



AN ADVANCE TECHNOLOGY IN DIGITAL PEN BY USING MEMS HAND GESTURE

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ABSTRACT:

Now daily, the enlargement of shrinking technology has greatly attenuated the dimension and weight of customer electronic merchandise, like wise phones and hand-held computers, and thus created them further handy and convenient. This paper presents associate accelerometer-based digital pen for written digit and gesture physical phenomenon recognition applications. This pen consists of a 3 angle measuring instrument, a microcontroller, associated an x-bee wireless transmission module for sensing and aggregation accelerations of handwriting and gesture trajectories. Victimization this project we have a tendency to square measure ready to do human laptop interaction. Users can use the pen to jot down digits or produce hand gestures, and conjointly the accelerations of mems motions measured by the measuring instrument unit wirelessly transmitted to a laptop for on-line physical phenomenon recognition. So, by dynamic the position of MEMS (micro electro mechanical systems) we are going to ready to show the alphabetical characters at intervals the pc. The acceleration signals measured from the triaxial measuring instrument unit transmitted to a laptop via the wireless module.

Keywords: ARM, ZigBee, Sensor module, Serial communication.

1. INTRODUCTION:

Explosive growth of shrinking technologies in electronic circuits and elements has greatly diminished the dimension and weight of consumer electronic product, like

wise phones and hand-held computers, so created them further handy and convenient. Because of the speedy development of technology, human-computer interaction.

Block diagram:

Pen section:

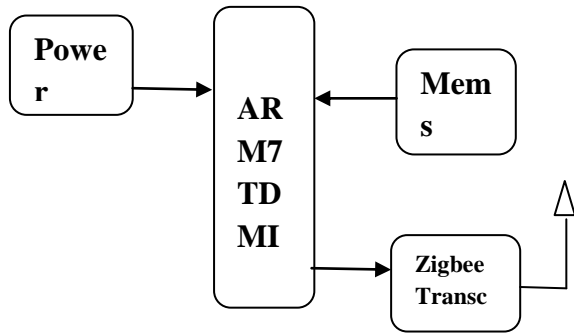


Fig:I Kit block diagram

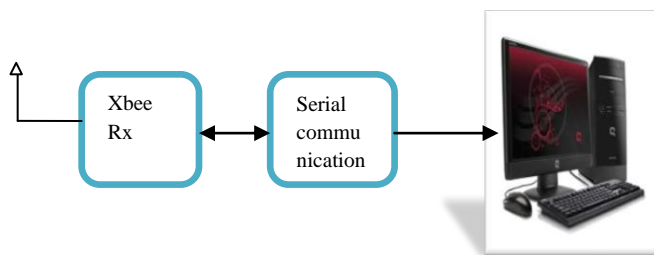


Fig: II PC section.

A. Small Controller (ARM7TDMI)

The ARM7TDMI resolution provides the low power (3.3v dc) consumption, small size, and high performance required in transferrable, embedded applications. The ARM7TDMI-S core is that the synthesizable version of the ARM7TDMI core, out there in each VERILOG and VHDL, prepared for compilation into processes supported by in-house or commercially out there synthesis libraries. Optimized for flexibility which incorporates an even feature set to the arduous macro cell, it improves time-to-market by reducing development time whereas providing enlarged vogue flexibility and enabling & amp get98% fault coverage. The ARM720T arduous macro cell contains the ARM7TDMI core, 8kb unified cache, and a Memory Management Unit (MMU) that permits the employment of protected execution areas and hardware. This offers designers a spread of software-compatible processors with durable price-

performance points. Support for the ARM vogue these days includes:

