

M851 Terminate-And-Stay-Resident Code for TOD Mode

The periodic task can be used to implement a form of a terminate-and-stay-resident (TSR) code that can be used to enhance the ROM-based TOD application. The sample periodic task, TimeWarp, uses this concept to provide a fancy hour and minute update to the time of day.

TSR Uses for TOD

- Fancy TOD updates to minute and hour rollover;
- Remove seconds from display and replace with blinking colon;
- Automatic Daylight-savings time update (forward or backward);
- Custom format of TOD after 2 minutes (minimum) of idle activity;
- Screen saver;
- Blank out of watch display for battery power conservation and restore display on switch depressions;
- Etc.

TOD Application Overview

The TOD application owns 3 TOD resources. Each resource keeps track of time and date. One of the resource will be designated as the primary time zone. The primary time zone data is used to display time information in the TOD screen as well as being used for comparison for for alarm and appointment.

The TOD application will request the primary time zone resource to send a display update event every second. This event is passed by the M851 OS to the TOD state manager for further processing, in the case of TOD, it will be to update the time and date information on the LCD display.

M851 OS State Handler Processing Overview

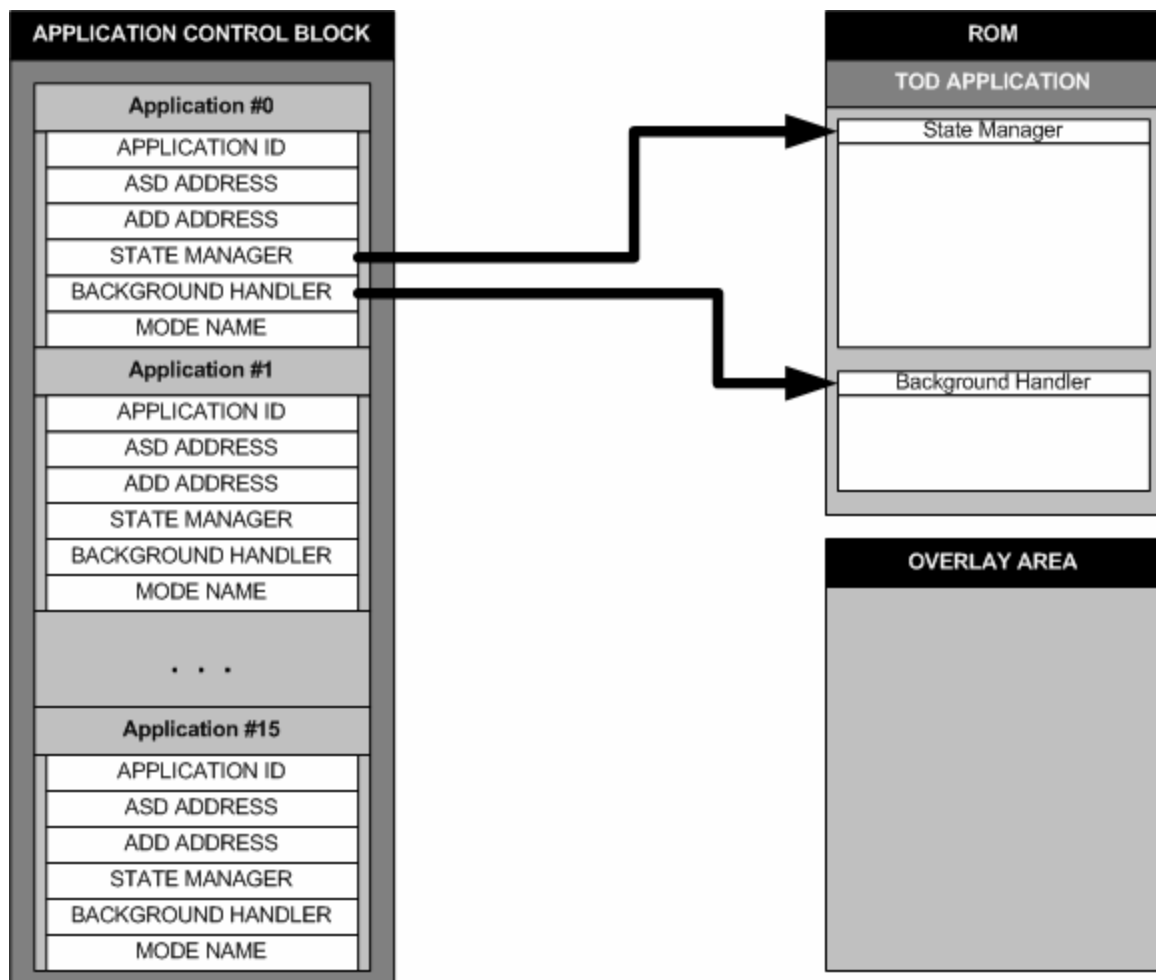
The M851 OS keeps track of an application through the Application Control Block (ACB) that is stored in system RAM. The block consists of pointers to the following application parameters stored:

- Application ID (Type and Instance)
- Base Address for Application Specific Data
- Base Address for Application Database
- Base Address for Application State Manager

- Base Address for Application Background Handler
- Base Address for Application Mode Name

To process the event passed by the hardware or from the TOD resource (in this example), the M851 OS will look up the State Manager address from the TOD Application's ACB and passes execution to the specified address.

Similarly, when background events needs to be passed to the application (for example a task exit operation when the user modes out of the current application), the M851 OS will look up the Background Handler address from the TOD Application's ABD and passes execution to the specified address.



Periodic Task Overview

During TOD minute rollover, hour rollover and day rollover, the M851 OS checks if there is any associated periodic task to be executed using the variable COREPeriodicTaskControl. Periodic task is checked only if TOD is the foreground application.

The M851 OS will load the periodic task code from EEPROM into the overlay memory area (900 bytes) and execute code starting at the overlay memory area's base address.

Using the Periodic Task to attached the TSR Code

In the TimeWarp example, the Periodic Task code has two sections:

- TSR Initialization and Setup
- TSR Code (State Manager and Background Handler)

TSR Initialization and Setup

In the TSR Initialization and Setup, the periodic task will replace the ACB parameters for State Manager and Background Handler of the TOD application. The new parameters will reference the custom State Manager and Background Handler located in the overlay area.

The TSR must not be setup if the following conditions are still active in the system:

- The flag CORESystemFlag4.bCOREPendingBackgroundAppTask is set. This indicates that the M851 OS is doing some background processing and will be using the overlay area to swap in code from EEPROM.
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- The variable CORECurrentState is not equal COREDEFAULTSTATE. Required by the TimeWarp example to be active only in the default state.

This ends the setup operation. As far as the TSR is concerned, it is now the TOD Application's State Manager and Background Handler.

TSR Code (State Manager and Background Handler)

Since the tod resource is still set to send update events every second, the TSR gets to operate and process the event. It could also pass on the event to the original tod state manager for processing.

Since the overlay area is used to swap code for other periodic tasks and WristApps (EEPROM based applications), the following operations should be implemented (depending on the required operation of the TSR):

- When the TSR is attached, it should indicate to the M851 that there is no periodic task to be processed during time rollover conditions. This is done by setting COREPeriodicTaskControl to 0x00. This will prevent the M851 OS from reloading the periodic task code from EEPROM.
- If there is any event other than COREEVENT_DISPLAY_UPDATE_TODRES, it should restore the modified ACB parameters to the original parameters if the event is passed to the original state manager. The original tod state manager may be doing some swapping operation with the overlay area. It should also set COREPeriodicTaskControl to the required value to allow the M851 OS to again execute periodic tasks and thereby initialize and setup the TSR.
- If the background handler gets the event COREEVENT_TASKEEXIT, it should restore the modified ACB parameters to its the original parameters. This is done since the next mode to be processed might be using the overlay area. It should also set COREPeriodicTaskControl to the required value to allow the M851 OS to again execute periodic tasks and thereby initialize and setup the TSR.

