TEMEX
TIME

iPrecision Timing Solutions[TM]

Low Cost, Pico Resolution Phase Stepper Test Set

High Resolution Phase Stepper
Easy-to-Use RF Device & Compact light weight

Calibration | Time Transfer | Doppler Shift Compensation | Instrument

Applications

Specifications are subject to change without prior notice

PicoStepper Features

- Power supply requirement   : AC input 85-264VAC / 47-63Hz
- Compact   : 1U rack mount chassis
- Input Frequency   : 10 MHz
- Output Frequency   : 4 x 10MHz
- Step size   : $\leq$ 10ps
- RS232 standard interface   : 9600 b/s
- No calibration required
- Internal Bit Alarm
- External signal stepping control   : TTL pulse signals

Key Application Features :

- Easy to use
- Compact
- High resolution
- COM standard interface
- Low noise performance
- Light weight

Key Applications :

- Time Keeping
- Time Lab device
- Time Transfer
- Doppler Shift Compensation

System Description

As illustrated in Figure 1, the main feature of the PicoStepper is to adjust the output frequency by controllable steps without changing the behavior of the master reference clock. A mechanical layout of the system illustrated in Figure 3.

This function is very useful in applications where users need to compensate the master clock frequency drift (or the Doppler shift in satellite communications system) without changing its internal parameters. Thus, the behavior of the master clock can be assessed during a complete experiment.
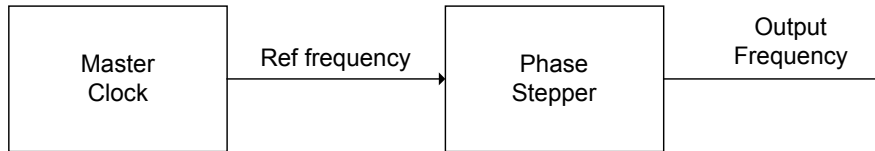

Figure 1- Application Diagram

Architecture

As illustrated in Figure 2, the PicoStepper architecture includes 2 functions: the Stepping and Command.
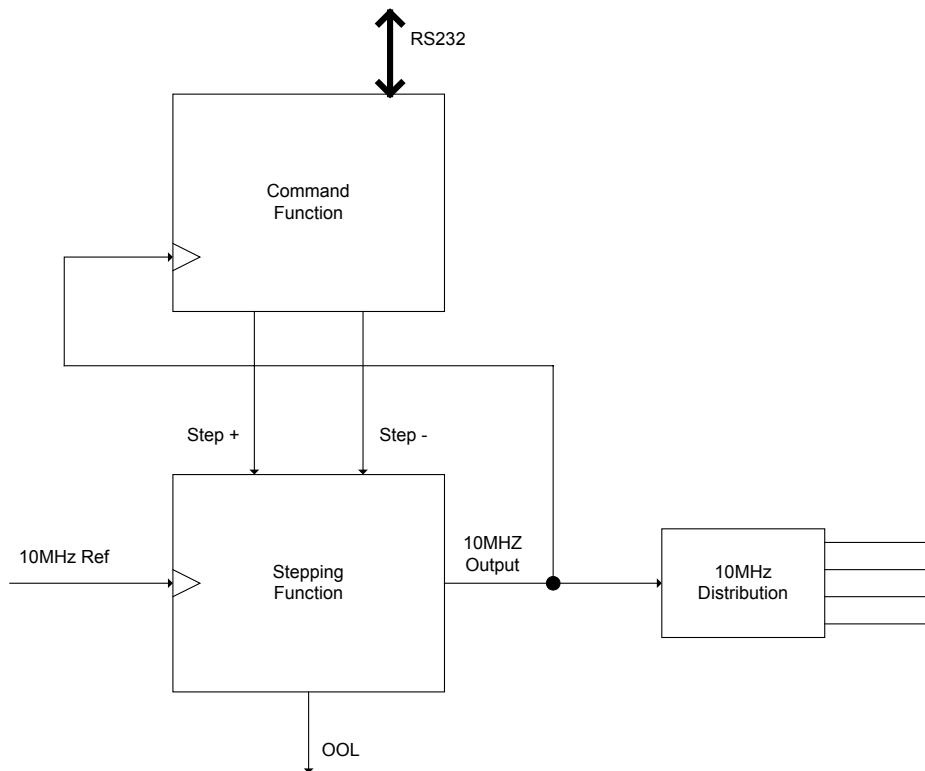

