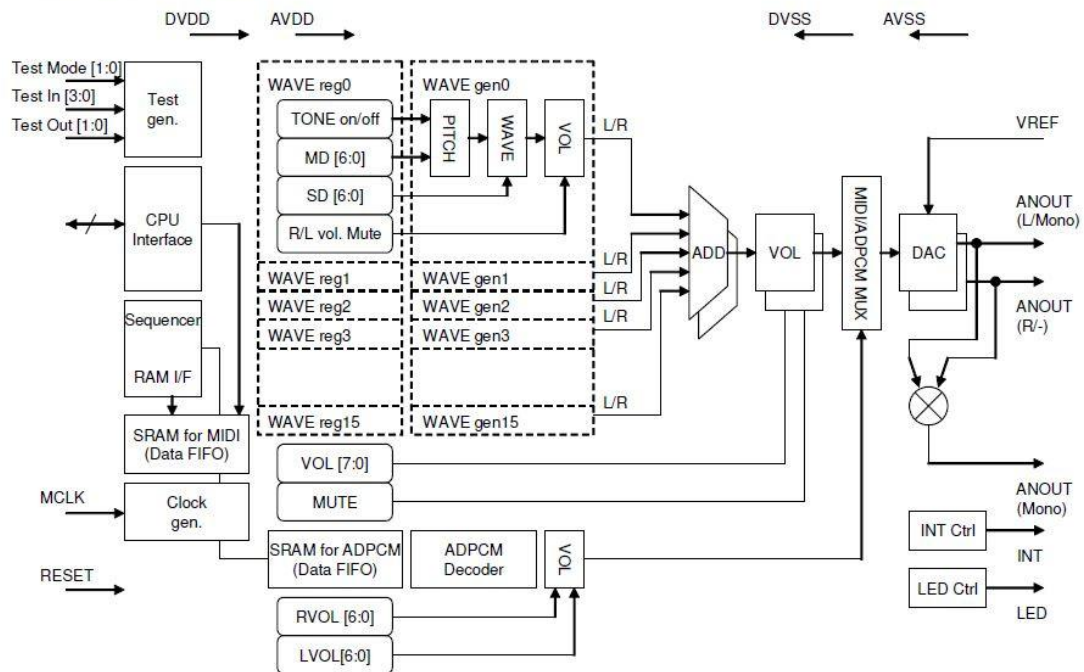


# 1 Features

- Generating 16 harmonies simultaneously: 128 sounds + 47 drum sets + special sounds
- Integrated ADPCM decoder, can be mixed with wave generator output signals
- FIFO buffer and sequencer to reduce CPU load
- Integrated FIFO buffer for downloading music data
- Stereo sound available
- Pitch bend and vibrato
- Integrated stereo DAC
- Integrated 2<sup>nd</sup> order filter ( $f_c = 20 \text{ kHz}$ )
- Power down mode
- Serial host CPU interface
- QFN28V package

## 1.1 Block Diagram



# 9 Instruments

SD [7:0]	Instrument	SD [7:0]	Instrument	SD [7:0]	Instrument	SD [7:0]	Instrument
0x00	Acoustic Grand Piano	0x40	Soprano Sax	0x80	Acoustic Bass Drum	0xC0	Laser Gun (short)
0x01	Bright Acoustic Piano	0x41	Alto Sax	0x81	Bass Drum	0xC1	Hit1 (hard)
0x02	Electric Grand Piano	0x42	Tenor Sax	0x82	Side Stick	0xC2	Hit2 (noise)
0x03	Honky-tonk Piano	0x43	Baritone Sax	0x83	Acoustic Snare	0xC3	Bomb (short)
0x04	Electric Piano 1	0x44	Oboe	0x84	Hand Clap	0xC4	Bomb (long)
0x05	Electric Piano 2	0x45	English Horn	0x85	Electric Snare	0xC5	Monster Damage
0x06	Harpichord	0x46	Bassoon	0x86	Low Floor Tom	0xC6	Robot Damage

