VIDEO PHONE SYSTEM

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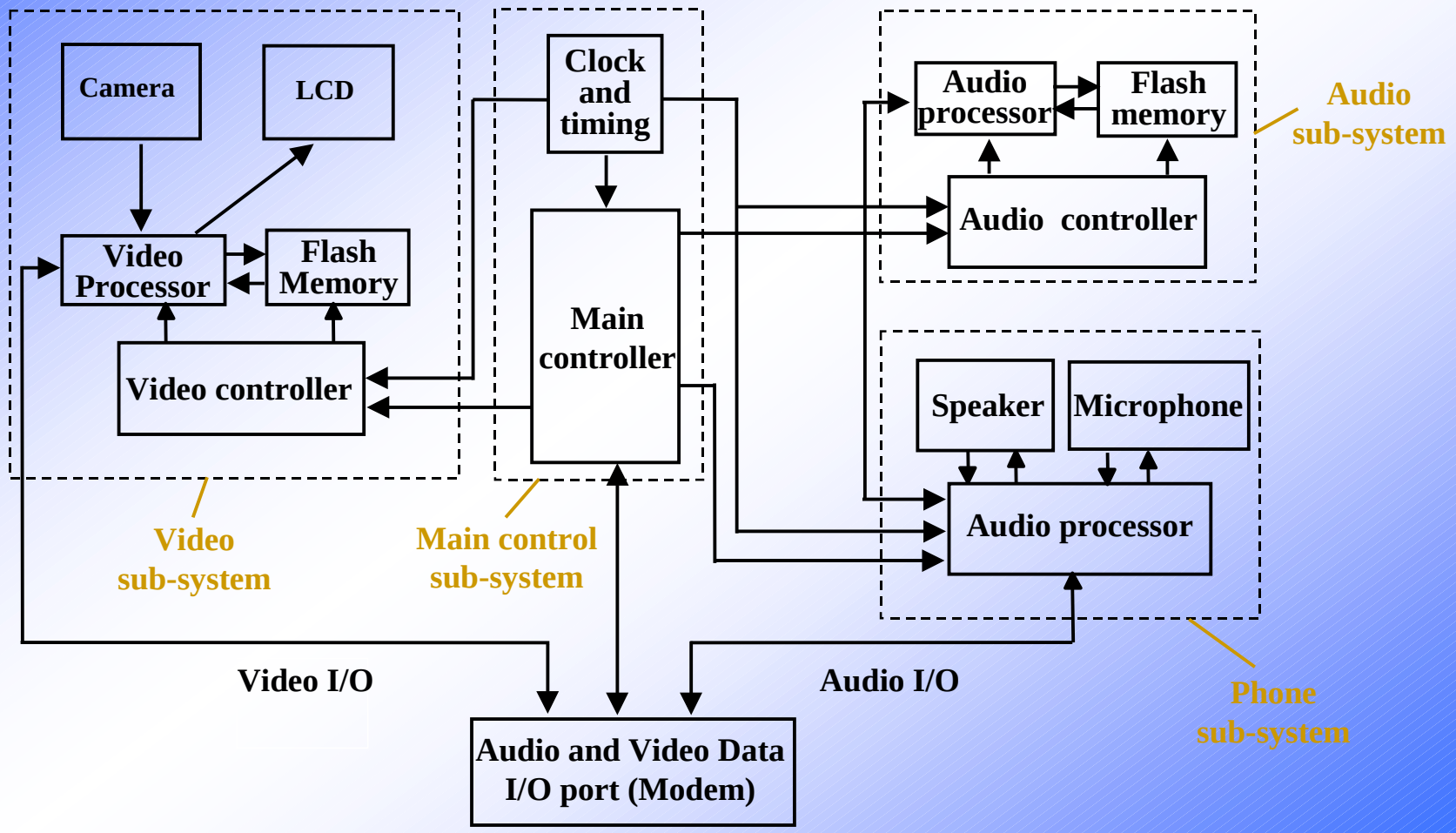
Block Diagram of Video Phone System (Top Level)



Video Phone System (Feasibility Study)

Video unit:

- **Digital video processor:**

  DSP56651 (Motorola, $15 each);

  16-bit DSP, 70 MIPS

- **Video controller:**

  MC68HC16S2 (Motorola, $8 each).

- **Flash memory:**

  HY29F040 (Hyundai, 4MB module, $12 each).

- **Digital camera:**

  Loitech 961121 (Logitech, $30 each).

- **Liquid crystal display:**

  TX26D80VC1CAA (Hitachi, 10.4” TFT, $100 each).

Telephone:

- **Regular phone unit:**

  $8 each.

Video Phone System (Feasibility Study)

Audio unit:

- **Digital audio processor:**

  CS4912 (Cirrus Logic, $7 each);

  16-bit DSP, RAM for program and data.

- **Audio controller:**

  CS4281 (Cirrus Logic, $4 each).

- **Flash memory:**

  HY29F040 (Hyundai, 4MB module, $12 each).

Main controller and other components:

- **Main controller:**

  MC68HC16Z2 (Motorola, $10 each).

- **Modem:**

  WINCOMM56 (Jaton Corp. 56K, $15 each).

Video Phone System (Cost and Competition)

- **COST:**

A) Audio processor and controller	= $ 11
B) Video processor and controller	= $ 23
C) Memory(4 MB audio, 4MB video)	= $ 24
D) Telephone	= $ 8
E) Digital camera	= $ 30
F) Modem	= $ 15
G) LCD display	= $ 100
H) Main microcontroller	= $ 10
I) Design cost (assuming 100,000 sold)	= $ 27
Total:	**= $ 250**

- **MSRP:**

Price: (40% gross profit margin) **= $ 350**

- **Competition:**

Standalone: (record motion pictures)	**>$1,000**
TV-based: (need TV)	**around $800**
PC-based: (need PC, slow)	**around $100**

