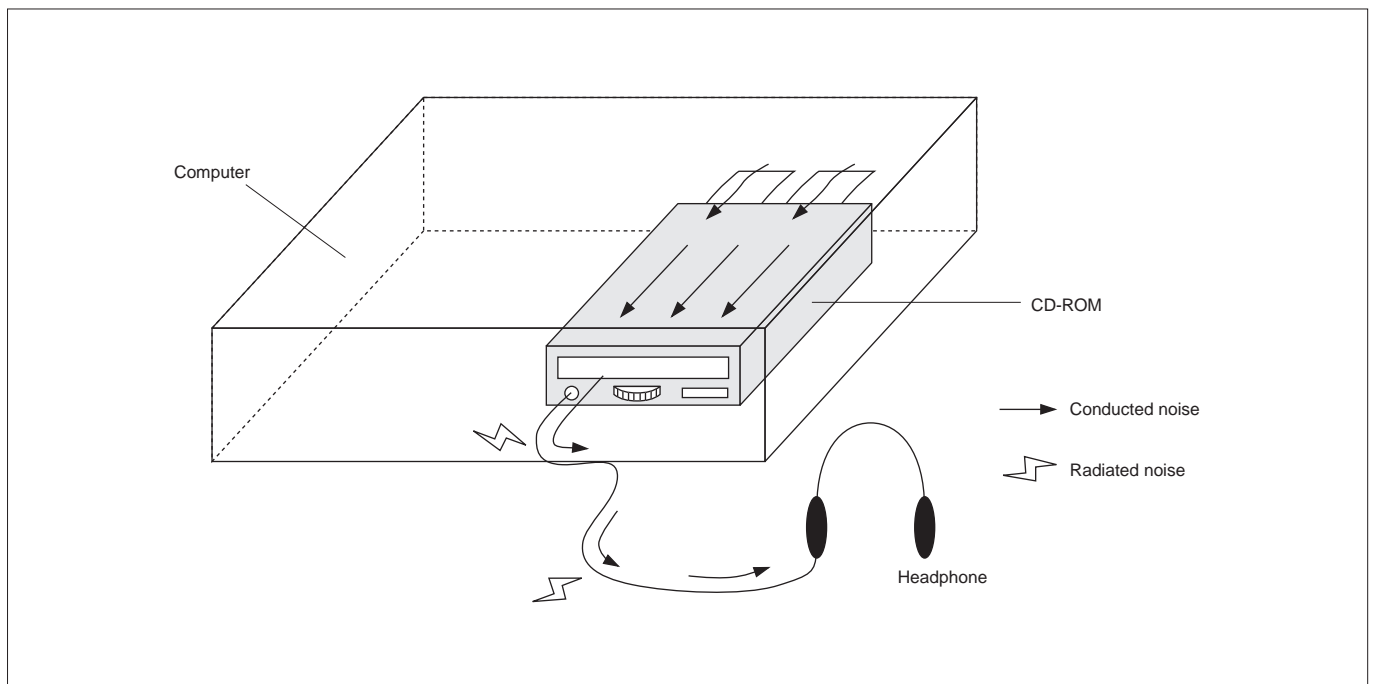


4 Example of Noise Suppression in CD-ROM Drives

Noise Emission Status :

Noise from both the CD-ROM drive and computer are conducted through the headphone cable and radiated.

Since an internal CD-ROM drive is shielded with a metal case, radiated noise from the CD-ROM drive rarely causes a problem. However, in some cases, radiated noise from the headphone cable can cause problems.