- Operational systems like Windows component, Linux, palm OS and SYMBIAN OS

B.LPC2148 MICROCONTROLLER

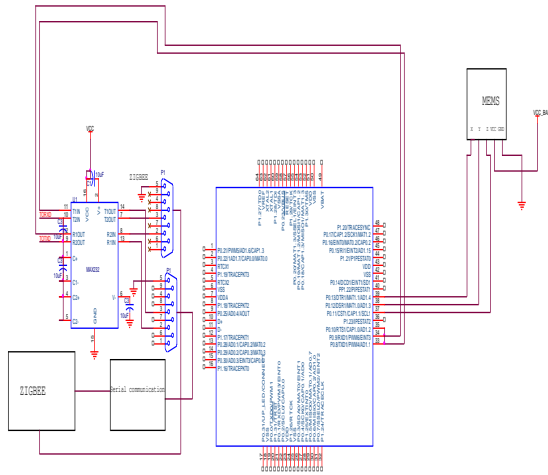
LPC2148 Microcontroller vogue the ARM7TDMI-S might even be a general purpose 32-bit small chip, that offers high performance and extremely low power consumption. The ARM vogue depends on Reduced Instruction Set laptop computer (RISC) principles, and in addition the instruction set and connected rewrite mechanism unit of measurement many easier than those of very little programmed tough Instruction Set Computers (CISC). This simplicity lands up terribly very high instruction product and spectacular quantity of sometime interrupt response from a little and economical processor core. Pipeline techniques unit of measurement used therefore all elements of the strategy and memory systems will operate endlessly. Typically, whereas one instruction is being dead, its successor is being decoded, and a 3rd instruction is being fetched from memory. The ARM7TDMI-S processor collectively employs a totally distinctive

study strategy aforesaid as Thumb that produces it ideally suited to high-volume applications with memory restrictions or applications wherever code density is also a issue. The key created behind Thumb is that of an excellent reduced instruction set. Basically, the ARM7TDMI-S processor includes a try of instruction sets:

- The traditional 32-bit ARM set.
- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length permits it to approach doubly the density of ancient ARM code whereas holding most of the ARM's performance advantage over a typical 16-bit processor victimization 16-bit registers. Generally this could be typically got ready as results of Thumb code operates on constant 32-bit register set as ARM code. Thumb code is terribly very position to supply up to sixty five create the foremost of the code size of ARM, and a hundred and sixty create the foremost of the performance of an equivalent ARM processor connected to a 16-bit memory system



Fig: ARM Processor**Fig: schematic diagram**

I. MEMS Technology:

Micro-Electro-Mechanical Systems (MEMS) is that the blending of mechanical elements, sensors, actuators, and natural science on a typical semiconductor substrate through small fabrication technology. MEMS is associate sanctioning technology permitting the event of wise merchandise, Augmenting the procedure ability of natural science in most cases, the physics behind the behavior of MEMS devices might even be expressed by mathematical expressions.

Thinker works by making a mathematical model of the system and generates analytical solutions to clarify the behavior of the MEMS device. The user simply have to be compelled to enter the input parameters like length Associate in Nursing dimension of the beam for instance in an extremely terribly user friendly graphical computer program, and in addition the laptop code can instantly calculate the relevant results and plot graphs that utterly produce a case for the MEMS device or a part of it. The laptop code is split into 5 modules specifically mechanics, sensing, actuation, and technique and data analysis. Mechanics module is split into 3 sub sections. The primary section being structures wherever the foremost generally used beams and diaphragm styles unit examined. The second section discusses vibration of those structures, each free and created vibration. The third section discusses damping among the look of squeeze film and slide film damping. Sensing module discusses sensing schemes wide employed in MEMS specifically piezoresistive and natural phenomenon sensing for bobbing up with pressure sensors and accelerometers. Accomplishment module examines the 2 wide used suggests that of accomplishment specifically static and thermal applied to

some generally used actuators like parallel plate, small mirror, comb drive, bimetallic and bimorph actuators. Technique module is split into six subsections specifically lithography, oxidation, diffusion, implantation, film deposition and wet etching. This covers style of the foremost generally used processes used at intervals the event of MEMS devices. The knowledge analysis module contains a die calculator, unit conversion tool and lists the fabric properties of generally used MEMS materials.

The increasing demand for MEMS (micro-electromechanical systems) technology is returning from various industries like automotive, area and shopper natural philosophy. MEMS guarantees to revolutionize nearly each product class by transportation along silicon-based electronics with micromachining technology, creating attainable the conclusion of complete systems-on-a-chip. KLA-Tenor offers the tools and techniques, 1st developed for the computer circuit business, for this rising market.

