EPSON

E0C33 Family TS33 Middleware

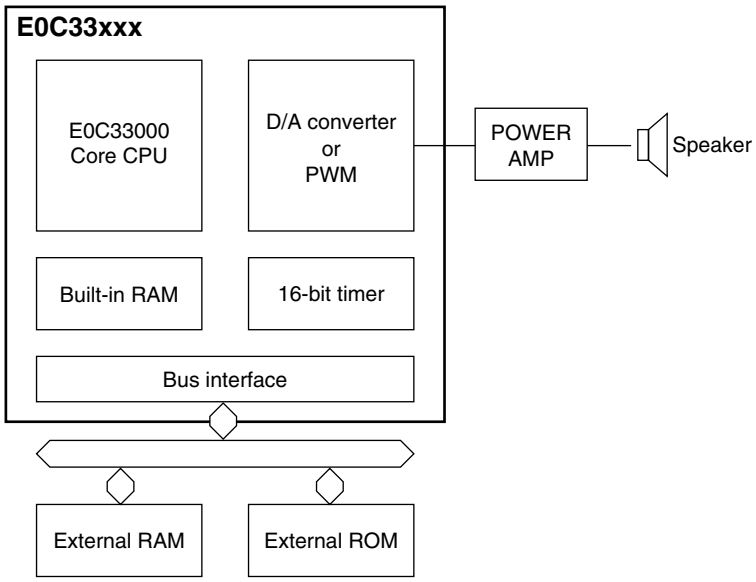
Text to speech middleware

- Text to speech middleware for the E0C33 Family
- Generates more natural speech by adjusting parameters for each phoneme
- Comes with VSX2, a high sampling rate version of VSX

■ FEATURES

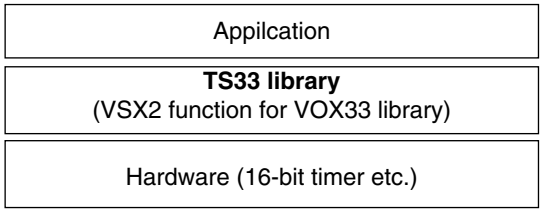
- The text-to-speech middleware for the E0C33 Family, this generates speech from Japanese text using phoneme data compressed by VSX (8kHz) or VSX2 (11.025 to 22.05kHz). Available in linkable library form.
- Speech can also be generated from your original registered words, with support for other languages aside from Japanese.
- A VSX2 speech compression/expansion technology supporting sampling rates of 11.025kHz, 16kHz, and 22.05kHz has just been introduced.
- The sound volume, pitch, length, and silent length between phonemes can be individually adjusted for each phoneme, for a more natural speech quality closer to actual speech.
- Running on a PC, the TS33 tools allow you to adjust output parameters as well as evaluate sound quality before final production.
- The standard Japanese language phoneme data can be stored in approximately 100KB of memory (for a sampling frequency of 16kHz).
- The library program is about 15KB in size.
- Ideally suited for vending machines, PDA, electronic toys, and electronic stationery.