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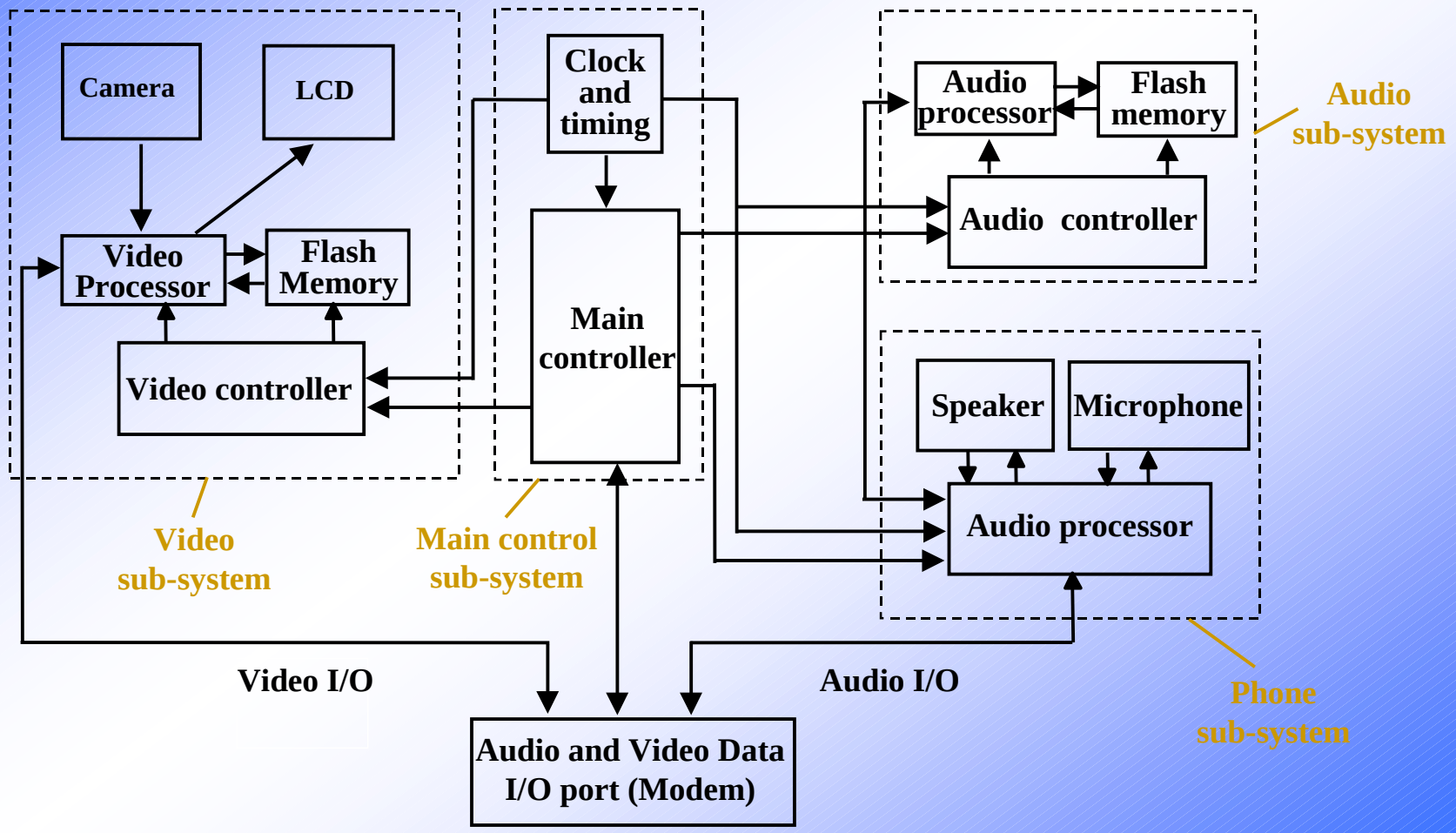
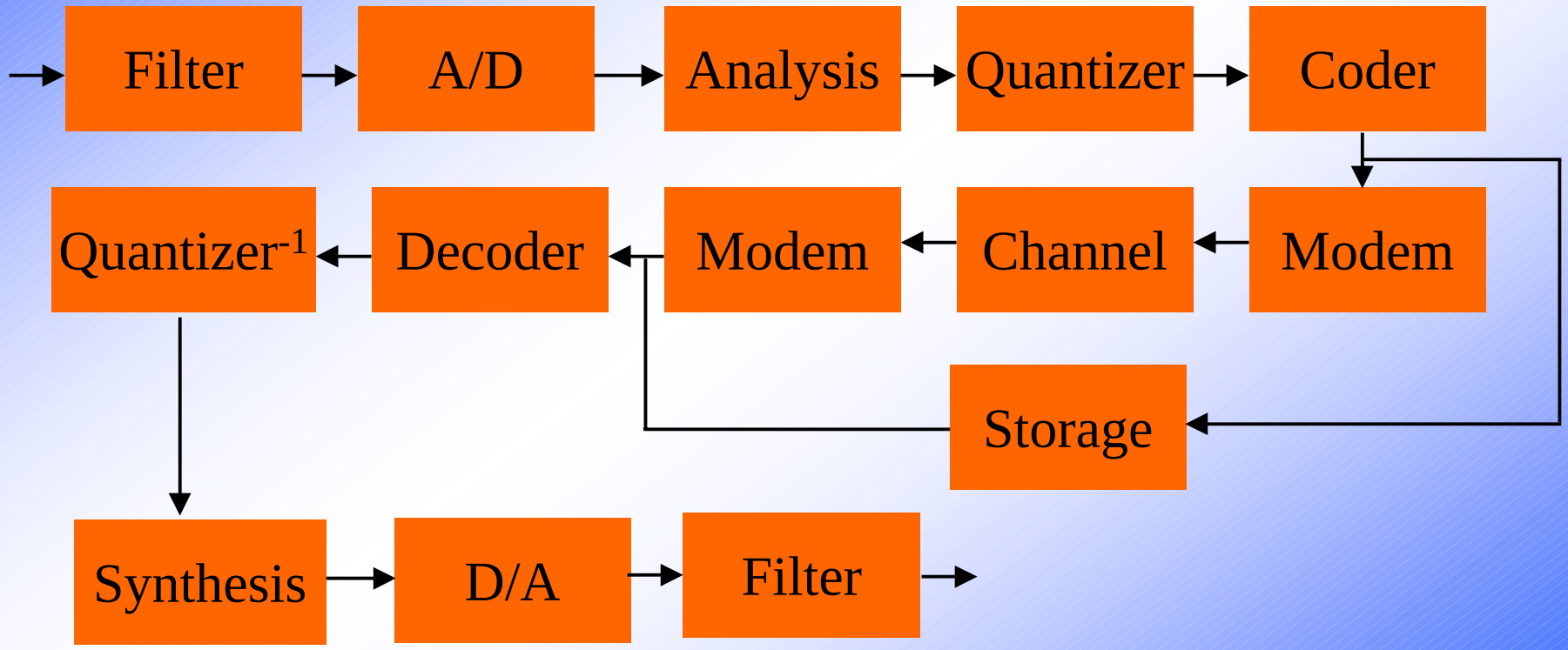
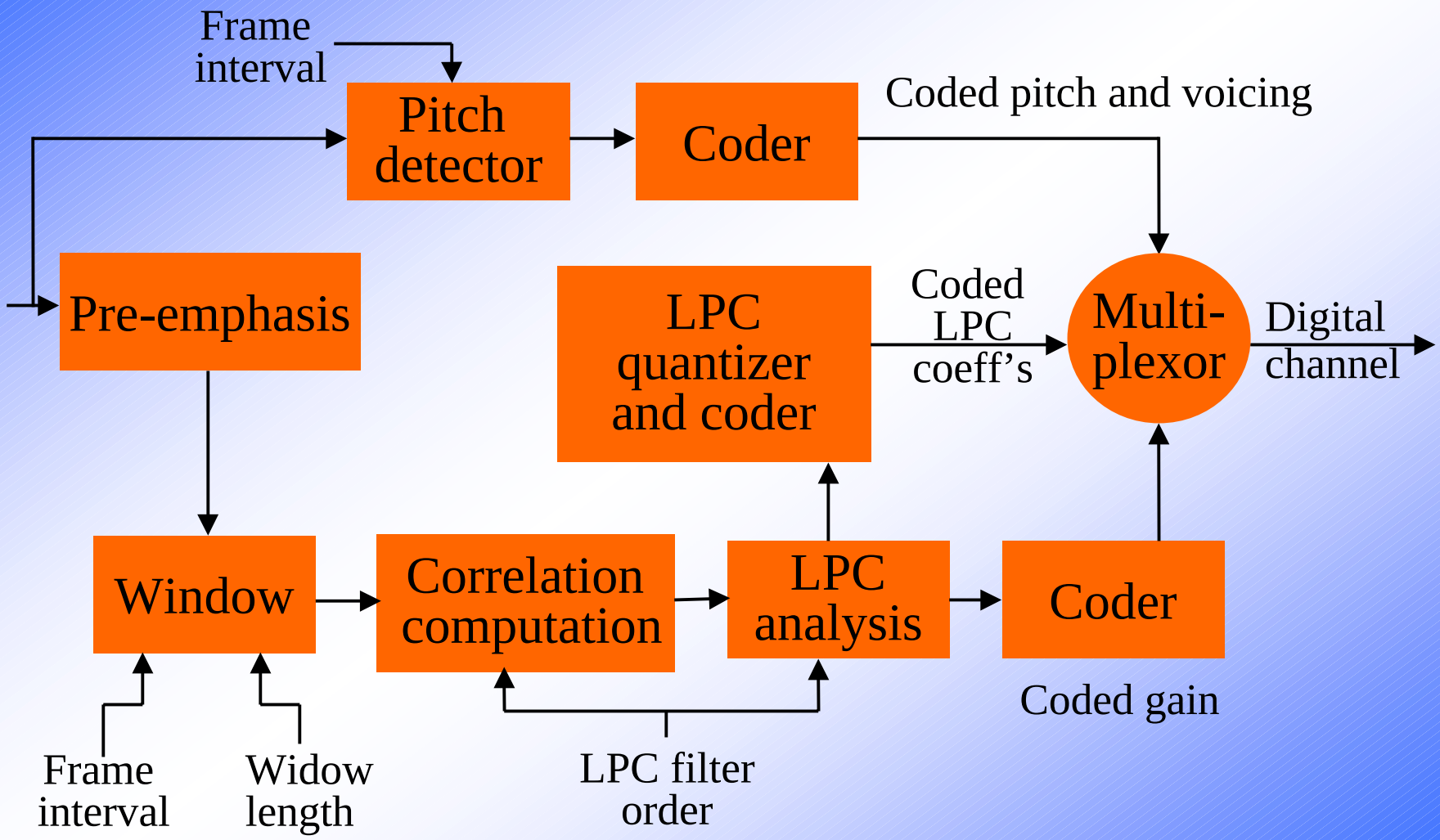


