

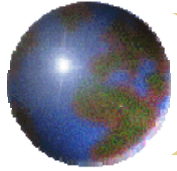
Embedded Vision-Servoing System

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Intelligent Robotics System
and Technology



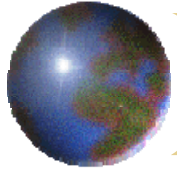
Shanghai Jiaotong University



List

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- System Hardware Architecture
- System Software Architecture
- Results and Application
- Other Experiences

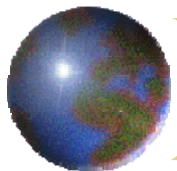




Introduction

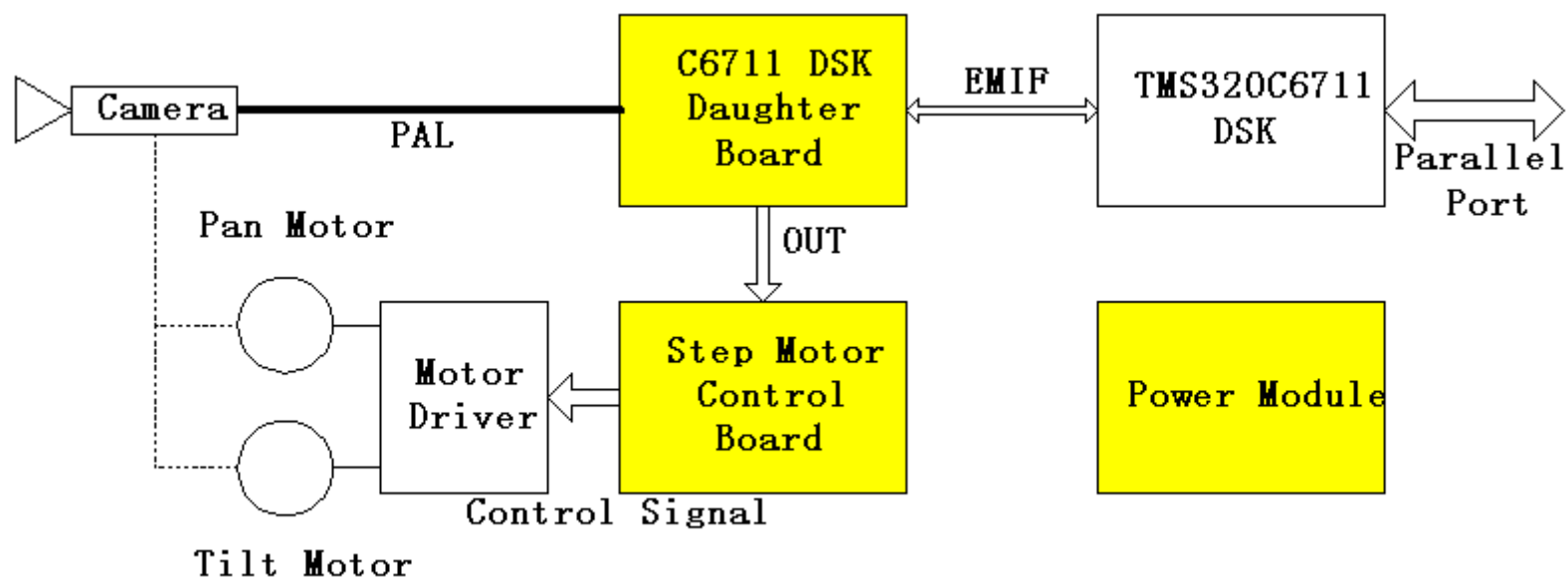
- Title Explanation
 - Vision-Servoed System
- Description
- Purpose
 - Autonomous navigation
 - Smart toy
 - Human computer interface
 - Real-time mobile robot