■ HARDWARE CONFIGURATION



■ SOFTWARE CONFIGURATION

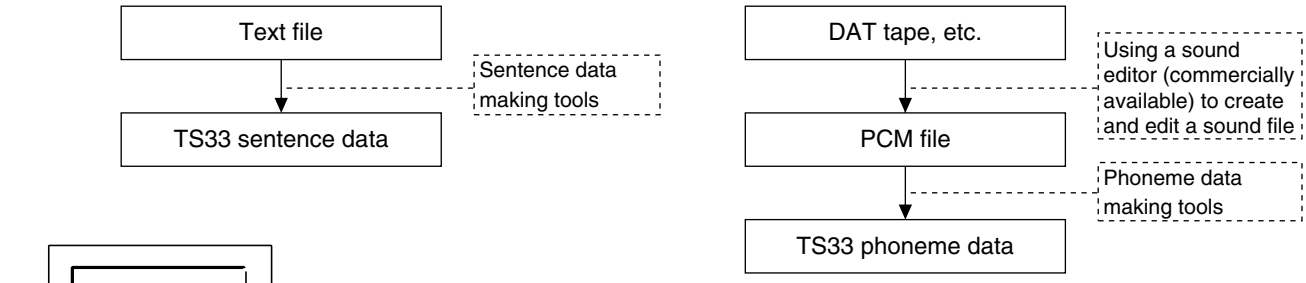
● TS33 Library

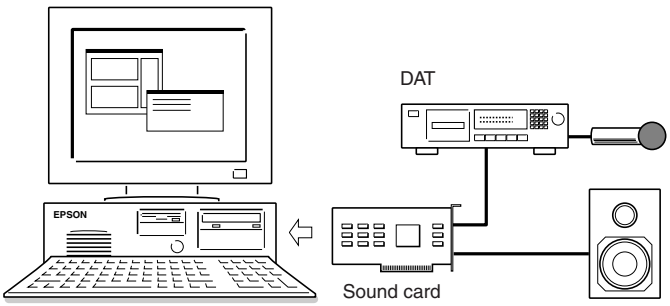


● **TS33 Tool**

This tool creates sentence data and phoneme (word) data.
It can be used with Windows 95/98/NT4.0, or higher versions.

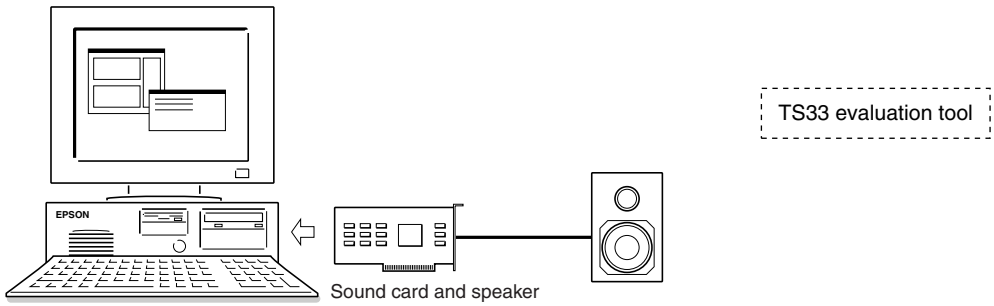
Flow in PC (Example)





● **TS33 Evaluation Tool**

This is a GUI tool used to evaluate speech generated by TS33, using a PC sound board.
It can be used with Windows 95/98/NT4.0, or higher versions.



∗ This middleware is only available with the IC (E0C33 Family).
This specification may change without notice.

E0C33 Family CF33 Middleware

● **ATA Card Device Driver**
Use of the compact FLASH and ATA FLASH cards require an ATA card device driver.

● **FAT File System Device Driver (supports FAT12 and FAT16)**
Permits MS-DOS Ver.6.x compatible file exchange (8 character file names, with three extension characters).
Support for Japanese file names.
API is standard ANSI-like (e.g., fopen() and fred()).

● **FAT File System Format Driver**
This driver initializes the FAT file system to make it usable in compact FLASH or ATA FLASH.

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E0C33 Family GRAPHIC33 Middleware