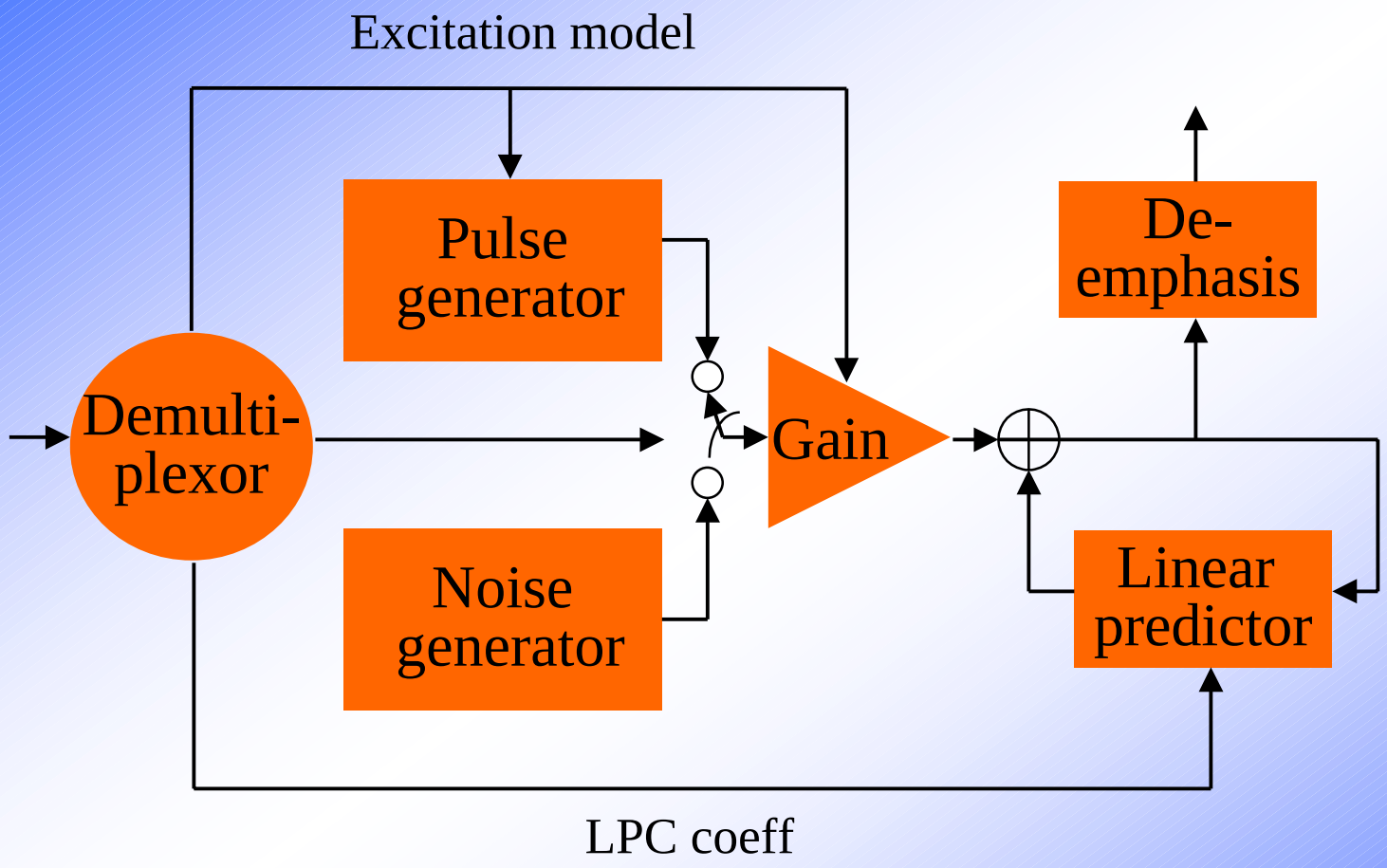
The Elements of a Speech Coding System



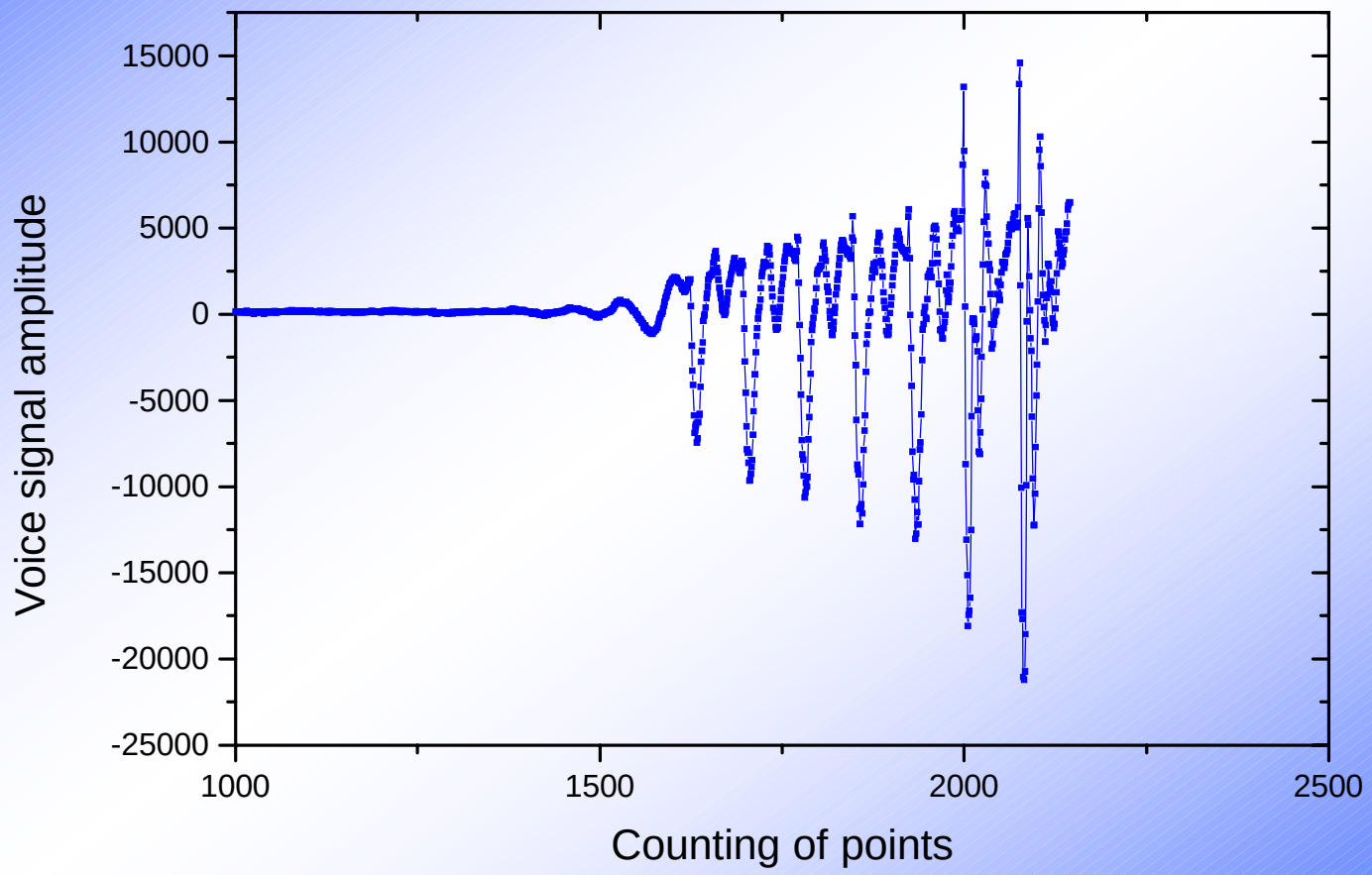
Block Diagram of a LPC Coder



Block Diagram of LPC Decoder

