome.
- Opto-isolated input for parking the telescope and the limits of its movement.
- Wide chance to program the positioning speed (up to 1500X*) with acceleration and deceleration ramps.
- You can set primary and secondary demultiplication ratios (if presents) with fractional values.
- It manages the crossing of the meridian for German mount.
- Internal database of 100 brightest stars and the entire NGC2000 with over 13000 objects in addition to calculate the positions of all the planets including the Sun and the Moon. It also has 128 Kbytes of EEPROM memory dedicated to lists or a user-defined database.
- It applies corrections for precession, nutation, aberration and atmospheric refraction on the objects in the database, in addition to proper motions for the stars.
- It performs manual positioning (joystick or keyboard) with the coordinates display.
- You can set the value of microcorrections with an arbitrary and fractional value if required, even the fast movements from the keyboard or joystick are programmable for speed and sense of direction.
- Internal calendar clock with lithium backup battery.
- Internal integrated GPS (optional) with external antenna, allowing to automatically detect the geographic position and the altitude. Other than, it can synchronize the internal clock with atomic time provided by this device.
- Arbitrary tracking on both axes.

- For those who know the C programming language and knows of spherical astronomy, it is available a complete SDK compiler, linker, editor, sources and libraries for building their applications.
- You can upgrade the internal software for PC, without any payment, downloading the last binary available from our support web page

SPECS

- Number of controlled axis: 2
- Type of motor: Compatible with most 4, 6 or 8 wires hybrid Stepper motors
- Max continuous current for motor phase: 2.8A RMS
- Current of the phase programmable starting from 0 to 2000mA by 1mA step
- Short circuit protection on the phases of the motor
- Protection from over-heating of the motor drivers
- Protection against reverse polarity of the powering
- Under-volt protection
- Low power dissipation
- Power supply 12-30 VDC, with ON/OFF control
- Humidity: 0 ~ 95% (non-condensing)
- Temperature: 0 ~ 70°C
- Forced ventilation of the motor drivers with control of operating temperature
- Two input channels for encoder, used as motor feedback
- Two RS232 serial channels for command controls
- Display of 4 rows for 20 characters
- Keyboard of 25 back-illuminated keys
- Sinusoidal current wave form
- Low current ripple
- Quiet operation
- Motor fraction from 400 to 200000 steps/revolution in 500 possible values
- Completely programmable accelaration and decelaration ramps for each controlled motor
- Max positioning speed 75000 step/s
- Tracking speed from 0.00001 Hz to 75000 step/s with 0.00001Hz minimum control
- Decreasing of tracking errors by double correlated count
- Two A/D outputs 0-4V 500mA
- Six fast opto-isolated inputs (4 reserved for the encoders) with HCPL2630
- Four opto-isolated inputs for generic use
- Eight TTL inputs optionally used by the keyboard
- Sixteen TTL outputs, 8 of which optionally used by the keyboard
- One open collector output by 500 mA 25V
- Four TTL outputs with bus driver as expansion
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- Calendar/Watch with backup lithium battery
- Secure Digital Interface
- 128KByte EEPROM memory for application data
- SDK available (optional), including C sources, IDE, compiler, linker and libraries
- Dimension: 200H x 112W x 64D mm
- Weight: 600g

MODELS AVAILABLE:

1. **Base**: Plastic case, 2 m motors cable, 2 m powering cable, 2 m RS232 cable, 2 m Joystick cable, USB-RS23 converter cable, CD-ROM, 24 Months warranty
2. **GPS**: Base model plus the integrated GPS with external magnetic antenna and relative 5m cable
3. **SDK**: as GPS model, with the adding of 32Mb RAM memory and SDK and C sources.

OPTIONS

1. Professional Joystick with 2m extender cable.
2. Step motor SANYO-DENKY 103-H548-04500
3. Step motor SANYO-DENKY 103-H7123-0740
4. Step motor SANYO-DENKY 103-H7126-0740