Graphic library

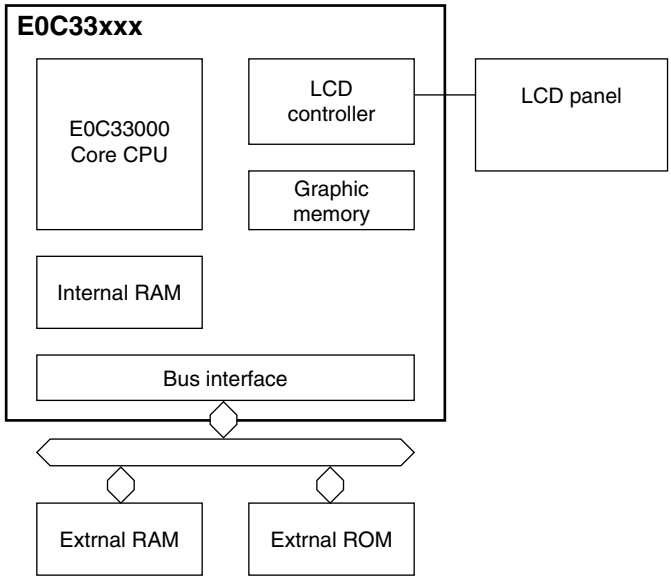
Preliminary

- Graphics library for the E0C33 Family
- Supports various grayscales, from 1, 2, 4, or 8bpp colors to monochrome
- Comes with the user interface resources necessary for GUI implementation

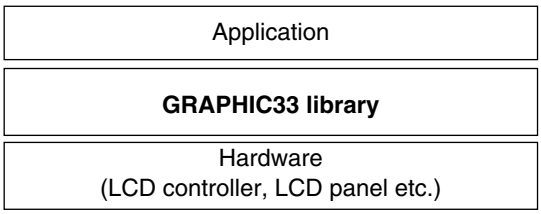
■ FEATURES

- This is a graphics library for the E0C33 Family provided in linkable library form. User interface resources required for GUI implementation are also available.
- Supports various grayscales from 1, 2, 4, or 8bpp colors to monochrome.
- Optimized for use with the E0C33 Family; library is fast and compact.
- Allows for advance evaluation using an emulation library running on a PC.
- Ideally suited for applications making use of LCD panels, including PDAs, electronic toys, and electronic stationery.

■ HARDWARE CONFIGURATION



■ SOFTWARE CONFIGURATION



■ PRIMARY USER INTERFACE RESOURCES

Resorce	Description
Form window	Standard window
Pop-up window	Used to display alert information
Text window	Displays text.
Command button	Command execution button
Check box	Square box - checked when selected
Radio button	Round button that can be selected from a group of buttons

■ PRIMARY GRAPHIC FUNCTIONS

Function	Description
gpcDrawPoint	Draws a point.
gpcDrawLine	Draws a line.
gpcDrawRect	Draws a rectangle.
gpcFillRect	Fills a rectangle.
gpcInvrertRect	Reverses a displayed area.
gpcDrawEllipse	Draws an ellipse.
gpcFillEllipse	Fills an ellipse.
gpcDrawCircle	Draws a circle.
gpcFillCircle	Fills a circle.
gpcDrawArc	Draws an arc.
gpcDrawText	Outputs text.
gpcPutImage	Outputs an image.
gpcGetImage	Captures an image.

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E0C33 Family Demonstration and Evaluation Board

■ FEATURES

- DMT3300X is the evaluation board for the E0C33XXX. It contains 128KB ROM or 1MB Flash memory, 1MB RAM, 1MB Flash memory, 20MHz and 32kHz oscillators.
- The onboard ROM or 1MB Flash memory includes the MON33 debug monitor. It provides debugging functions, such as downloading a program to the RAM or Flash memory, running, stepping, setting breaks, with the DMT33MON board and the db33 debugger on the PC. The demonstration boards support stand alone running by the program written in the Flash memory.
- The DMT33AMP, DMT33LCD, DMT33CF and other expansion boards provide an environment for demonstration and evaluating the voice, graphic, comppact FLASH and other middlewares.
- DMT33004PD (E0C33A104 QFP socket type) connected to ICE33 provides a development environment using ICE33.
- DMT33005 to DMT33008PD (E0C332XX QFP socket type) with EPOD33XXX provide an internal ROM emulation function allowing evaluation and development of programs for ROM built-in models.