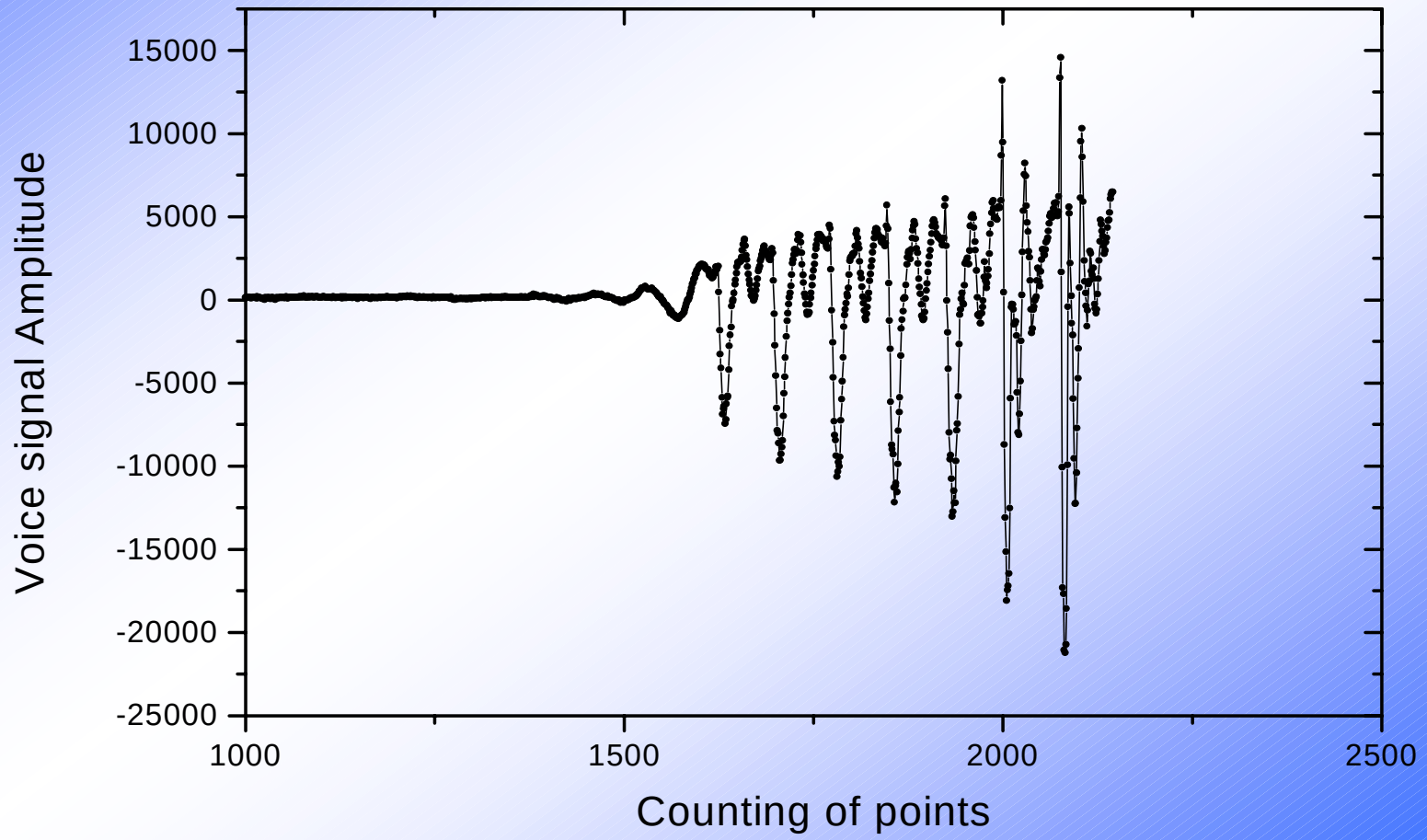


Waveform of Input Signal



Waveform of Output Signal

Input file size: 336KB; compressed file size 7KB; compression ratio is 48:1. Decompressed file size: 336KB.



