DA32HY User Manual

◆ The Writing Formats and Technical Terms of This Manual

- User mainframe means single chip applied by user; DA32X means single chip applied by digital audio decoder of DA32 series.
- Requirements of Dolby means <<MULTICHANNEL DIGITAL AUDIO DECODING SYSTEM FOR CONSUMER PRODUCTS Licensee Information Manual Version 2.0 April, 1997>>
- Copyrights of the Dolby, Dolby digital are belonged to Dolby Laboratories Inc. http:// www.dolby.com
- Dolby testing disk means DOLBY DVD DEMO AND TEST DISC VERSION 1.0
- MP3 means MPEG layer 3, decoding has no a copyright restricting.
- Copyright of HDCK is belonged to Pacific Microsonics Inc. http://www.hdcd.com。
- "n" means 4bit (hexadecimal, from "0" to "f") variable, for example, 2nH / 0nnH means sending and receiving instructions, and any values that parameter is hexadecimal between the 20H/ 00H and 2fH/ ffH.
- "b" means byte (binary, from "0" to "1") variable, for example, 0010b1bbB / 0nnH means sending and receiving instructions, and any values that parameter is hexadecimal between the 20H/ 00H and 2fH/ ffH, but C2 is fixed for 1.
- nnH / nnH means the general expression form of instructions （C7-C0）/parameters （P7-P0）, sending and receiving are suitable.

◆ Features

- Apply CRYSTAL CS4926（CS49326）24bit audio DSP, CS8415 low time base error 96KHz digital receiver, and CS4228A 96K/24bit A/D & D/A CODEC.
- Internal analog mute function, matching CS4926 high-speed DSP processing can achieve the best mute effect automatically, and reduce noise down to minimum.
- Apply late-model bi-directional bus HSBⅡ of high speed, user mainframe can continuously send as many as 16 set of instructions and parameters, and then using of user is more nimble. Moreover, the bus is completely compatible with HSB bus of the first generation.
- Built-in main current decoding system DOLBY DIGITAL, HDCD, MP3 and so on, besides, have various surround sound decoding and playback such as DOLBY PRO-LOGIC and RO-LOGICⅡ.
- There is no need for upgrade to change any hardware, totally support all digital compression code stream such as AAC and MPEGⅡ so as to suit different markets. Users have to apply for the use license of corresponding company before production.
- One internal fiber input and three coaxial input, or seven digital input and a digital output. Provide many groups of analog input switching signals A/B/C, can switch as many as 8 analog input；6CH switches external 5.1CH input, when analog and listening mod are stereo ANA can switch analog signal without passing decoder, or output and control directly signal from M62446.
- Matching DV37AB OSD board can realize Chinese/English OSD menu display, the instructions of user are

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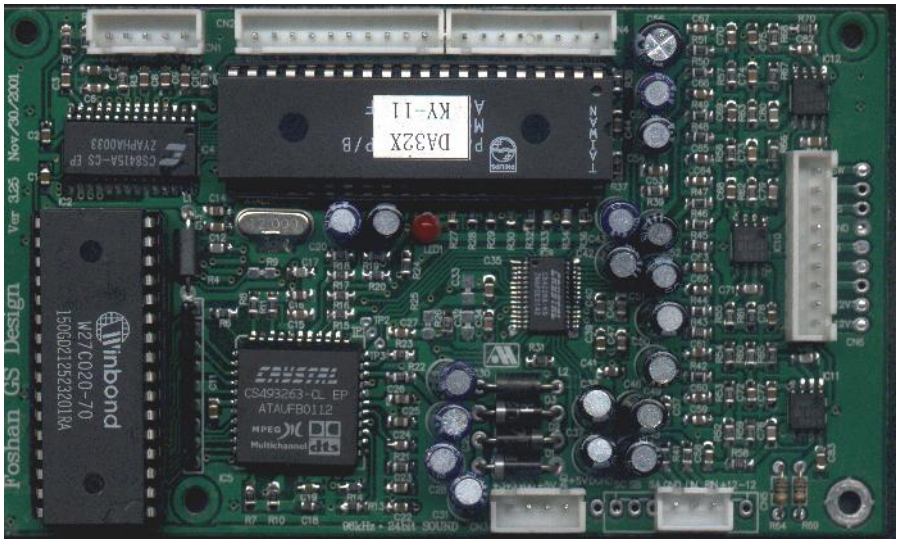
completely compatible with vision having not OSD, can be upgraded nimbly and boundlessly.