■ E0C33 FAMILY DEMO BOARD LIST

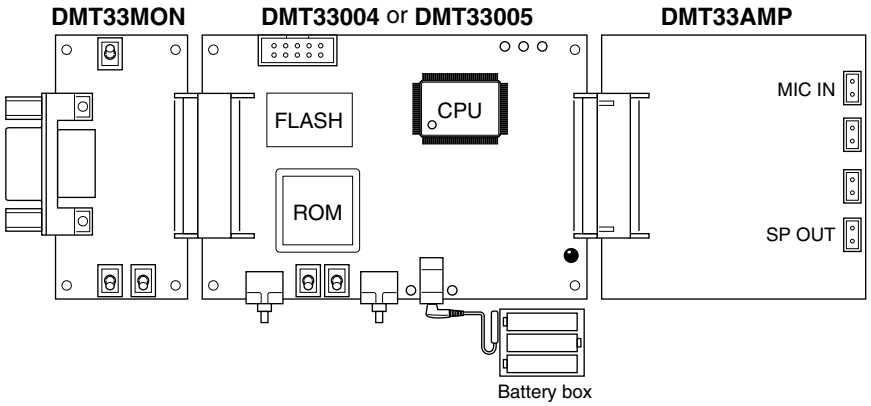
Board name	IC supported	Input voltage Operating voltage	Operating frequency	MON33 area	Flash	SRAM	I/F	Bus I/O output	Others
DMT33004 DMT33004PD	E0C33A104	3–4.5V input 5V operation	20MHz 32kHz	ROM 128KB	1MB	1MB	DMT33MON DMT33AMP	None	PD is for ICE + POD33001
DMT33005 DMT33005PD	E0C33208	3–4.5V input 5V operation	40MHz 32kHz	ROM 128KB	1MB	1MB	DMT33MON DMT33AMP	None	PD is for EPOD33001 and EPOD33208
DMT33006LV DMT33006PDLV	E0C332L01	5V input 3.3V operation	40MHz 32kHz	Flash 1MB	1MB	1MB	DMT33MONLV DMT33AMP DMT33LCD	Bus connector I/O pin output	PD is for EPOD332L01LV With 12V, 5 to 28V, -5 to -28V outputs for LCD
DMT33007 DMT33007PD	E0C33208	5V input 5V operation	40MHz 32kHz	ROM 128KB	1MB	1MB	DMT33MON DMT33AMP	None	PD is for EPOD33001 and EPOD33208 Supports PCM15
DMT33008LV (Under development)	E0C332T01	5V input 3.3V operation	40MHz 32kHz	Flash 1MB	1MB	1MB	DMT33MONLV DMT33AMP	Bus connector I/O pin output	–

● Expansion Board

Board name	Power	Function
DMT33AMP	5V	8kHz sampling audio input/output board (for the E0C33A104/332XXX) Contains various low-pass filter circuits.
DMT33AMP2	5V	16 & 22kHz sampling audio input/output board (for the E0C33A104/332XXX) Contains various low-pass filter circuits.
DMT33AMP3 (To be released shortly)	5V	8–32kHz sampling audio input/output board Supports PCM15, stereo output, and MELODY33 piezoelectric buzzer output.
DMT33LCD26 (To be released shortly)	5V	LCD demonstration board with 2.6-inch DTFD panel (exclusive use for DMT33006LV) Note)
DMT33LCD37 (To be released shortly)	5V	LCD demonstration board with 3.7-inch DTFD panel (exclusive use for DMT33006LV) Note)
DMT33CF (To be released shortly)	3.3V	Demonstration board for compact flash Connected with a bus connector.

Note: A rental board only is available because the quantity is limited.

■ BOARD SYSTEM EXAMPLE (1) DMT33004 or DMT33005 + DMT33AMP



● Description

- Connecting the DMT33MON and a PC allows on-board debugging of the user application, using a debugger (db33.exe) running on the PC.
- The DMT33AMP allows 8kHz-sampled voice/sound to be input or output to or from the board.
- The DMT33AMP has four types of low-pass filter circuits available: a transistor amp circuit (fc = 2.7kHz), an RC second-order low-pass filter circuit (fc = 2.5kHz), an op-amp 4th-order low-pass filter circuit (fc = 3.0kHz), or an op-amp 4th-order low-pass filter circuit (fc = 3.5kHz).