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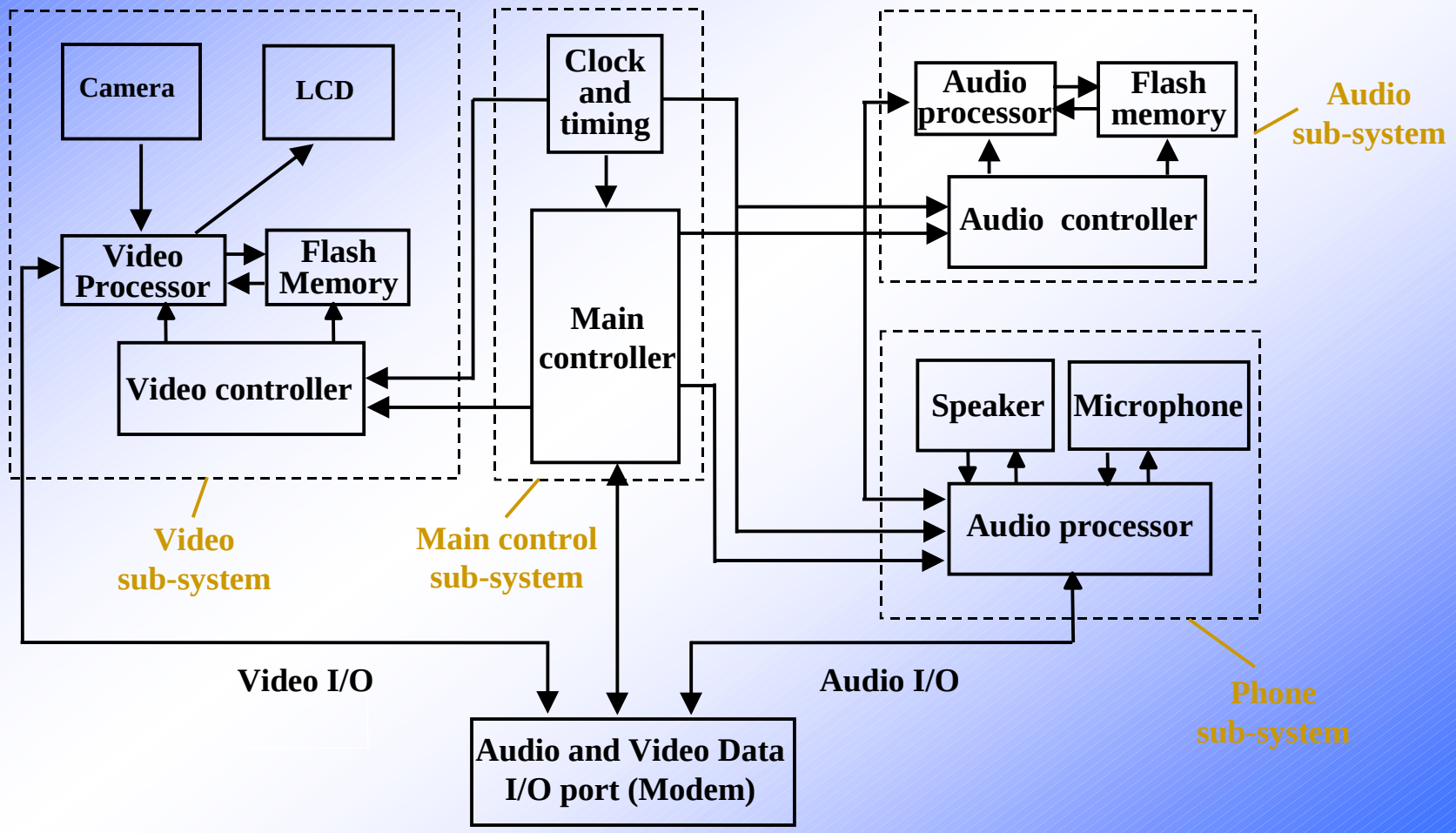
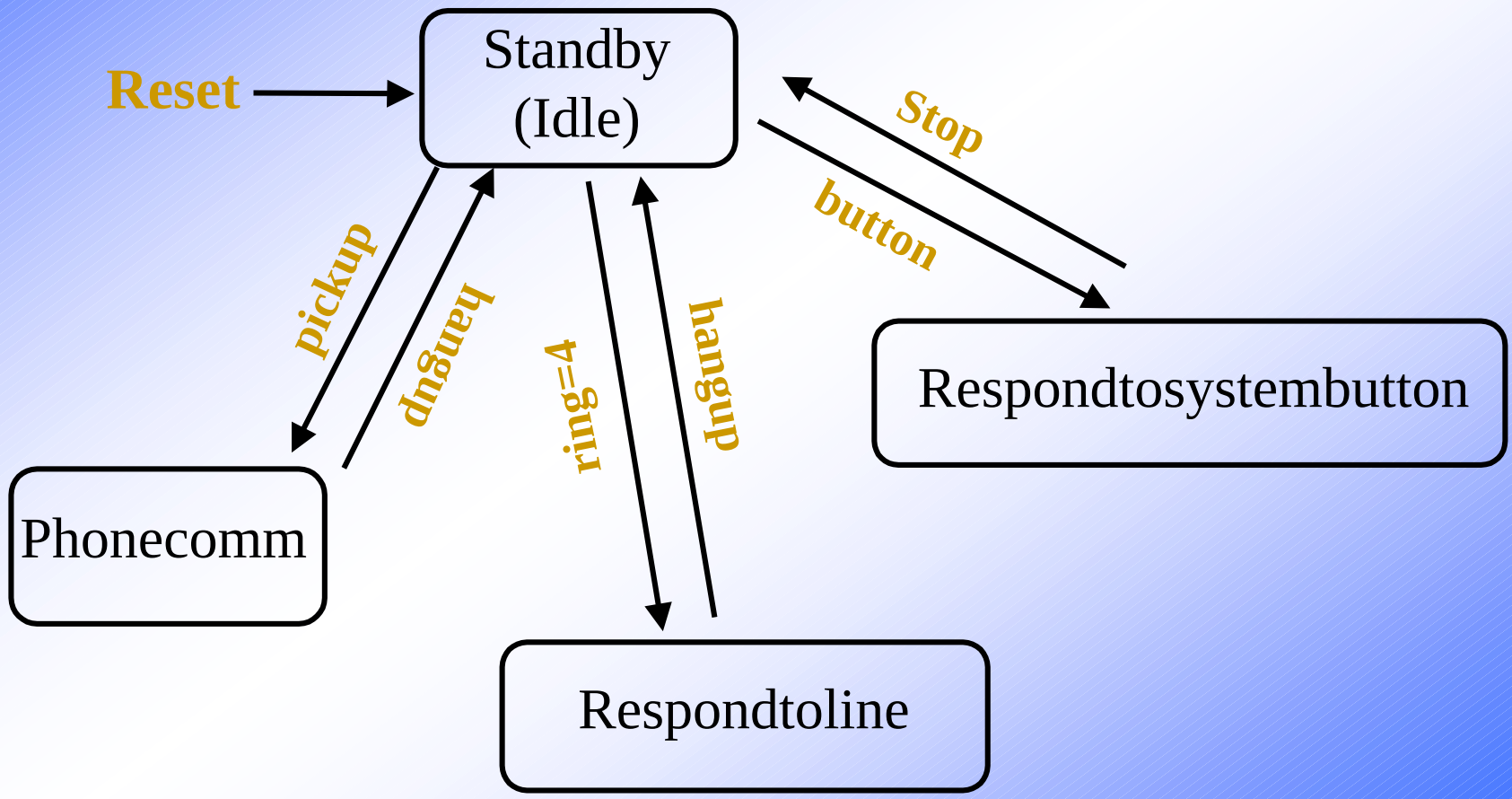
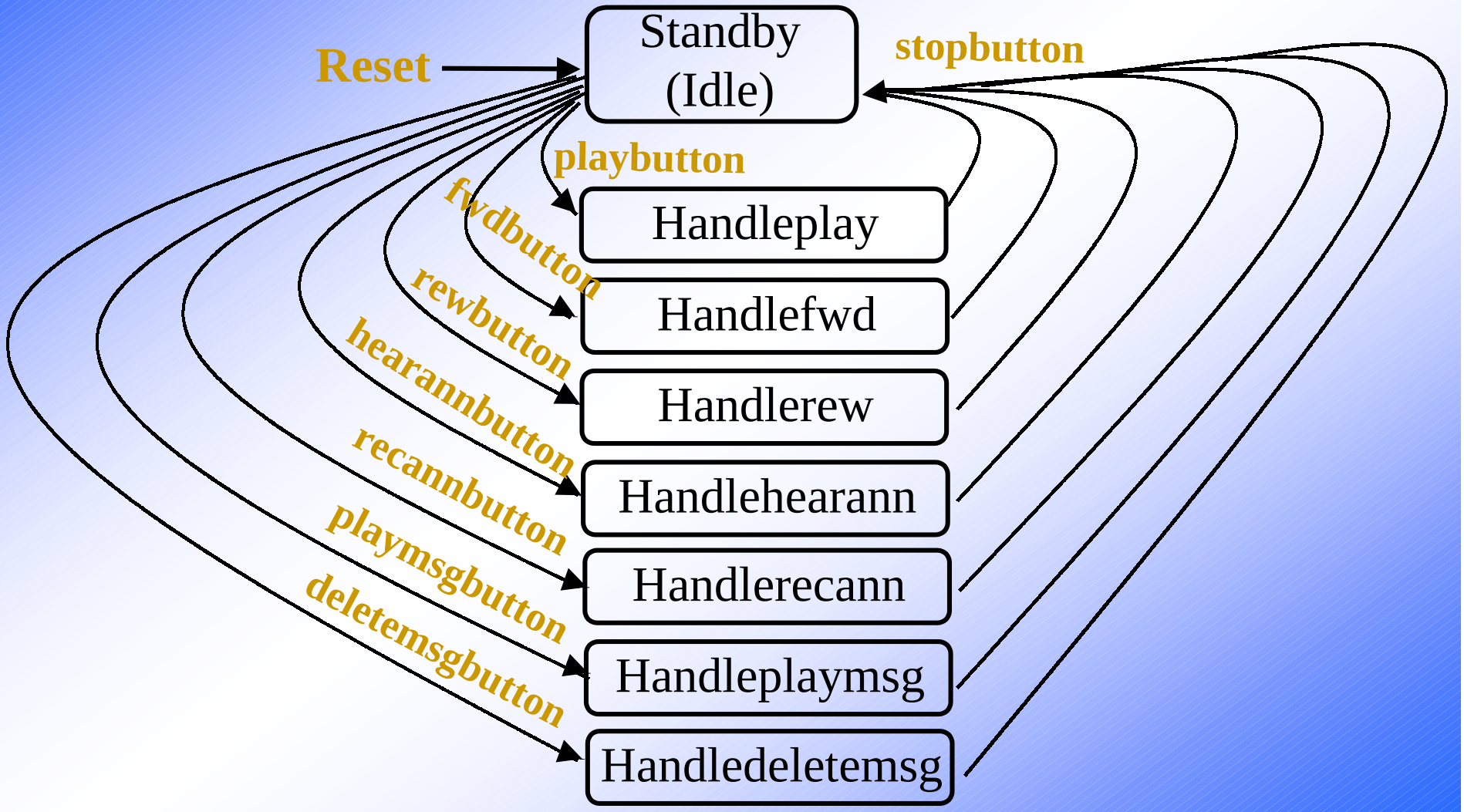