SD [7:0]	Instrument	SD [7:0]	Instrument	SD [7:0]	Instrument	SD [7:0]	Instrument
0x07	Clavi	0x47	Clarinet	0x87	Closed Hi-hat	0xC7	Character Fade Out
0x08	Celesta	0x48	Piccolo	0x88	High Floor Tom	0xC8	Engine
0x09	Glockenspiel	0x49	Flute	0x89	Pedal Hi-hat	0xC9	Approach (fade in)
0x0A	Music Box	0x4A	Recorder	0x8A	Low Tom	0xCA	Take Off (fade out)
0x0B	Vibraphone	0x4B	Pan Flute	0x8B	Open Hi-hat	0xCB	Space (filter down)
0x0C	Marimba	0x4C	Blow Bottle	0x8C	Low Mid Tom	0xCC	Science (Hi drown)
0x0D	Xylophone	0x4D	Shakuhachi	0x8D	High Mid Tom	0xCD	Bubble
0x0E	Tubular Bells	0x4E	Whistle	0x8E	Crash Cymbal 1	0xCE	Drop
0x0F	Dulcimer	0x4F	Ocarina	0x8F	High Tom	0xCF	Reserved
0x10	Drawbar Organ	0x50	Lead 1 (square)	0x90	Ride Cymbal 1	0xD0	Reserved
0x11	Percussive Organ	0x51	Lead 2 (sawtooth)	0x91	Chinese Cymbal	0xD1	Reserved
0x12	Rock Organ	0x52	Lead 3 (calliope)	0x92	Ride Bell	0xD2	Reserved
0x13	Church Organ	0x53	Lead 4 (chiff)	0x93	Tambourine	0xD3	Reserved
0x14	Reed Organ	0x54	Lead 5 (charang)	0x94	Splash Cymbal	0xD4	Reserved
0x15	Accordion	0x55	Lead 6 (voice)	0x95	Cowbell	0xD5	Reserved
0x16	Harmonica	0x56	Lead 7 (fifths)	0x96	Crash Cymbal 2	0xD6	Reserved
0x17	Tango Accordion	0x57	Lead 8 (bass + lead)	0x97	Vibra-slap	0xD7	Reserved
0x18	Acoustic Guitar (nylon)	0x58	Pad 1 (new age)	0x98	Ride Cymbal 2	0xD8	Reserved
0x19	Acoustic Guitar (steel)	0x59	Pad 2 (warm)	0x99	High Bongo	0xD9	Reserved
0x1A	Electric Guitar (jazz)	0x5A	Pad 3 (polysynth)	0x9A	Low Bongo	0xDA	Reserved
0x1B	Electric Guitar (clean)	0x5B	Pad 4 (choir)	0x9B	Mute Hi Conga	0xDB	Reserved
0x1C	Electric Guitar (muted)	0x5C	Pad 5 (bowed)	0x9C	Open Hi Conga	0xDC	Reserved
0x1D	Overdrive Guitar	0x5D	Pad 6 (metallic)	0x9D	Low Conga	0xDD	Reserved
0x1E	Distortion Guitar	0x5E	Pad 7 (halo)	0x9E	High Timbale	0xDE	Special Rectangle (1.6 s)
0x1F	Guitar Harmonics	0x5F	Pad 8 (sweep)	0x9F	Low Timbale	0xDF	Special Rectangle (0.8 s)
0x20	Acoustic Bass	0x60	FX1 (rain)	0xA0	High Agogo	0xE0	Special Rect. (no env.)
0x21	Electric Bass (finger)	0x61	FX2 (soundtrack)	0xA1	Low Agogo	0xE1	Sine (1.6 s)
0x22	Electric Bass (pick)	0x62	FX3 (crystal)	0xA2	Cabasa	0xE2	Sine (0.8 s)
0x23	Fretless Bass	0x63	FX4 (atmosphere)	0xA3	Maracas	0xE3	Sine (no env.)
0x24	Slap Bass 1	0x64	FX5 (brightness)	0xA4	Short Whistle	0xE4	Reserved
0x25	Slap Bass 2	0x65	FX6 (goblins)	0xA5	Long Whistle	0xE5	Reserved
0x26	Synth Bass 1	0x66	FX7 (echoes)	0xA6	Short Guiro	0xE6	Reserved
0x27	Synth Bass 2	0x67	FX8 (sci-fi)	0xA7	Long Guiro	0xE7	Reserved
0x28	Violin	0x68	Sitar	0xA8	Claves	0xE8	Reserved
0x29	Viola	0x69	Banjo	0xA9	Hi Wood Block	0xE9	Reserved
0x2A	Cello	0x6A	Shamisen	0xAA	Low Wood Block	0xEA	Reserved
0x2B	Contrabass	0x6B	Koto	0xAB	Mute Cuica	0xEB	Reserved
0x2C	Tremolo Strings	0x6C	Kalimba	0xAC	Open Cuica	0xEC	Reserved
0x2D	Pizzicato Strings	0x6D	Bagpipe	0xAD	Mute Triangle	0xED	Reserved
0x2E	Orchestral Harp	0x6E	Fiddle	0xAE	Open Triangle	0xEE	Reserved
0x2F	Timpani	0x6F	Shanai	0xAF	Cursor move (short)	0xEF	Reserved
0x30	String Ensembles 1	0x70	Tingle Bell	0xB0	Cursor move (long)	0xF0	Reserved
0x31	String Ensembles 2	0x71	Agogo	0xB1	Beep (normal)	0xF1	Reserved
0x32	Synth Strings 1	0x72	Steel Drum	0xB2	Beep (outer space)	0xF2	Reserved
0x33	Synth Strings 2	0x73	Woodblock	0xB3	Siren 1	0xF3	Reserved
0x34	Choir Aahs	0x74	Taiko Drum	0xB4	Character power up	0xF4	Reserved
0x35	Voice Oohs	0x75	Melodic Tom	0xB5	Character get	0xF5	Reserved
0x36	Synth Voice	0x76	Synth Drum	0xB6	Up	0xF6	Reserved
0x37	Orchestra Hit	0x77	Reverse Cymbal	0xB7	Down	0xF7	Reserved
0x38	Trumpet	0x78	Guitar Fret Noise	0xB8	Luffin	0xF8	Reserved
0x39	Trombone	0x79	Breath Noise	0xB9	Scream	0xF9	Reserved
0x3A	Tuba	0x7A	Seashore	0xBA	Pretty	0xFA	Reserved
0x3B	Muted Trumpet	0x7B	Bird Tweet	0xBB	Mystery	0xFB	Reserved
0x3C	French Horn	0x7C	Telephone Ring	0xBC	Robot	0xFC	Reserved
0x3D	Brass Section	0x7D	Helicopter	0xBD	Foot Step	0xFD	Reserved
0x3E	Synth Brass 1	0x7E	Applause	0xBE	Character Rotation	0xFE	Reserved
0x3F	Synth Brass 2	0x7F	Gun Shot	0xBF	Character Jump	0xFF	Reserved