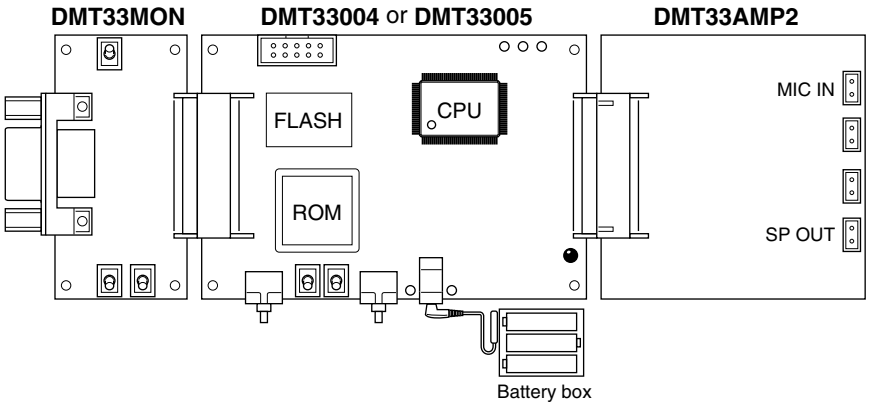
● Operational Demo Software

dm4s8jVx.exe (Voice demo 8kHz Japanese)–DMT33004 + DMT33AMP
(VOX33 (Japanese), SOUND33, MELODY33, VRE33, TS33)
dm4s8eVx.exe (Voice demo 8kHz English)–DMT33004 + DMT33AMP
(VOX33 (English), SOUND33, MELODY33, VRE33)
dm5s8jVx.exe (Voice demo 8kHz Japanese)–DMT33005 + DMT33AMP
(VOX33 (Japanese), SOUND33, MELODY33, VRE33, TS33)
dm5s8eVx.exe (Voice demo 8kHz English)–DMT33005 + DMT33AMP
(VOX33 (English), SOUND33, MELODY33, VRE33)

● Corresponding Middleware and Firmware Sample Software

VOX33 : Voice compression/expansion and voice processing
VRE33 : Voice recognition
TS33 : Text to speech
MELODY33 : PWM method simple sound output (1ch output only)
SOUND33 : Sound output based on WAVE sound source
JPEG33 : JPEG compression/expansion (DMT33004 only)
MON33 : Debug monitor running on user board
FLS33 : Flash memory programming routine

■ BOARD SYSTEM EXAMPLE (2) DMT33004 or DMT33005 + DMT33AMP2



● Description

- Connecting the DMT33MON and a PC allows on-board debugging of the user application, using a debugger (db33.exe) running on the PC.
- The DMT33AMP2 allows 16-kHz or 22kHz-sampled voice/sound to be input or output to or from the board.
- The DMT33AMP2 has four types of low-pass filter circuits available: a 16kHz-sampling transistor amp circuit (fc = 5.8kHz), a 16kHz-sampling RC second-order low-pass filter circuit (fc = 4.0kHz), a 16kHz-sampling op-amp 4th-order low-pass filter circuit (fc = 6.0kHz), or a 22kHz-sampling op-amp 4th-order low-pass filter circuit (fc = 8.2kHz).