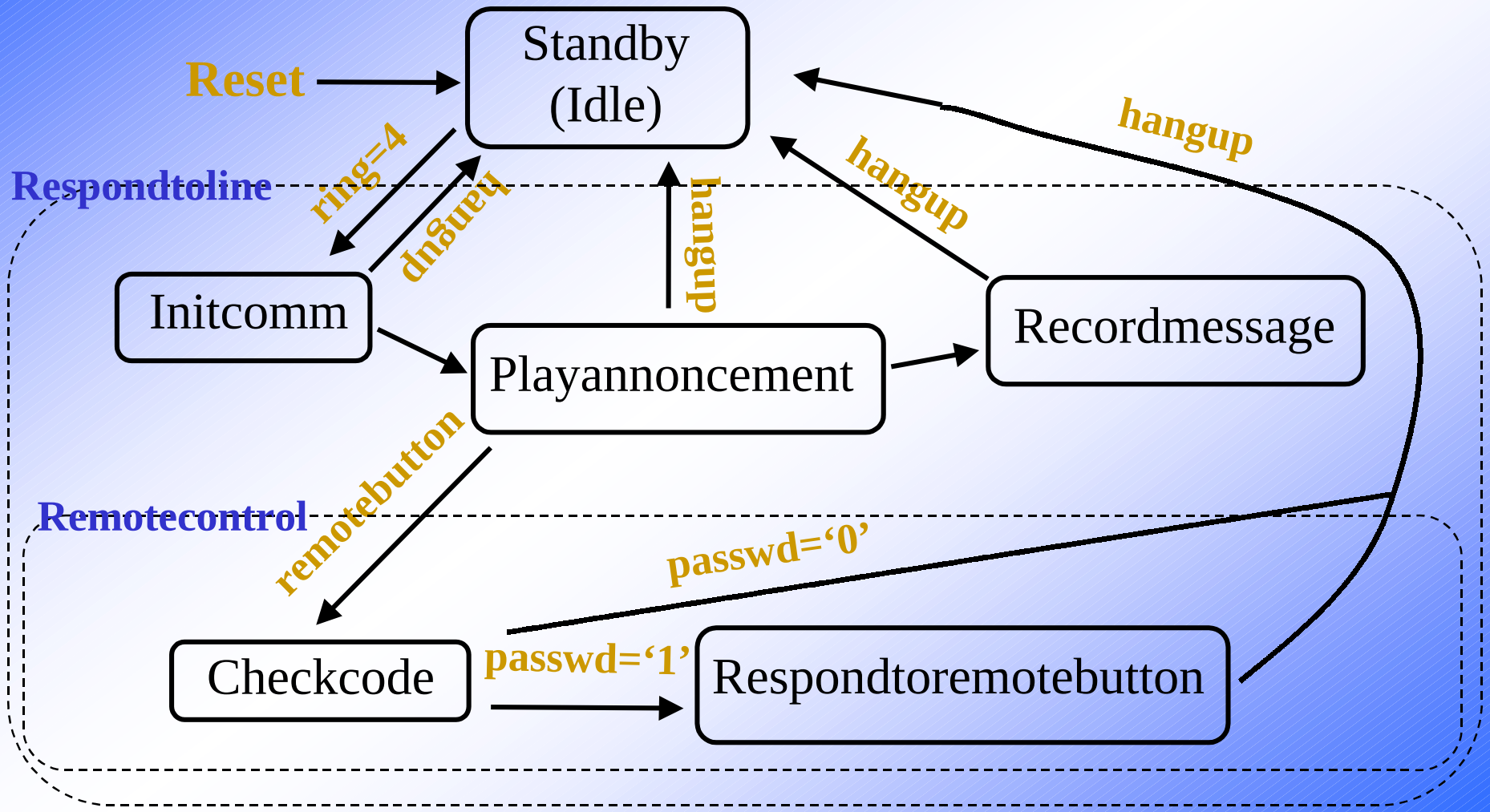
State Diagram of Audio Unit (top level)