Figure 2 - Architecture

The basic feature is to command the output phase/frequency by sending controllable stepping commands through the RS232 interface. The PicoStepper can also be manually controlled with 2 external pulse signals (positive and negative steps), each adjusting the output in step of 10ps.
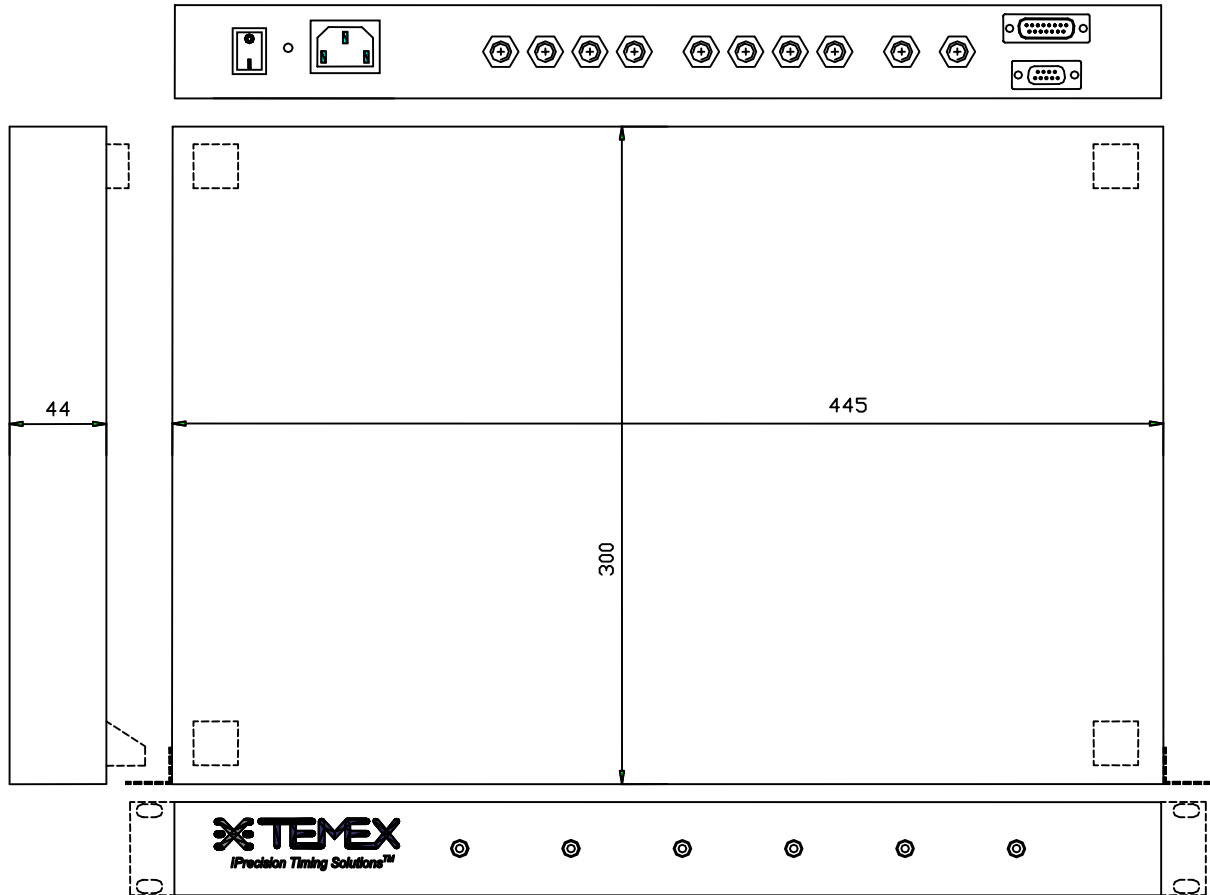
Figure 3 - Mechanical Layout

RS-232 Interface Functionality

The PicoStepper can accept the following basic ASCII commands: Data is in decimal ASCII code.