- Adding only corresponding hardware, DA32HY can realize Dolby EX6.1 and others 6.1, 7.1 functions.
- Equipping M62446 and bass management circuit can finish complete decoding and volume control functions; requiring very short time can let products reach Dolby standard, which provides convenience for capturing the market quickly.

◆ The Requirements on The Hardware and Testing Steps That User Applying DA32HY Decoder Design Products According with Dolby Digital Attestation of Type B.

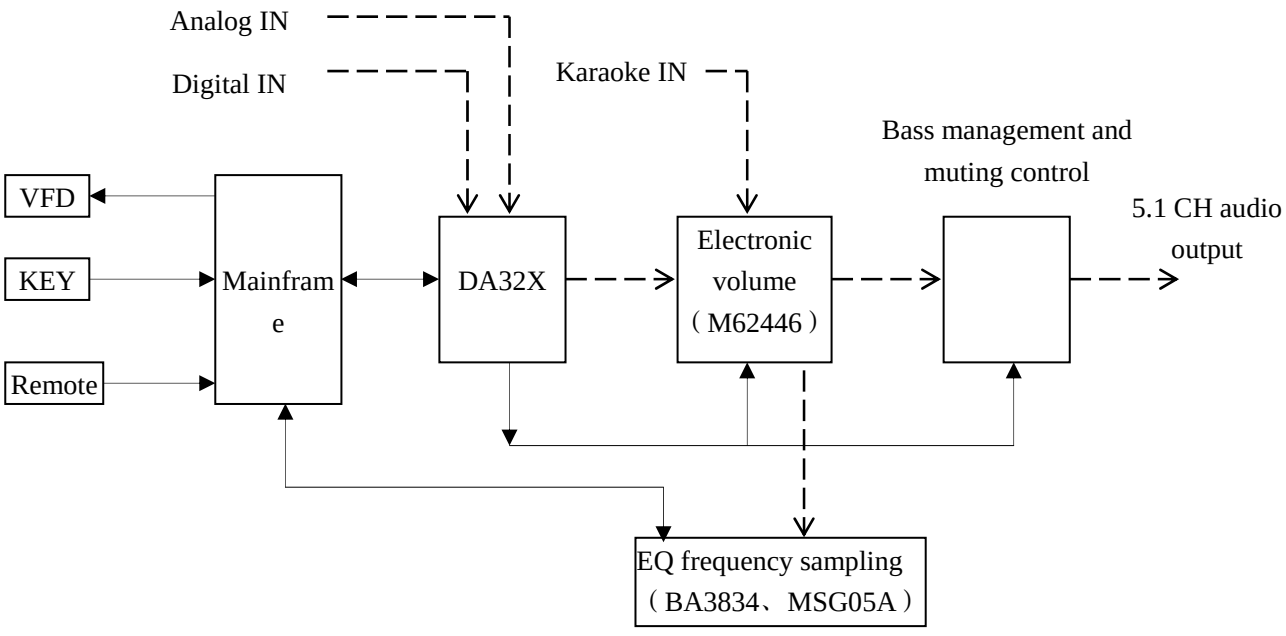
- ✓ The following is general testing conditions: level of every channel and left-right channel balance inching are in normal position, and compression mode is closed.
- ✓ *Setup of speaker is* Config 2 (left and right channels are big speaker, the others are small speaker, and set extra bass), play Title 30, millivoltmeter is connected with left channel, modulating volume make volume reach the maximum, should can output full power (i.e. just appear distortion.), that is the minimal request of complete machine gain.（Test complete machine gain.）
- ✓ The same as above, modulating volume make output be 1W (about 2.83V), and this time, level is applied in the after statement as reference 0dB.
- ✓ *Play Title 30, respectively test central output, right channel output, left back channel output, right back channel output, the output change relative to* reference 0dB *can not exceed + 0.5 dB range till 0.5 dB. (Test channel balance.)*
- ✓ Play respectively Title 43、45, respectively test left channel output, right channel output, entire time inner in playing（20Hz - 20KHz）, the output change can not exceed +0.5dB range till -1dB.(Test frequency responding.)
- ✓ Play respectively Title 44、46、47, about between the 30 seconds and 59 seconds, respectively test central output, left back output, right back output, the output change can not exceed +0.5dB range till -1dB. (Because setup is small speaker, in the first 30 seconds, output level is able to rise slowly). (Test frequency responding.)
- ✓ *Play Title 80, using millivoltmeter with CCIR/ARM to test all channels should lower 65dB than* reference 0dB *at least. (Test digital signal-to-noise ratio.)*
- ✓ When the first 2seconds in playing Title 48, testing extra bass output should lower 24dB +/-3dB than reference 0dB. (Test bass channel balance.)
- ✓ Play Title 48, in the first 2seconds, extra bass is closed, testing extra bass should lower 50dB reference 0dB. (Test bass muting switch.)
- ✓ Play Title 48, in the first 2seconds, testing left channel output should higher 5.5dB than reference 0dB. (Test bass management level balance.)
- ✓ *Play* Title 72, make tone bass reach the maximum, if using oscilloscope or distortion device test left channel output, the slight distortion is acceptable, but playing Title 73 shouldn't distort. (Test bass surcharge.)
- ✓ Speakers are configured for Config 1 (all speakers are small, and have extra bass); left speaker and right speaker should lower 50dB than reference 0dB at least. (Test bass management switch.)
- ✓ *Input* 1KHz / 200mV analog signal from every analog port, under the BYPASS state, output of left channel and right channel relative to reference 0dB can not exceed +1dB range till –1dB. (Test analog input.)
- ✓ Do away with analog signal have inputted, place listening mode in the PRO-LOGIC state, using millivoltmeter with CCIR/ARM to test all channels should lower 65dB than reference 0dB. (Test analog signal-to-noise ratio.)