4 Example of Noise Suppression in CD-ROM Drives

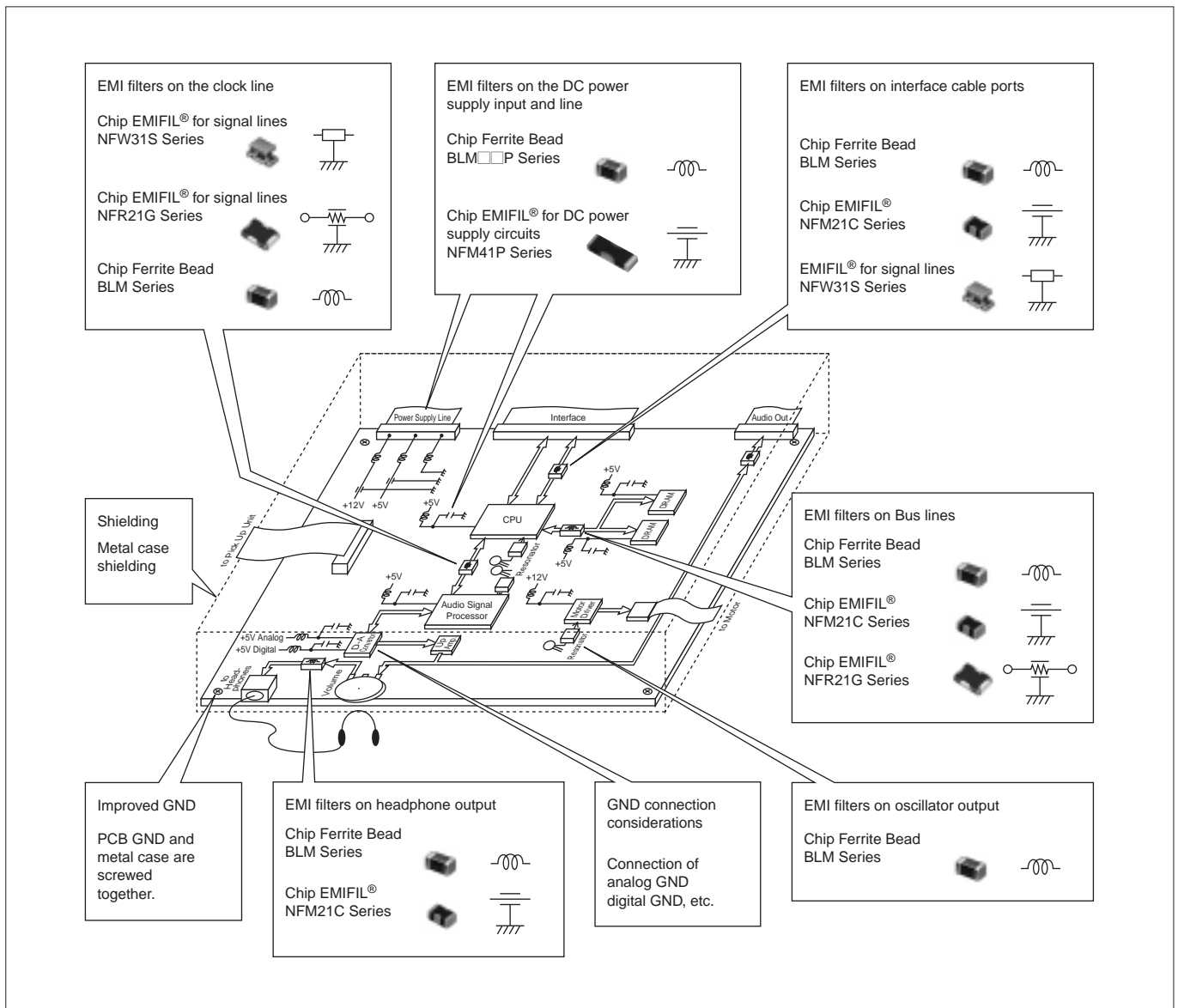
Noise Suppression Content in CD-ROM Drives

Noise conducted to the headphone cable comes from the both the CD-ROM drive and the PC.

Initially, noise from the headphone cable needs to be suppressed. The PCB's GND is first connected to the metal case, and then EMI filters are installed. If radiated noise cannot be suppressed using these methods, additional measures must be taken.

If the problem appears to be noise generated from the CD-ROM drive, the source of the noise must be suppressed. The first potential noise sources are the clock and bus lines.

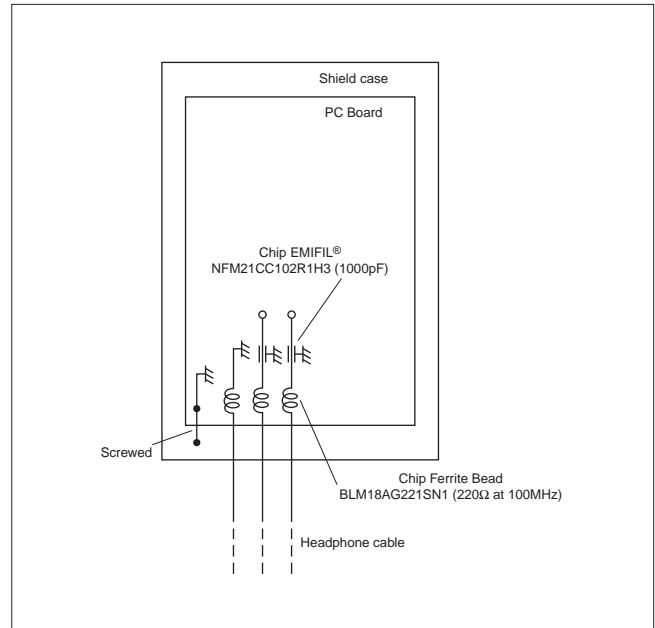
Note that noise generated around the oscillator frequently can also cause problems. When noise generated around the D-A converter causes a problem, the point where the analog and digital GNDs are connected must be carefully considered. In many cases, improving this connection often suppresses the noise. If noise generated from the PC is causing a problem, EMI filters need to be installed on the cable between the PC and CD-ROM drive. Note that the CD-ROM drive may not operate on some computers if large capacitance or large inductance EMI filters are used.