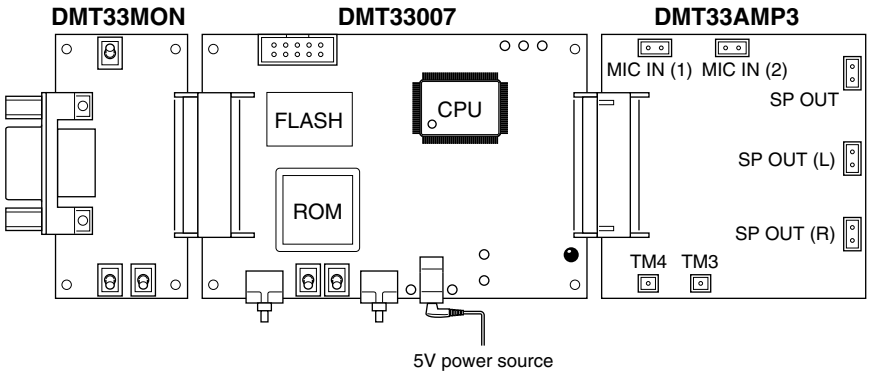
● Operational Demo Software

dm5s16Vx.exe (Voice demo 16kHz, 22kHz Japanese only)–DMT33005 + DMT33AMP2
(TS33 (VSX2-16kHz, 22kHz), SOUND33-16kHz)

● Corresponding Middleware and Firmware Sample Software

TS33 : Text to speech
MELODY33 : PWM method simple sound output (1ch output only)
SOUND33 : Sound output based on WAVE sound source
MON33 : Debug monitor running on user board
FLS33 : Flash memory programming routine

■ BOARD SYSTEM EXAMPLE (3) DMT33007 + DMT33AMP3



● **Description**

- Connecting the DMT33MON and a PC allows on-board debugging of the user application, using a debugger (db33.exe) running on the PC.
- The DMT33AMP3 allows 8-kHz, 16-kHz, 22-kHz or 32kHz-sampled voice/sound to be input or output to or from the board.
- Supports PCM15, stereo output, and MELODY33 piezoelectric buzzer output.

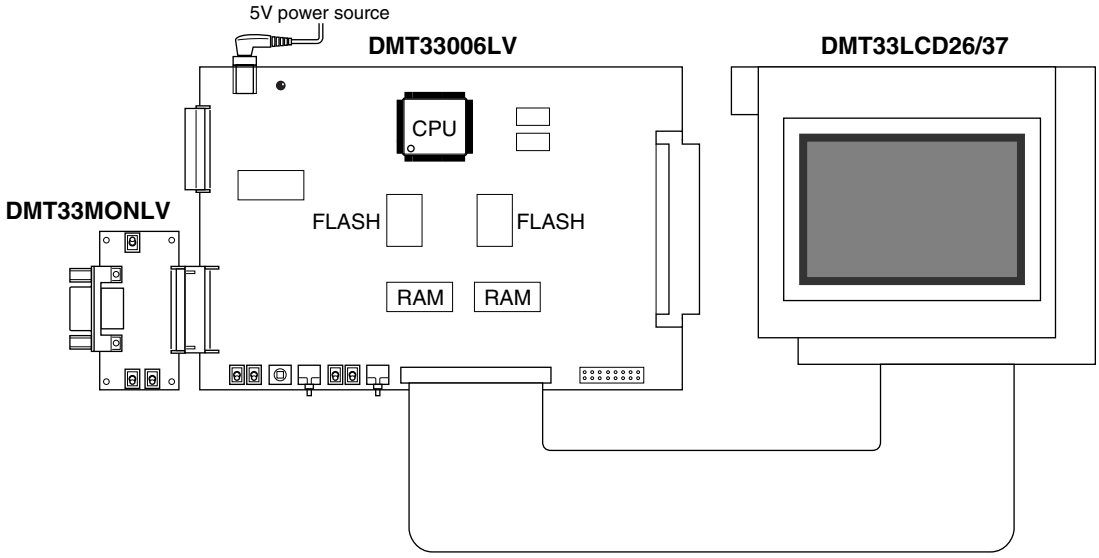
● **Operational Demo Software**

dm7s22Vx.exe (Sound demo 22kHz)–DMT33007 + DMT33AMP3
(SOUND33, 15 bits, 22kHz stereo, MELODY33 2ch differential outputs)
dm7s32Vx.exe (Sound demo 32kHz)–DMT33007 + DMT33AMP3
(PCM15, 32kHz monaural (guitar sound))
dm7s3bVx.exe (Sound demo 32kHz)–DMT33007 + DMT33AMP3
(PCM15, 32kHz monaural (beatmania))
dm7s3cVx.exe (Sound demo 32kHz)–DMT33007 + DMT33AMP3
(SOUND33, 15 bits, 32kHz stereo)