◆ Application Fields

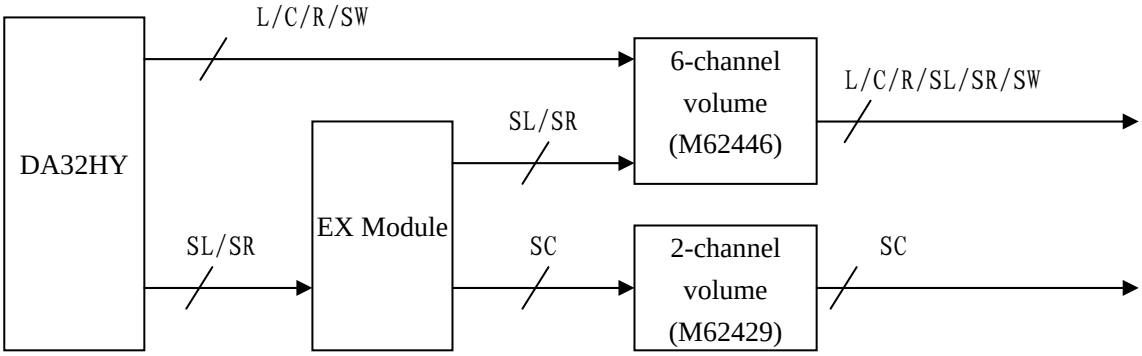
- ✓ Compose multi-format digital audio decoder.
- ✓ Compose AV reception power amplifier.
- ✓ Computer multi-channel multimedia sound box.
- ✓ External sound card of computer with USB input.

◆ The System Diagram Applying DA32HY Decoder (Dotted Lines are Audio Channels)



◆ The Solution Composing Dolby EX6.1

DA32HY composing Dolby EX6.1 is called SEX6.1 (Simple EX6.1), it is necessary that adding circuits abstract SC signal from the SL and SR. there are two circuits, the first kind: employs NJW1102 or the other DOLBY PRO-LOGIC as decoding IC, the characteristic is that separation degree of the back channel is high (exceeds 25dB); the second kind: employs operational amplifier as adder, the characteristic is that circuit is simple and Price is cheap.