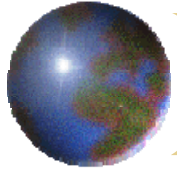




Hardware Architecture

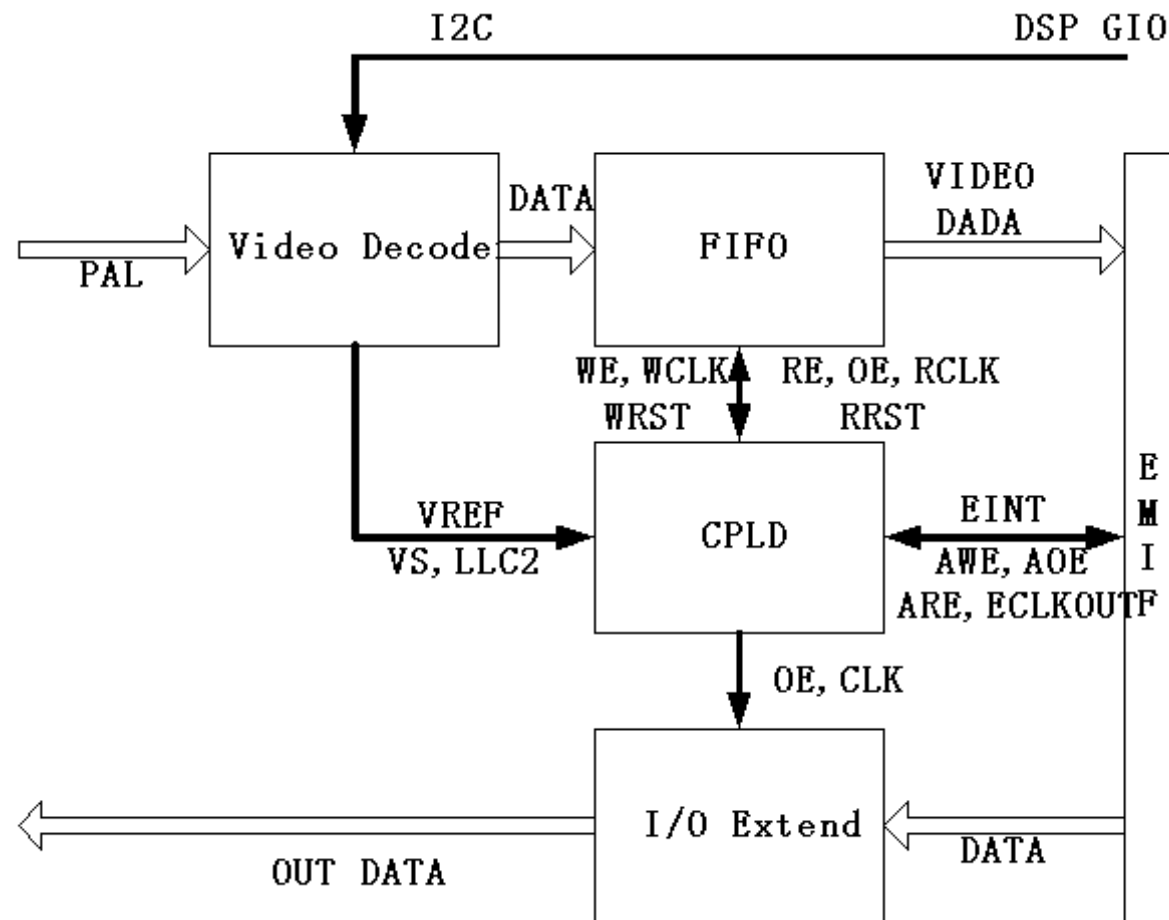
System Block Diagram

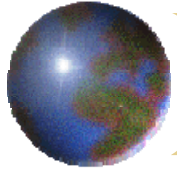




Hardware Architecture

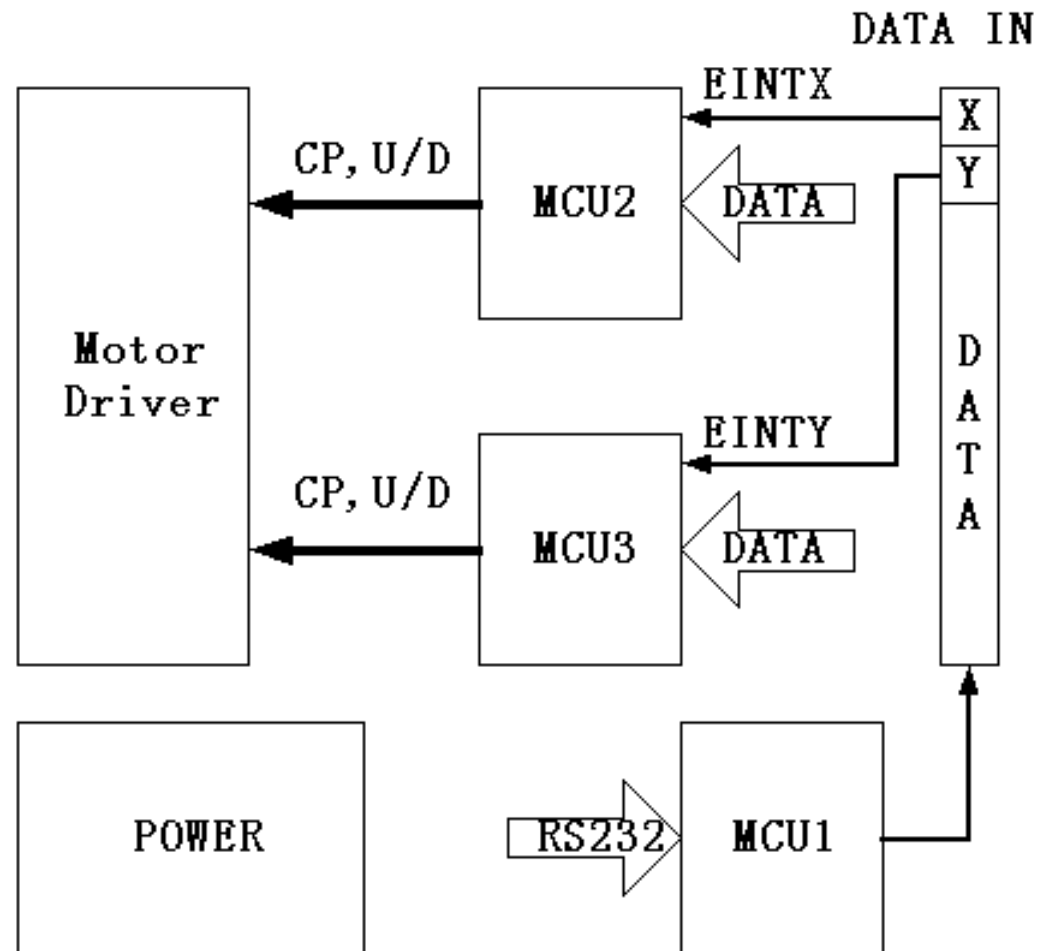
TMS320C6711DSK Daughter Board Block Diagram

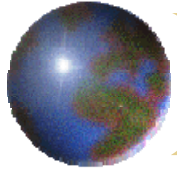




Hardware Architecture

Step Motor Control Board Block Diagram

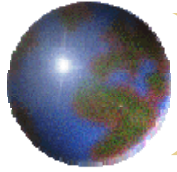




Hardware Architecture

- Constructed the system
- Designed the motor control board