● **Corresponding Middleware and Firmware Sample Software**

MELODY33 : PWM method simple sound output (supports 2ch differential outputs)
SOUND33 : Sound output based on WAVE sound source
MON33 : Debug monitor running on user board (same as DMT33005)
FLS33 : Flash memory programming routine (same as DMT33005)

■ BOARD SYSTEM EXAMPLE (4) DMT33006LV + DMT33LCD26/37



● **Description**

With the inclusion of the DMT33LCD26/37, this example configuration allows demonstrations of LCD display capability using a 2.6-inch or 3.7-inch DTFD panel.

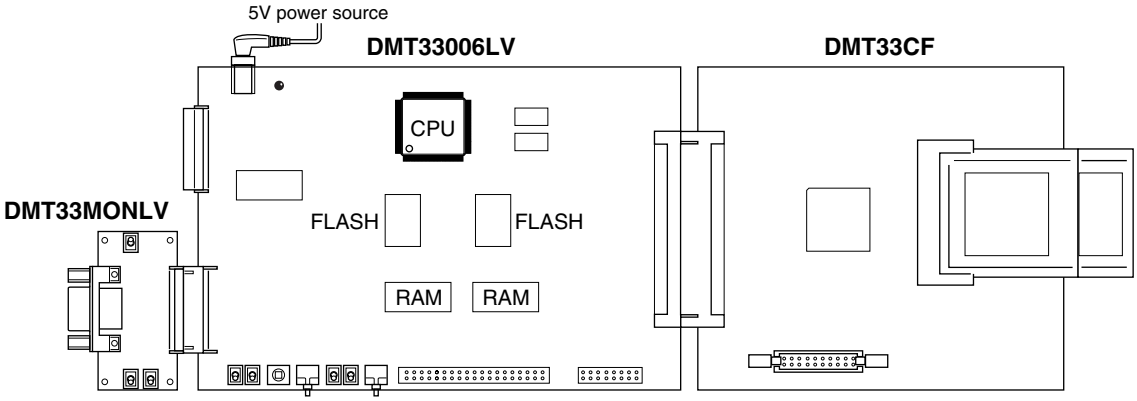
● **Operational Demo Software**

dm6g26Vx.exe (Display demonstration)–DMT33006 + DMT33LCD26
dm6g37Vx.exe (Display demonstration)–DMT33006 + DMT33LCD37
dm6guiVx.exe (GRAPHIC33 demonstration)–DMT33006 + DMT33LCD26/DMT33LCD37

● **Corresponding Middleware and Firmware Sample Software**

GRAPHIC33 : Graphics and GUI library
ROS33 : µITRON3.0 compliant real-time OS
MON33 : Debug monitor running on user board (same as DMT33005)
FLS33 : Flash memory programming routine (same as DMT33005)

■ BOARD SYSTEM EXAMPLE (5) DMT33006LV + DMT33CF



● **Description**

With the inclusion of the DMT33CF, this example configuration allows demonstrations of compact flash. Use a bus connector to connect the DMT33CF.

● **Operational Demo Software**

dm6cfVx.exe (CF33 compact FLASH demonstration)–DMT33006 + DMT33CF

● **Corresponding Middleware and Firmware Sample Software**

GRAPHIC33 : Graphics and GUI library
ROS33 : µITRON3.0 compliant real-time OS
MON33 : Debug monitor running on user board (same as DMT33005)
FLS33 : Flash memory programming routine (same as DMT33005)
CF33 : Compact FLASH library

E0C33 Family Data Sheets

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