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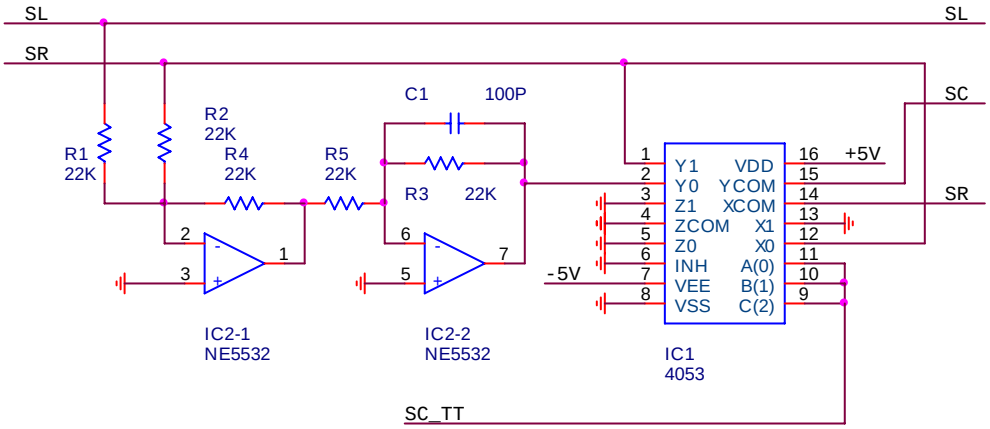
I. The diagram composing Dolby EX6.1

The following is the circuit applying operational amplifier as adder (Does not include volume control section); revising this circuit correspondingly can apply others Dolby Pro-logic as decoding.



II. A part of the circuit applying operational amplifier as adder (SC_TT connects with VCS port)

◆ DA32HY Connection Methods

DA32HY contains a fiber input and three coaxial inputs, if using must to exceed four digital inputs, using CN1 can connect with corresponding socket; RX1, RX2, RX3, RX4 have contained internal input matching resistance and coupling capacitance, only require the coaxial input connecting directly to be OK. RX5, RX6, and RX7 have connected with ground on the DA32HY, when they are used, have to cut off corresponding copper skin, moreover, it is necessary to add coupling capacitance (104Ω series connection), and input matching resistance(75Ω parallel connection), after dong this, they are able to connect with the coaxial input.

1. **+5V** Digital power supply input.
2. **+5V** Digital power supply input.
3. **DGND** Digital ground wire input.
4. **DGND** Digital ground wire input.
5. **LIN** Left channel analog signal input (contains a low-pass filter; first connects with 150Ω resistance serially, and then connects with 1500P capacitance to ground parallel).
6. **RIN** Right channel analog signal input (contains a low-pass filter; first connects with 150Ω resistance serially, and then connects with 1500P capacitance to ground parallel).
7. **–9V** Analog signal power supply input.
8. **AGND** Signal input analog ground wire.
9. **+9V** Analog signal power supply input.
10. **SB** Control 2 used to extend analog input.
11. **SA** Control 1 used to extend analog input.
12. **SC** Control 3 used to extend analog input.
13. **L** Left channel signal output.
14. **R** Right channel signal output.
15. **SL** Back left channel signal output.
16. **SR** Back right channel signal output.
17. **C** Central channel signal output.
18. **SW** Extra bass channel signal output.
19. **GND** Signal output analog ground wire.
20. **VCS** Dancing machine and OSD control VCS port or mainframe expansion input/output port (P37), it is controlled by bit 7 of Custom A (57H/0nnH) instruction, if bit 7 is high, the output is high; can use Custom B（58H / 00H）to find input port; If input is low, the callback parameter bit 7 is low. After starting SEX6.1 function, SC uses this port to test noise; when SC is testing noise, the output is high.
21. **MDA** 6-channel volume control IC（M62446FP） P40（DATA）.
22. **VT1** Dancing machine and OSD control VT1 port or mainframe expansion input/output port (P36), it is controlled by bit 6 of Custom A (57H/0nnH) instruction, if bit 6 is high, the output is high; can use Custom B（58H / 00H）to find input port; If input is low, the callback parameter bit 6 is low.
23. **MCK** 6-channel volume control IC（M62446FP） P41（CLOCK）.
24. **VT2** Dancing machine and OSD control VT2 port or mainframe expansion input/output port (P35), it is controlled by bit 5 of Custom A (57H/0nnH) instruction, if bit 5 is high, the output is high; can use Custom B（58H / 00H）to find input port; If input is low, the callback parameter bit 5 is low.
25. **BCK** Mainframe and DA32X communication HSB (three lines bi-directional time-sharing bus) **BCK.**
26. **6CH** 6CH_IN external 6-channel input selection, when it is used, the instruction is 34H / 0a0H, when it is effective, it is high; external circuit can be used to switch external 6-channel.