BASIC CONNECTIONS

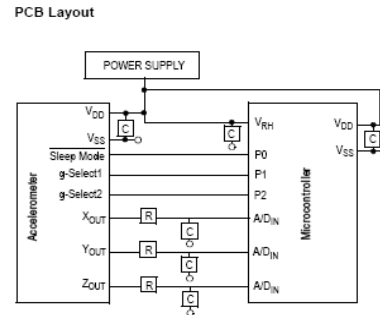
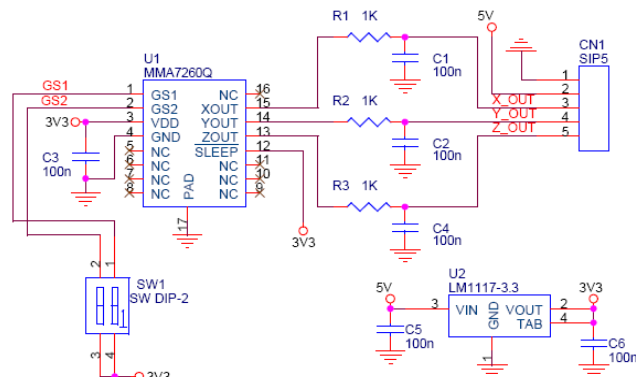
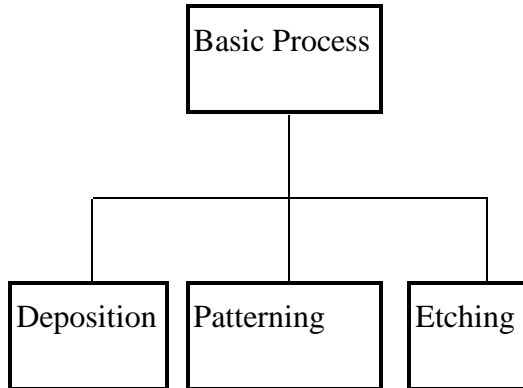


Figure 6. Recommended PCB Layout for Interfacing Accelerometer to Microcontroller

IV. TRAJECTORY ALGORITHM



MEMS basic process**Deposition processes:**

One of the essential building blocks in MEMS process is that the ability to deposit skinny films of fabric with a thickness anyplace between some nanometers to concerning a hundred micrometers. There are unit 2 styles of deposition process, as follows.

- Physical deposition.
- Chemical deposition

Patterning

Patterning in MEMS is that the transfer of a pattern into a cloth.

Etching processes

There are unit 2 basic classes of etching processes: wet etching and dry etching. Within the former, the fabric is dissolved once immersed in an exceedingly chemical resolution. Within the latter, the fabric is sputtered or dissolved victimization reactive ions or a vapor section etchant. For a somewhat dated summary of MEMS etching technologies.

II. Trajectory algorithm:

A mechanical phenomenon is that the path that a moving object follows through house as a operate of your time.

A trajectory is a sequence $(f^k(x))_{k \in \mathbb{N}}$ of values calculated by the iterated application of a mapping f to an element x of its source.

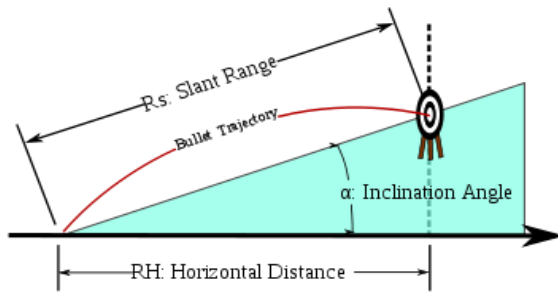
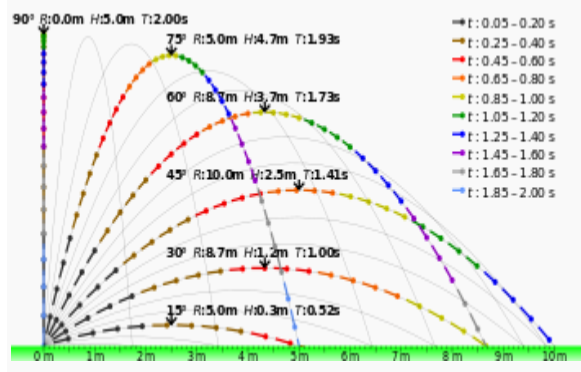