Pan data for the drum set

Note	Instrument	Pan	Note	Instrument	Pan	Note	Instrument	Pan
35	Acoustic Bass Drum	64	51	Ride Cymbal 1	44	67	High Agogo	29
36	Bass Drum 1	64	52	Chinese Cymbal	44	68	Low Agogo	29
37	Side Stick	64	53	Ride Bell	44	69	Cabasa	29
38	Acoustic Snare	64	54	Tambourine	74	70	Maracas	24
39	Hand Clap	54	55	Splash Cymbal	54	71	Short Whistle	99
40	Electric Snare	64	56	Cowbell	84	72	Long Whistle	99
41	Low Floor Tom	34	57	Crash Cymbal 2	44	73	Short Guiro	94
42	Closed Hi-Hat	84	58	Vibra-Slap	29	74	Long Guiro	94
43	High Floor Tom	46	59	Ride Cymbal 2	44	75	Claves	84
44	Pedal Hi-Hat	84	60	High Bongo	99	76	High Wood Block	99
45	Low Tom	58	61	Low Bongo	99	77	Low Wood Block	99
46	Open Hi-Hat	84	62	Mute High Conga	39	78	Mute Cuica	44
47	Low Mid Tom	70	63	Open High Conga	39	79	Open Cuica	44
48	High Mid Tom	82	64	Low Conga	44	80	Mute Triangle	24
49	Crash Cymbal 1	84	65	High Timbale	84	81	Open Triangle	24
50	High Tom	94	66	Low Timbale	84			

Pan = 0 is left, 64 is centre, and 127 is right.