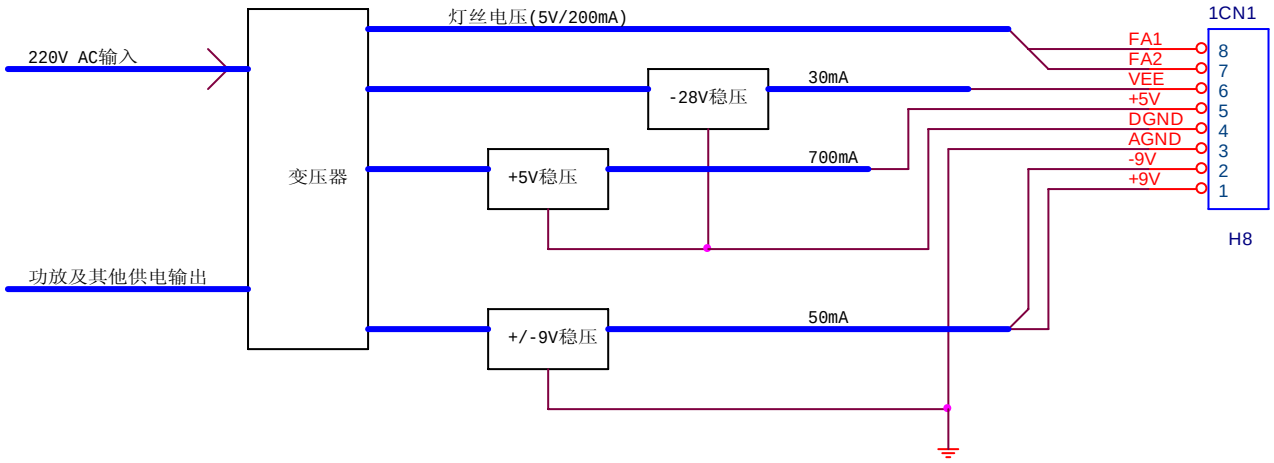
27. **SDA** Mainframe and DA32X communication HSB (three lines bi-directional time-sharing bus) **SDA.**
28. **LATCH** 6-channel volume control IC（M62446FP） P39（LATCH）.
29. **HOLD** Mainframe and DA32X communication HSB (three lines bi-directional time-sharing bus) HOLD**.**
30. **ANA** Control port of Decoder outputting directly, under the analog input or listening mode is under the BYPASS state, this pin is high.
31. **P24** Mainframe expansion input/output port(P24), it is controlled by bit 4 of Custom A (57H/0nnH) instruction, if bit 4 is high, the output is high; can use Custom B（58H / 0nnH）to find input port; If input is low, the callback parameter bit 4 is low.
32. **MSW** Mike switch control input, when MIC is not inserted, this pin is low, or it is high; even though have sent “karaoke commixture switch (7eH/20H)”instruction, this pin must be high, and the fourth pin of M62446 has corresponding control action.
33. **VDA** Dancing machine and OSD control VDA, it is used in company with the DATA_IN and DATA_OUT of 93C46.
34. **VCK** Dancing machine and OSD control VCK, it is used in company with the CLOCK of 93C46.