- Use the lest units realized the high-performance low-cost daughter board
- Use EPM7032SLC-10 at 100MHz system
- DSK's EMIF don't support SBSRAM

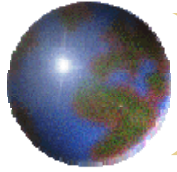




Software Architecture

- Object Recognition Algorithm
- Step Motor Control Strategy
- System Software Implementation

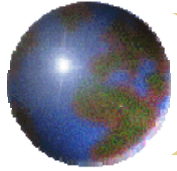




Object Recognition

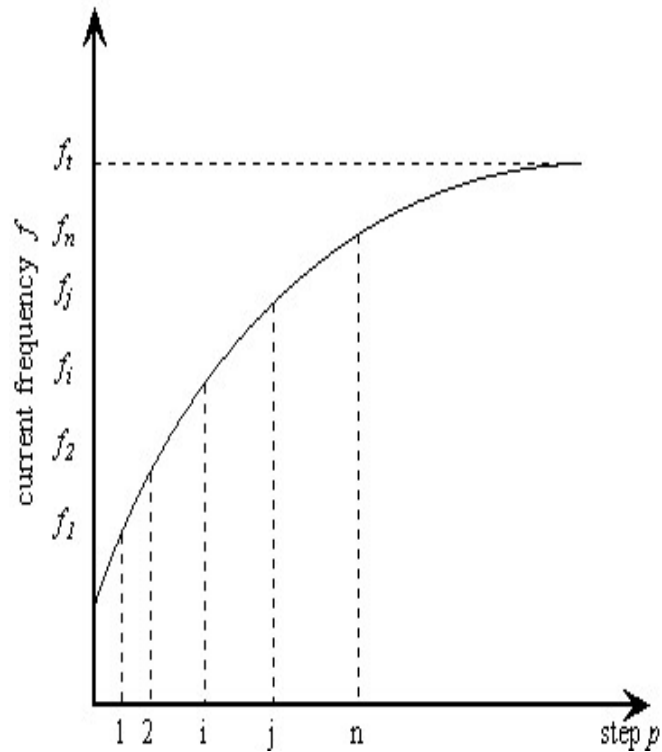
- Color Space Selection
RGB versus YUV
- Object Setting
YU[256][256]
- Object Recognition
Thresholding
Connected Regions
Extracting Region Information