Command name	Syntax command	Data field (if any)	Response syntax	Response data (if any)
Identification	**ID**<CR><LF>	-	TNTMPS-ddd/hh/s.ss <CR><LF>	ddd: design review hh: hardware review s.ss: software review
Serial number	**SN**<CR><LF>	-	xxxxxx<CR><LF>	xxxxxx : 6 digits serial nbr
Enable RS232 stepping command	**EN**s<CR><LF>	s=0: Disable stepping cmd through RS232 s=1: Enable stepping cmd through RS232	s<CR><LF>	s: State s=0: RS232 stepping cmd disabled s=1: RS232 stepping cmd enabled
Status	**ST**<CR><LF>	-	s<CR><LF>	s:Status s=0 :warming up s=1 :running s=2 :OOL
Single Phase Step	**PS**s<CR><LF>	s=+ : Positive Step s=- : Negative Step	s<CR><LF>	s:signe s=+ : Positive Step s=- : Negative Step
Packet Phase Step	**PS**sddddddddd<CR><LF>	s=+ : Positive Packet Step s=- : Negative Packet Step ddddddddd: number	sddddddddd<CR><LF>	s:signe s=+ : Positive Packet Step s=- : Negative Packet Step ddddddddd: number
Frequency offset	**FA**sddddddddd<CR><LF>	s=+ : Positive offset s=- : Negative offset ddddddddd: number	sddddddddd<CR><LF>	s=+ : Positive offset s=- : Negative offset ddddddddd: number

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SPECIFICATIONS

ELECTRICAL

Type	Phase Stepper
	Standard version
Input reference frequency	10MHz
Input reference amplitude / impedance	$\geq 0.5VRMS / 50\Omega$
10MHz input reference connector	BNC
External stepping command pulse signals (one for Positive and one for Negative steps) Each pulse corresponds to a step of 10ps	
Level	TTL level
Active edge	Rising edge
Minimum pulse duration	>100ns
Number of outputs	4 x 10MHz
10MHz outputs amplitude / impedance	$\geq 1.0V_{RMS} \pm 20\% / 50\Omega$
10MHz outputs connectors	BNC
Minimum step on 10MHz output	$\leq 10ps$
Maximum frequency offset range	$\pm 1 \times 10^{-7}$
Output jitter without stepping	< 1ps
Output jitter while stepping	< 10ps
Phase stability (input reference to outputs) Versus temperature	$\leq 30ps/°C$
Phase deviation between outputs	$\leq 10ns$
Phase stepping command	By RS232
Frequency offset command	By RS232
Bit alarm	Front panel indicator

ENVIRONMENT

Type	Phase Stepper	
	Temperature	**Relative Humidity**
Operating	20 to 30°C	10% - 85%
Recommended operating	25°C $\pm$ 1%	50% $\pm$ 10%
Storage	-25 to 55°C	
Transportation	-25 to 70°C	

POWER REQUIREMENTS

Type	Phase Stepper
	Standard version
Input Range	85-264 VAC
Frequency	47 – 63 HZ
Power Consumption @25°C	< 20W after warm-up
Connector Type	230VAC IEC plug

PHYSICAL:

Type	Phase Stepper
	Standard version
Size	445 x 300 x 44 mm (1U)
Weight	2.0 Kg
	Front connector Rack **(Option R)**

Ordering Information

PicoStepper / R

Type   option Rack mount