Illustration showing the trajectory of a bullet fired at an uphill target. **Physics of trajectories**



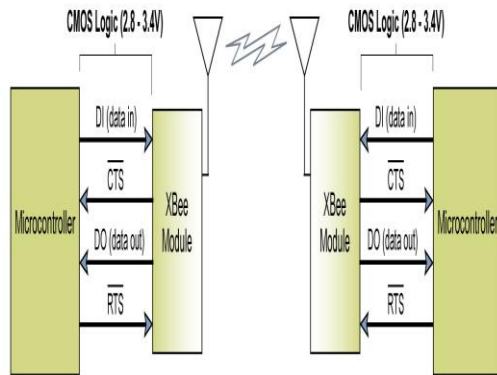
III. WIRELESS COMMUNICATION

A. Zigbee module:

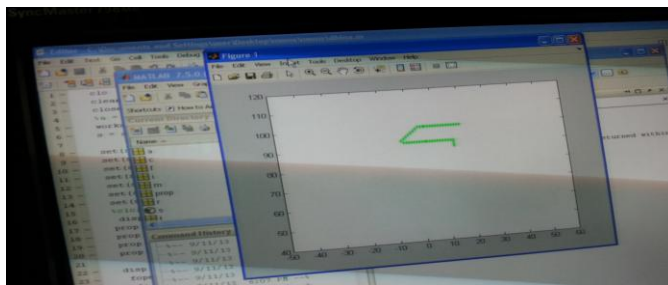
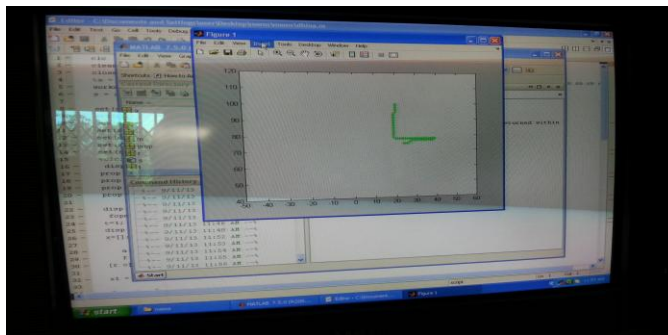
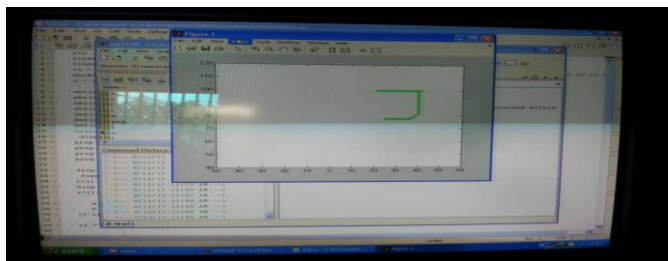
The XBee/XBee-PRO RF Modules unit designed to figure within the ZigBee protocol and supports the distinctive wishes of reasonable, low-power wireless device networks. The modules want minimal power and provide reliable delivery of data

between remote devices. The modules operate within the assumption a try of.4 rate per second frequency band and unit compatible with the following:

- XBee RS-232 Adapters
- XBee RS-232 pH (Power Harvester) Adapter
- XBee RS-485 Adapters
- XBee Analog I/O Adapter
- XBee Digital I/O Adapter
- XBee device Adapter
- XBee USB Adapter
- XStick
- Connect Port X Gateways
- XBee Wall Router.



IV. Output Screen shots:



V. Conclusion

This project has incontestable by presenting associate accelerometer-based digital pen for written digit by victimization physical phenomenon recognition applications. The digital pen consists of a triaxial measuring instrument, a semiconductor device, associated a Zigbee wireless transmission module for sensing and gathering the signals of accelerations of handwriting and gesture trajectories. By victimization this technology we have a tendency to square measure ready to write & amp to indicate the characters whereas not Victimization the keyboard by applying the human interaction to the laptop.

VI. Reference:

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