SPEECH SYNTHESIZER

μPD7751
µPD7751

FEATURES

- ADPCM DECODING CAPABILITY
- ZERO SIGNAL DURATION COMPRESSION DECODING
- EASY VOICE PROCESSING
  - HIGH-QUALITY VOICE
  - LOW DEPENDENCE ON TALKER'S VOICE CHARACTER
  - EASY ANALYSIS AND DATA GENERATION
  - STABLE VOICE QUALITY
  - BACKGROUND MUSIC MIXING CAPABILITY
- SAMPLING CLOCK:
  - 4 KHz TO 6 KHz
- VARIABLE BIT RATE:
  - 14 KBPS TO 20 KBPS
- 8 DIRECTLY SELECTED MESSAGES
- VARIOUS EXTERNAL ROM APPLICABLE
- N CHANNEL MOS
- 40-PIN PLASTIC DIP
- +5V SINGLE POWER SUPPLY
- SUPPLY CURRENT 65mA TYP.
- OPERATING TEMPERATURE RANGE 0~+70°C

PIN CONFIGURATION (Top View)

NEC Electronics (Europe) GmbH
µPD7751

BLOCK DIAGRAM

INTERNAL BUS

PROG

AD3
AD2
AD1
ADO

VOICE DATA
OUTPUT BUFFER

MESSAGE ADDRESS DECODER

FREQ. FRAME CONTROLLER

ROM DATA BUFFER

BUSY

XTAL1
XTAL2

START

COMMAND INTERFACE

TIMING GENERATOR

ADPCM DECODER

DECODE TABLE

ADDRESS OUTPUT BUFFER

DATAx

NEC Electronics (Europe) GmbH
ADPCM - ADDAPTIVE DIFFERENTIAL PCM

- Quantization Step varied according to the Input signal amplitude
  (μPD7751 has 5 binary coded steps)

- Each 8 Bit Differential PCM sample encoded with 4 Bits preceded by the
  Quantization Step Size

- The Quantization Step size is constant within one Frame (8 - 128 samples)

- Zero Signal duration (10-20%) is stored separately from the Speech Data

- Finally by digital integration a 8 Bit PCM output at the sampling rate
  will result
ADDAPTIVE DIFFERENTIAL PCM

QUANTIZATION STEP SIZE AND CORRESPONDING CODE

8 Bit Differential Code

-128 -64 -32 -16 -8 +8 +16 +32 +64 +128

1 Step Size

2 Step Size

3 Step Size

4 Step Size

5 Step Size

-7 -6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6 +7

4 Bit Code Correspondance
MESSAGE SELECTION

DIRECTLY 8 MESSAGES SELECTION

EASILY EXPANDABLE

8255A

μPD7751

PB0 10 38 BUSY
PA3 1 37 SEL2
PA2 2 36 SEL1
PA1 3 35 SEL0
PA0 4 6 START

 Acc

3 2 1 6

SEL code

NEC Electronics (Europe) GmbH
µPD7751

EXTERNAL ROM ADDRESSING & SELECTION

* 4 MEMORY CHIPS SELECTABLE WITHOUT EXTERNAL DECODING

* ANY MEMORY CHIP USABLE WITH ACCESS TIME LOWER THAN 4µS
µPD7751

EXTERNAL ROM ADDRESSING & SELECTION

Binary Addressing Mode (256 kBit ROM)
D/A Conversion

- 8 bit monolithic or Resistor Ladder DAC's usable

D/A Converter Using
Resistor Ladder.

D/A Converter Using
µPC624.

NEC Electronics (Europe) GmbH
LOW PASS FILTER

- 24dB/oct Butteworth active filter with Dual OP-AMP
POWER AMPLIFIER

- SINGLE SUPPLY, LOW VOLTAGE (+5V) POWER AMPLIFIER (0.75W)
11PD7751 SPEECH SYNTHESIS SYSTEM DESIGN

(1) Ext. reset input
(2) START key
(3) Select sw
(4) Busy output

NEC
NEC Electronics (Europe) GmbH
μPD7751 Speech Synthesis System Design

ROW Interface for 32 Message Selection

NEC Electronics (Europe) GmbH
HPD7751 SPEECH SYNTHESIS SYSTEM DESIGN

Full Binary Decoding ROM Interface

NEC Electronics (Europe) GmbH