◆ Electrical Specification

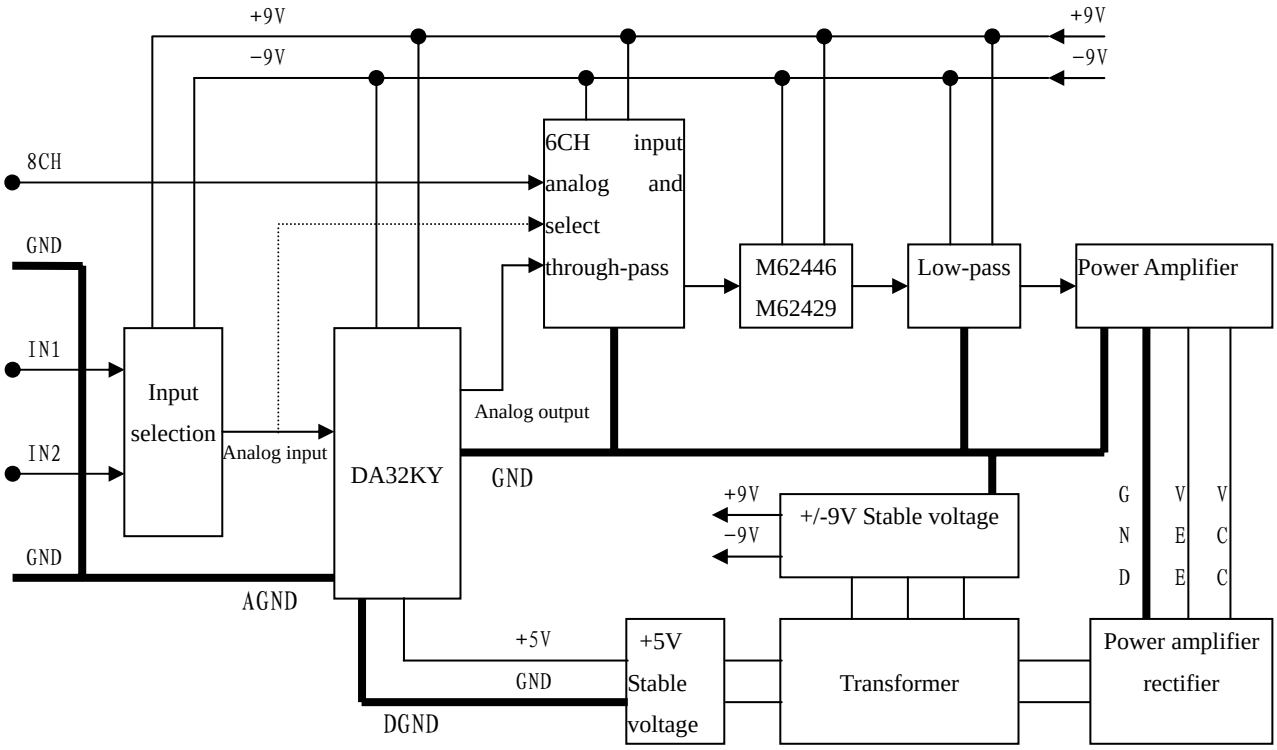
Item	Minimum	Normal	Maximum
Digital power supply +5V	4.75V	+5V	5.15V
Digital operating current	400mA	500mA	800mA
Analog circuit voltage	+9V / -9V	+12V / -12V	+18V / -18V
Analog input level（@-20dB）	200mV	210mV	220mV
Analog input impedance		100 Ohm	
Analog output （L&R @ 0dB）	2.0Vrms	2.2Vrms	2.3Vrms
Analog output（LS&RS&C&ER&ELSW @ 0dB）	2.8Vrms	3.0Vrms	3.3Vrms
Output noise level (digital input CCIR/ARM)	50uV	58uV（S/N = 93dB）	76uV
Output noise level (digital input，not weighted)	560uV	600uV	800uV
Output noise level (analog input CCIR/ARM)	70uV	76uV（S/N = 90dB）	80uV
Output noise level (digital input，not weighted)	600uV	700uV	800uV
Output impedance		100ohm	
Digital input		0.5Vp-p	

◆ Instructions of The Power Supply and Ground Wire

In DA32HY, digital ground wire have connected with analog ground wire, when the mainboard LAYOUT, user should pay attention to the digital and analog power supply and ground wire. Input and output of the analog ground wire and digital ground wire are connected in the DA32HY, so anywhere out of decoder board is no connection, or can appear low frequency noise. DGND, AGND, and corresponding parts shouldn’t have any electrical connection. +/-9V stable voltage may be +/-9V range till +/-18V. Filament voltage and VEE (-28V stable voltage) are parts supplying electricity for VFD, must be revised according to different display.



Power supply diagram



Power supply and ground wire diagram (Heavy lines express ground wire)