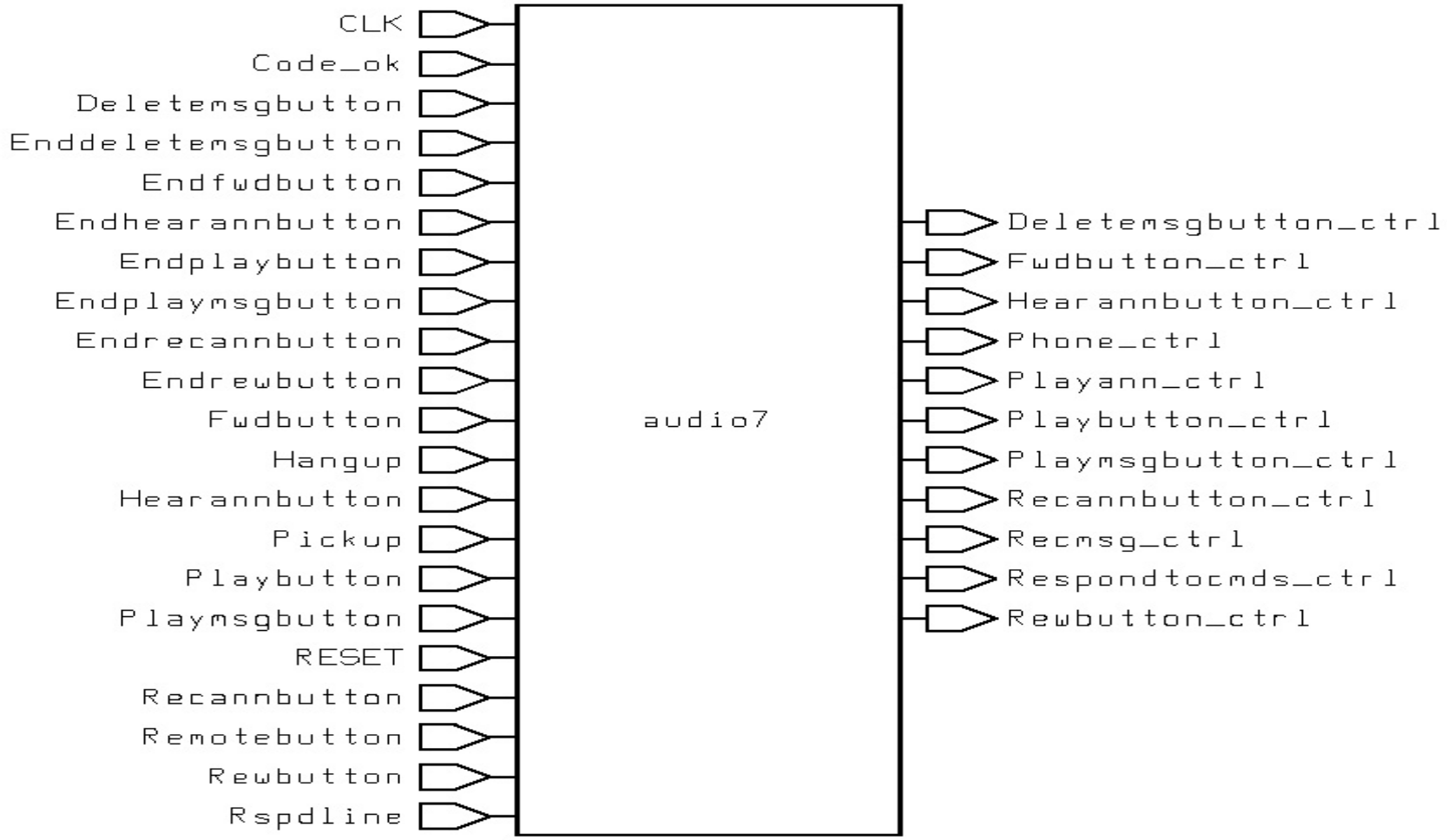
State Diagram of Audio Unit (Respondtosystembutton subsystem)



State Diagram of Audio Unit (Respondtoline subsystem)

