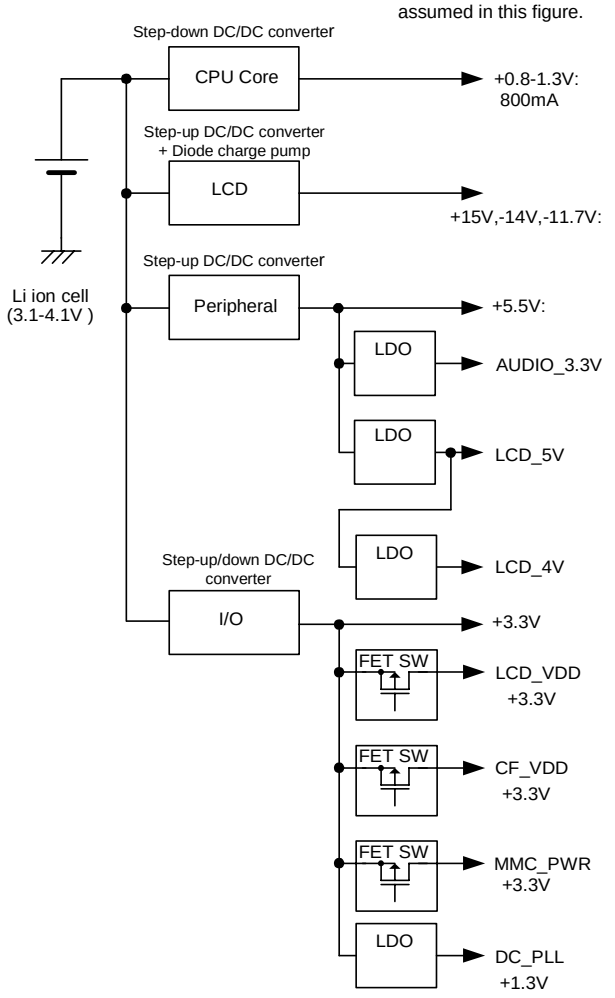
■ General Description

High-performance yet power-thrifty, the Intel® XScaleTM processor has become a focus of attention and is incorporated in a variety of products.
The Intel® XScaleTM processor PXA250 achieves low power operation by varying its core voltage according to variation in load. It thus extends battery life.
Torex proposes PDA power supplies incorporating XScale.

■ Power Block Diagram

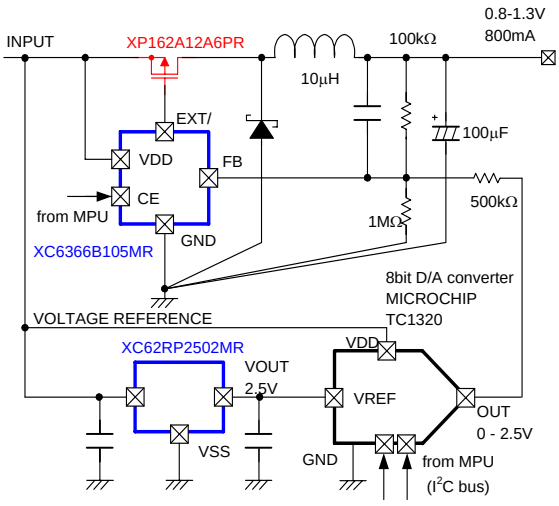
Note: The PXA250 necessitates a variable voltage. A voltage variation range of 0.8 to 1.3 V is assumed in this figure.



It is recommended to use the step-up/down type for circuits converting the voltage of a Li-ion battery to 3.3 V. This allows simple circuitry. Use FET SWs to distribute 3.3 V to each circuit. This also ensures simple configuration.