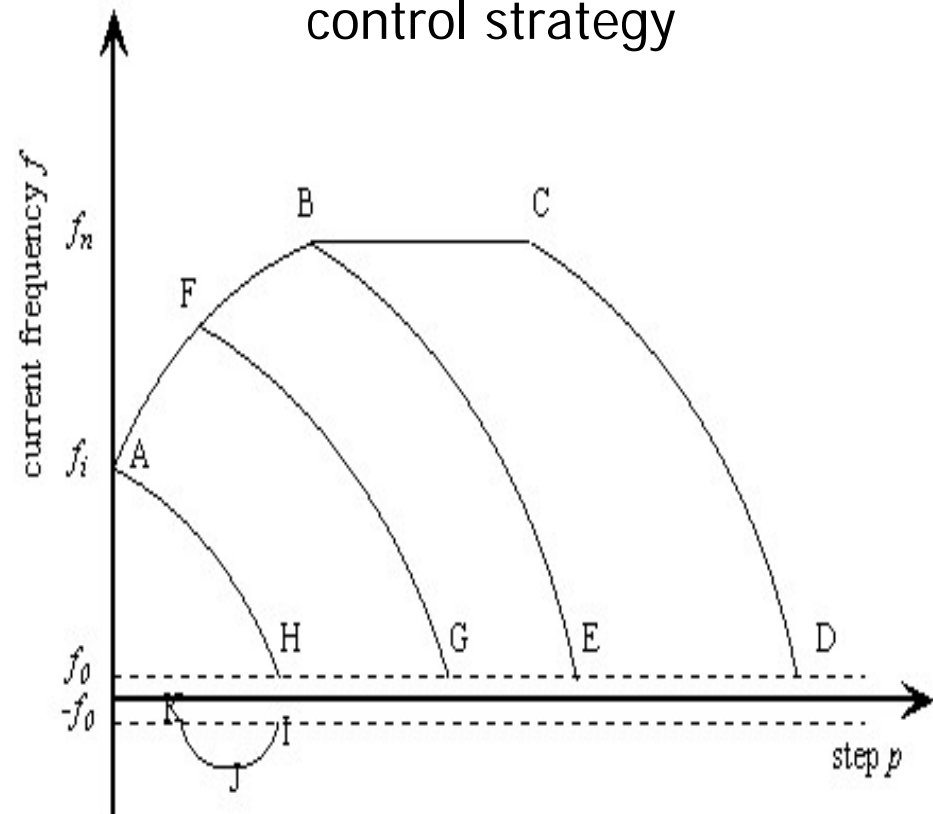


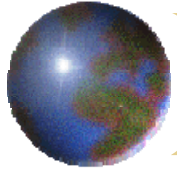
Step Motor Control

Speed Up Curve



F-S Curve under new position control strategy

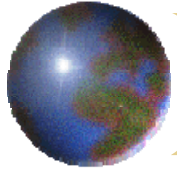




Step Motor Control

《高速云台中的步进电机控制方法》
在上海市自动化学会主办的
“2002上海市青年学术论文比赛”
中获优秀论文奖

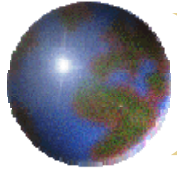




Software Implementation

1. System Initialization
2. Capture Background Image
3. Capture Changed Image
4. Image Capture
5. Object Recognition
6. Output and Tracing