Example of Noise Suppression in CD-ROM Drives 4

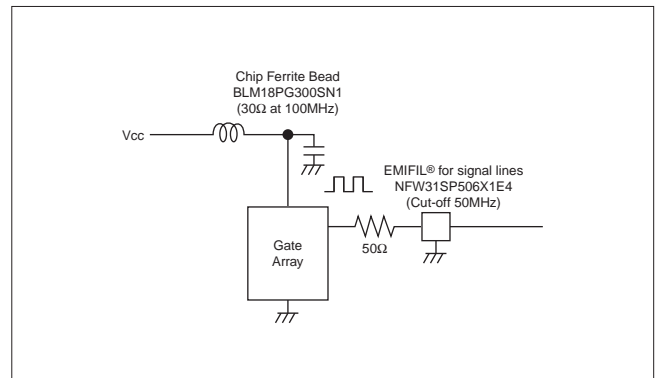
Installing EMI Filters on the Headphone Output Port

To suppress noise in the headphone output port, it is important to minimize the GND's noise level of the port. The PCB's GND and metal case are screwed together to make a low impedance connection at high frequency. The NFM21C series (Chip EMIFIL[®]) capacitor is then installed on the headphone lines. More effective noise suppression can be achieved by also installing BLM series (Chip Ferrite Bead) on the lines.



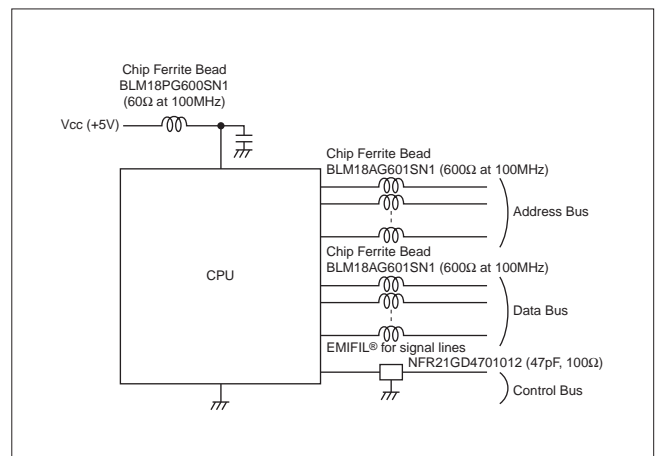
Installing EMI filters on the Clock Line

High-speed clock signals generate high frequency noise and in these conditions, the noise frequency may be sometimes quite close to the signal frequency. Therefore, an EMI filter with high suppression ability and steep attenuation characteristics is used such as the NFW31S series (Chip EMIFIL[®] for signal lines), or the BLM□□B series (Chip Ferrite Bead for high speed signal lines). Noise caused by transient current is also generated on the power supply line. Therefore, a chip ferrite bead is installed, as well as a by-pass capacitor to suppress the noise on the power supply line.



Installing EMI filters on Bus Lines

Data bus/Address bus lines contain many lines that switch on and off simultaneously. An instantaneous large current flows into the GND and power supply lines. Therefore, it is necessary to suppress the current flow to the signal lines. The BLM series (Chip Ferrite Bead) is generally used for this purpose. On the control bus line, especially at high operating speeds and high noise levels, a filter with resistance components is used such as the NFR21G series (Chip EMIFIL[®]).

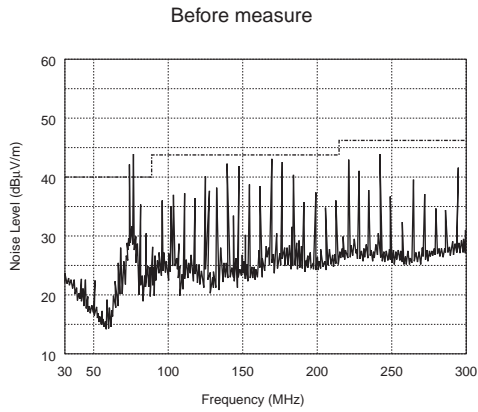


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4 Example of Noise Suppression in CD-ROM Drives

Example of effects produced when installing the Chip Ferrite Bead on the bus lines

Noise suppression effects produced when installing the BLM series on the data bus lines.



Before measure