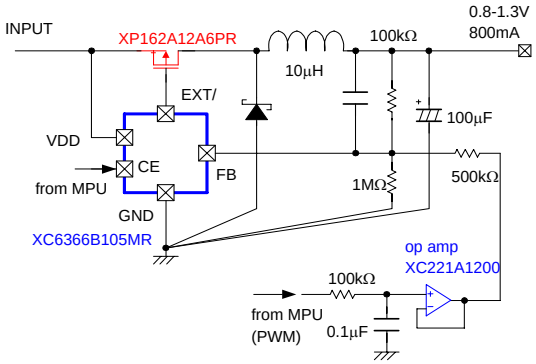
■ Circuits

Fig. 1 Core Circuit (1)
Voltage variation by I²C D/A converter



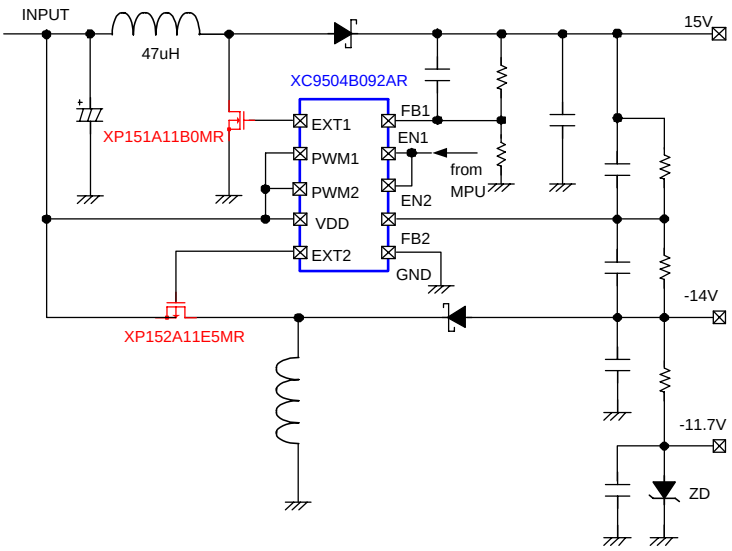
This circuit varies the output voltage of the DC/DC converter by applying the output voltage of the D/A converter to the FB terminal (addition of offsets). Replacement of the XC6366 with the XC9211 will be a solution achieving high efficiency. The XC9211 is a synchronous rectifying step-down DC/DC converter currently under development.

Fig. 2 Core Circuit (2)
PWM output of CPU integrated to produce signals for voltage variation



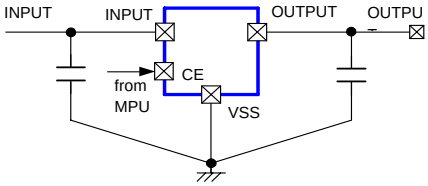
The circuit integrates and converts the signal output from the PWM terminal of the CPU to a direct current. The direct current is then applied to the FB terminal of the DC/DC converter to vary its output voltage. The output voltage of the OP amp is proportional to the duty ratio of the PWM signal. Choose such CR values between the PWM terminal and OP amp that do not affect the output of the DC/DC converter.

Fig. 3 LCD Circuit
2-ch DC/DC converter for boosting and inversion



Use of the XC9504 series ensures stable boosting of voltage and production of negative voltages.

Fig. 4 Various LDO Circuits



Circuit Designation	Output Voltage	IC Designation
AUDIO_3.3V	3.3V	XC6204B332MR
LCD_5V	5.0V	XC6204B502MR
LCD_4V	4.0V	XC6204B402MR
DC_PLL	1.3V	XC6205B132MR

It is recommended to use a regulator that permits the use of a ceramic capacitor. The products shown above are small, produce only low ripples, and deliver high performance.

Fig. 5 5.5-V Circuit for Peripheral Components

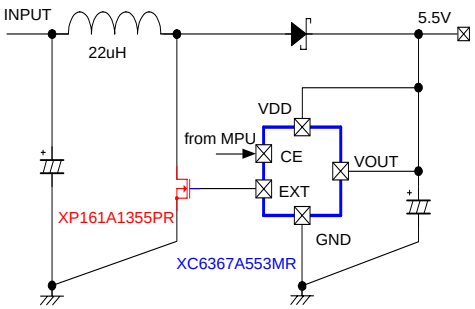
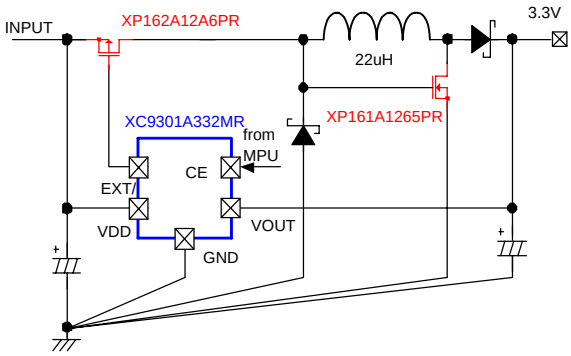


Fig. 6 3.3-V Circuit for Inputs and Outputs
Step-Up/Down DC/DC Converter



In the conventional design, a step-down DC/DC converter is required if the battery voltage is higher than the output voltage, and accordingly a step-up DC/DC converter if the battery voltage is lower than the output voltage. In contrast, use of the single circuit shown above will meet needs in both cases.
(It is recommended, however, to combine step-up and step-down DC/DC converters to meet high current requirements.)