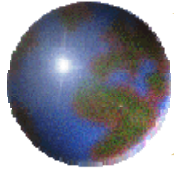




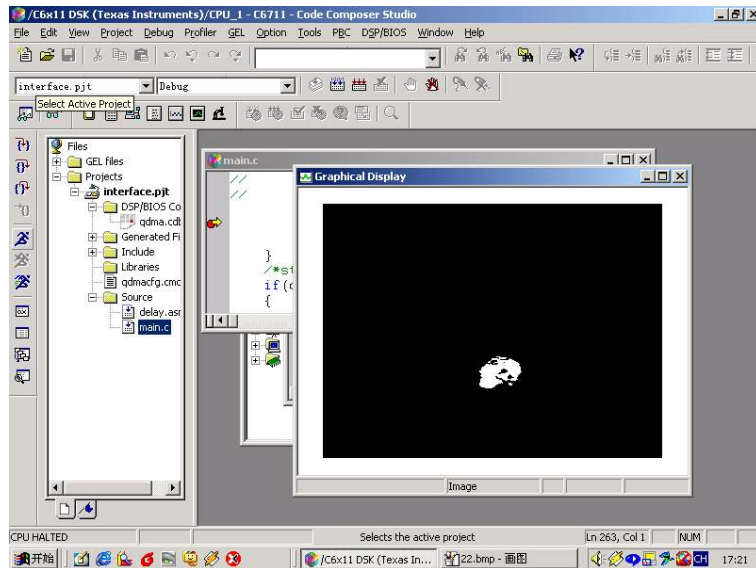
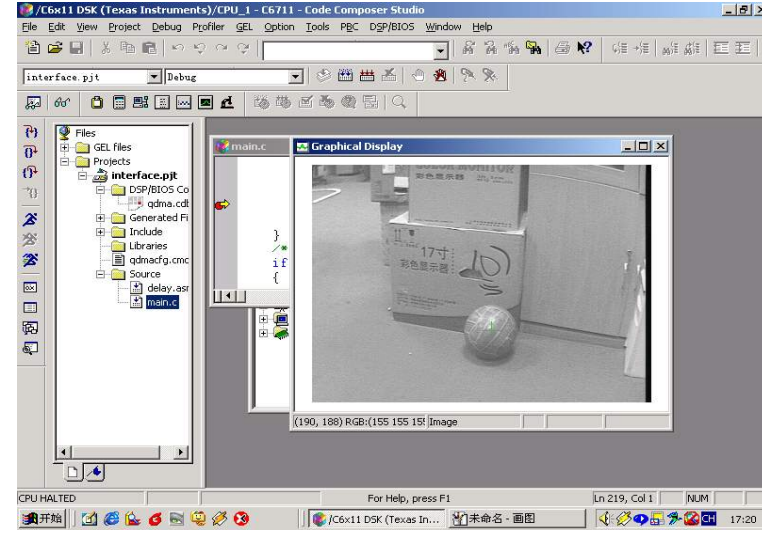
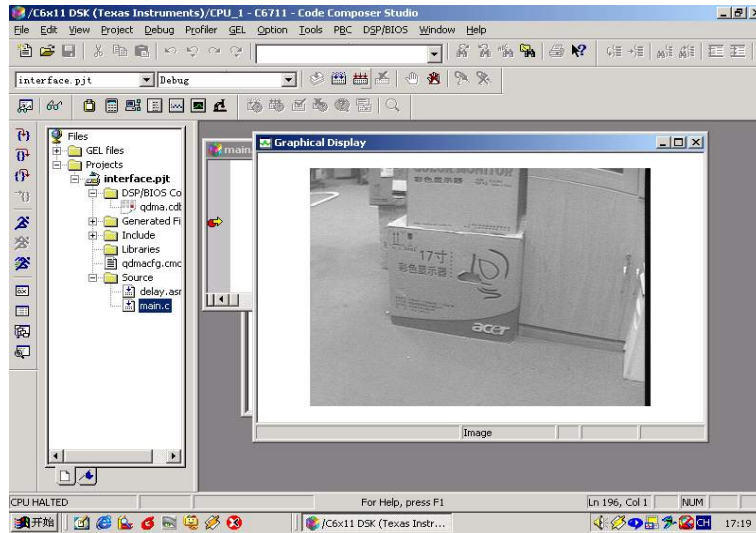
Software Implementation

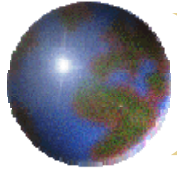
- Step motor control strategy
- Object recognition algorithm
- Finished all the software





Results and Application





Results and Application

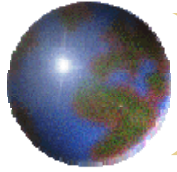
The screenshot displays the Code Composer Studio interface for a C6x11 DSK. The main window shows a graphical display of a 3D scene. The scene includes a white box with Chinese text "17寸 彩色显示器" (17-inch color monitor) and a green sphere with a red crosshair. The status bar at the bottom of the graphical display shows the coordinates "(179, 175) RGB:(216 216 216)" and the label "Image".