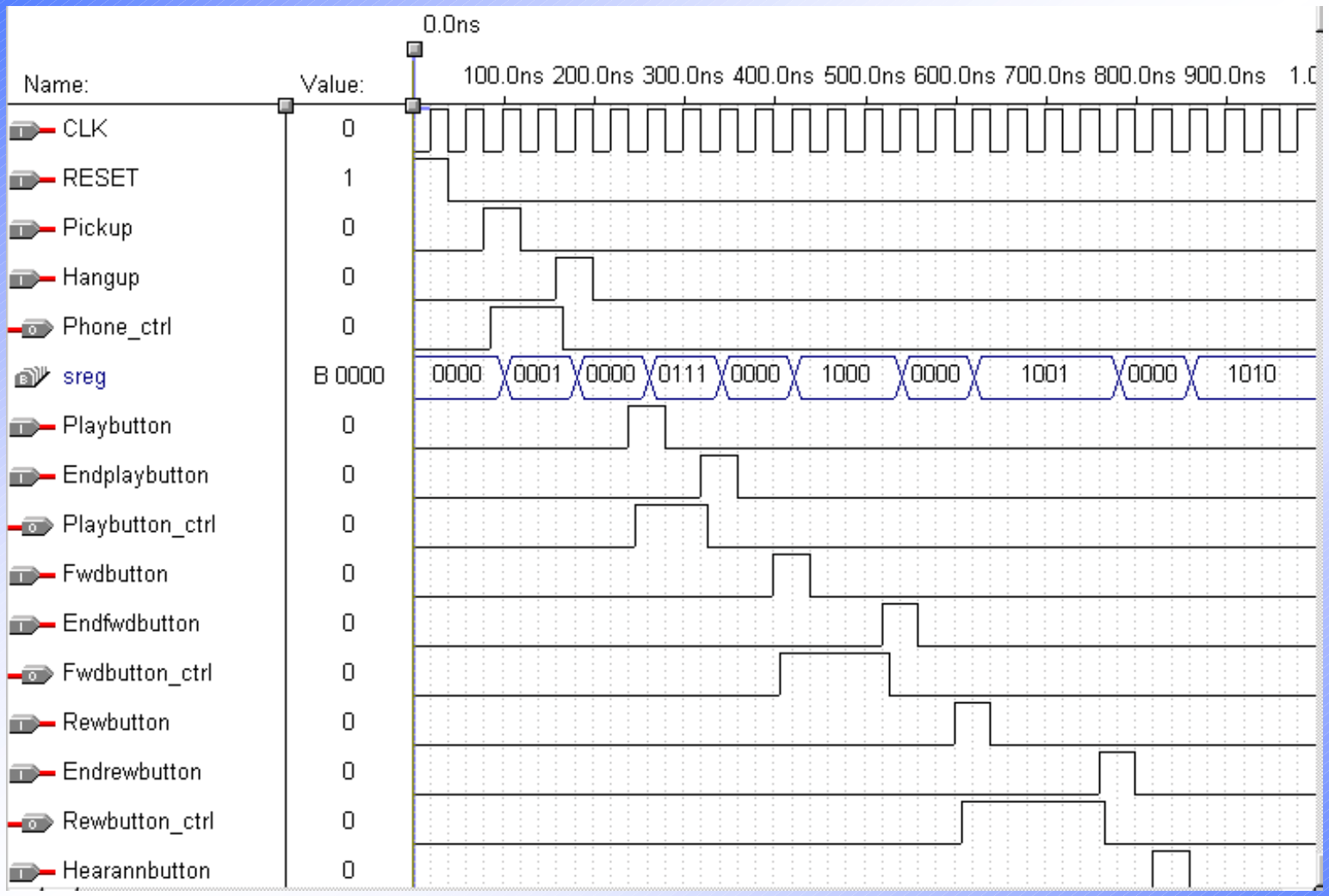


Symbol of Audio Unit Controller



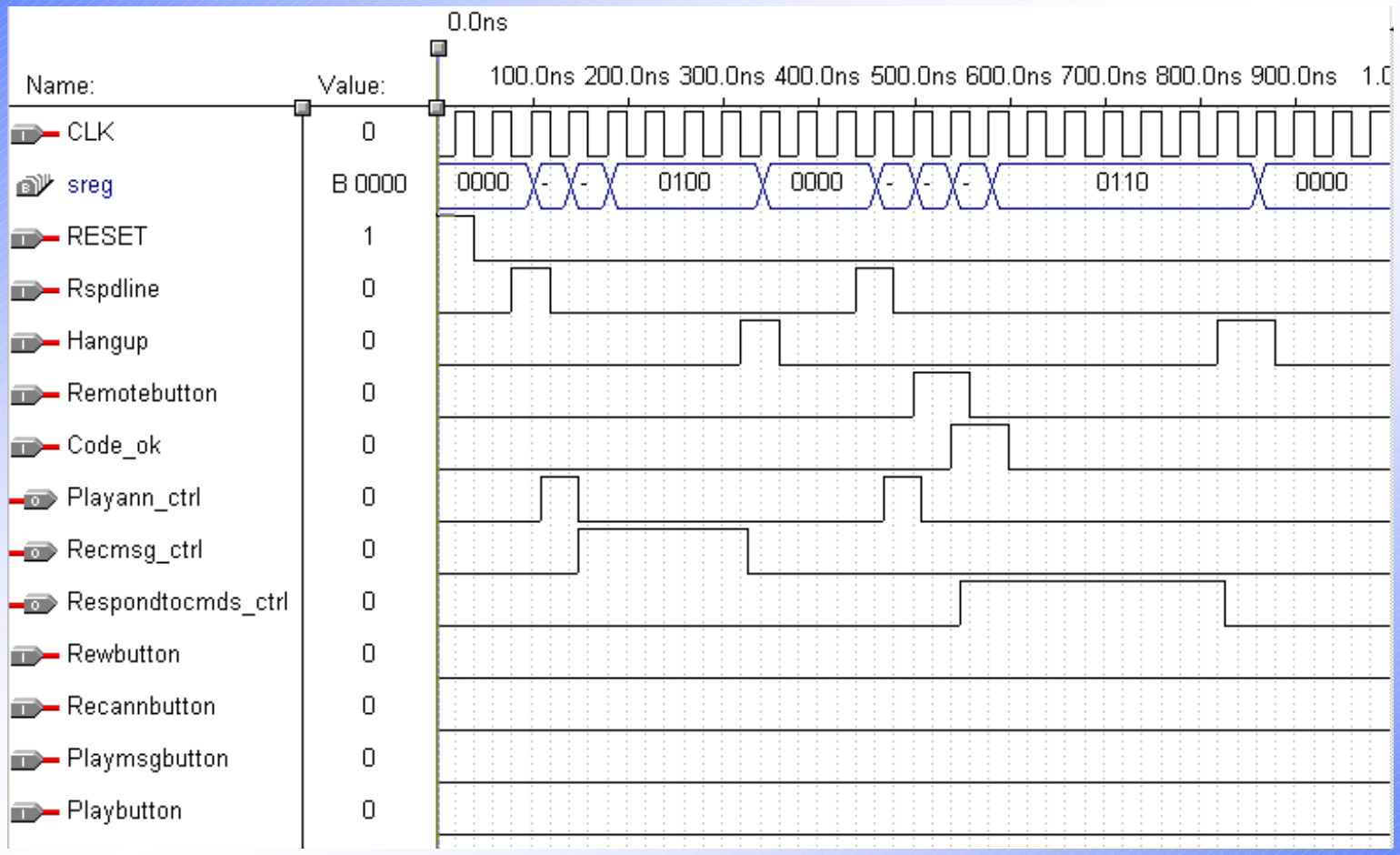
Gate Level of Audio Unit Controller

Simulation Result for Audio Unit (Phonecomm and Respondtosystembutton subsystems)



State	sreg
Idle	0000
Phone	0001
Handle_play	0111
Handle_fwd	1000
Handle_rew	1001

Simulation Result for Audio Unit (Respondtoline subsystem)



State	sreg
Initcomm	0010
Playann	0011
Recmsg	0100
Check_ code	0101
Respond tocmds	0110

Conclusions

- **Cost/performance reduction approaches:**

  Hardware/software co-design;

  Off-the-shelf components (small quantity);

  In-house design and fabrication of chips (large quantity).

- **Competing with existing products:**

  Aiming at GSTN (analog phone line) market;

  Cheaper than existing standalone units;

  More convenient than TV-based or PC-based units.