The left pane shows the file explorer for the project "interface.pjt", listing files such as "main.c" and "delay.asr". The bottom pane shows the log window with the following text:

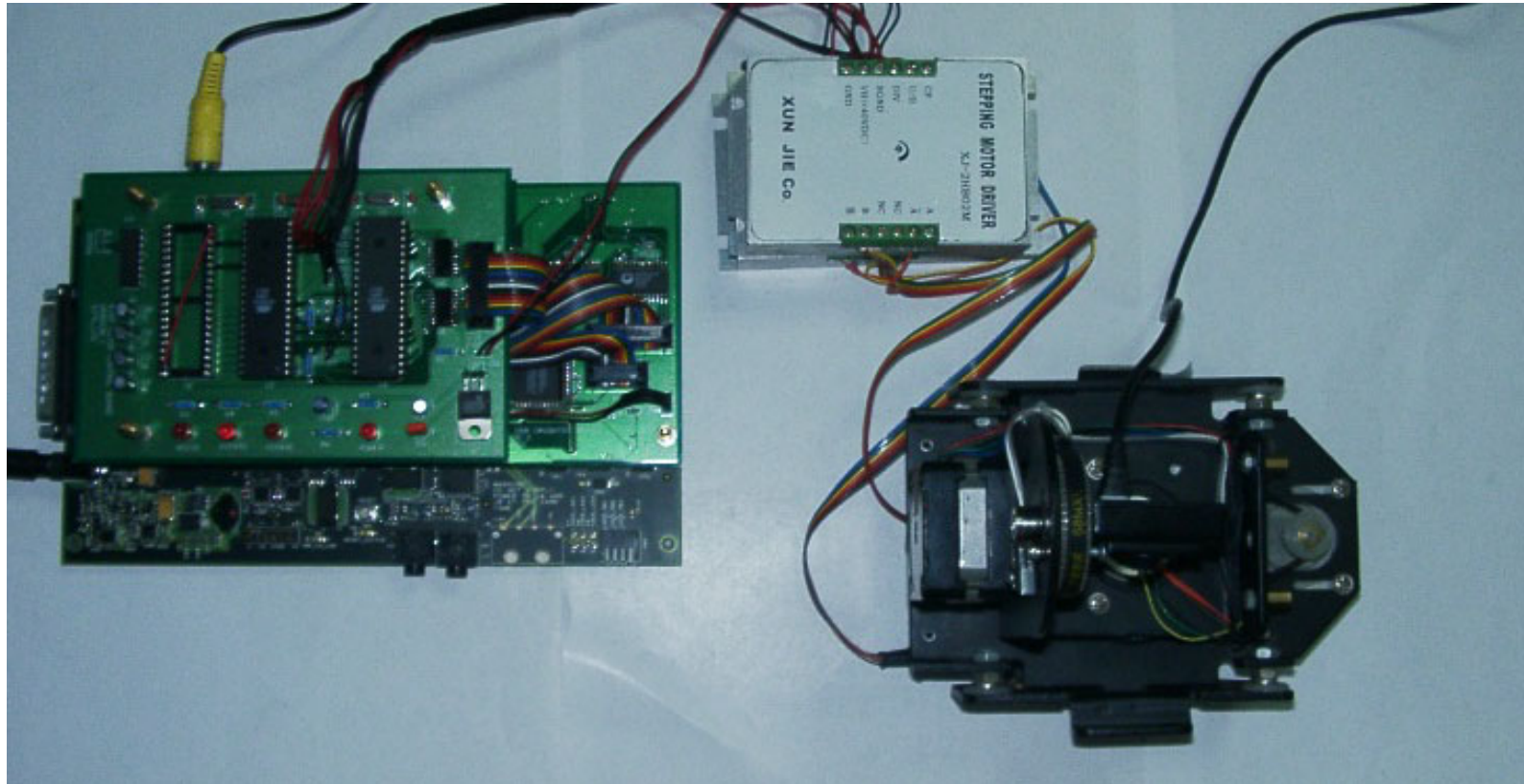
```
Log Name: trace  
6 find obj 1  
7 coorx=177  
8 coory=174
```

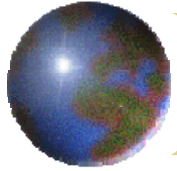
The status bar at the bottom of the IDE indicates "CPU HALTED" and "For Help, press F1". The taskbar at the bottom shows the Windows taskbar with the Start button and several open applications, including "C6x11 DSK (Texas In..." and "23.bmp - 画图". The system tray shows the date and time as "17:24".





Results and Application





Results and Application

