

Arm Based Theft Control, Accident Detection Vehicle Monitoring of Drivers Habit and Positioning System

S.Swathi

M.Tech (VLSI & ES),
DVR College of Engineering &
Technology.

S.Swetha

ME (ES & VLSI),
Assistant Professor,
CVR Engineering College,
Hyderabad.

P.Ramesh Reddy

M.Tech(VLSI),
Associate Professor,
DVR College of Engineering &
Technology.

ABSTRACT:

This Project describes a design of effective alarm system that can monitor an automotive / vehicle / car condition in traveling. This project is designed to inform about an accident that is occurred to a vehicle to the family members of the traveling persons. The system can be interconnected with the car alarm system and alert the owner on his mobile phone. This detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude. The LPC2148 controller processes this information and this processed information is sent to the user/owner using GSM modem. A GSM modem is interfaced to the MCU. The GSM modem sends an SMS to the predefined mobile number and informs about this accident.

This enable it to monitor the accident situations and it can immediately the message to the family members with the location of accident. Here the unlocking of car is provided with keypad. If the person enters with correct password then the car gets unlocked. If he gives wrong password then the message will be sent to the pre-stored mobile number with GSM and GPS values. Few sensors are interfaced to the controllers those are alcohol, temperature and vibration sensor to detect any abnormalities. Message will be sent when alcohol or high temperature is detected and buzzer alert will be given whenever the high temperature is detected.

INTRODUCTION:

This PROJECT explains the implementation of “**ARM BASED THEFT CONTROL, ACCIDENT DETECTION VEHICLE MONITORING OF DRIVERS HABIT AND POSITIONING SYSTEM**”.

This project can be used to control the theft of vehicles, finding the location of vehicle and also implement the scene of accident alarm system. In this I am trying to program a GPS/GSM module to report occurrences of accident automatically via the GSM communication platform (using SMS messaging) to the enrolled number and giving the exact position of the point where the crash had occurred. This can provide early response and rescue of accident victims; saving properties and lives. The whole paper is based on arm controller. This controller is used to coordinate all the activities in the system. The components details are ARM 7(LPC 2148), GPS module, and GSM module.

II. SYSTEM DESCRIPTION:

In above paper heart of above system is ARM7LPC2148, GPS module and GSM module. Power supply requires for GPS, GSM and ARM7LPC2148 is 3.3V & 5V. Keypad is used to enter security code. Alcohol sensor, vibration sensor & temperature controller is used for pre-accident detection system. GPS module is used to find the location with the help of GSM module. If any value of alcohol sensor, temp-controller & vibration sensor is changed beyond limit then buzzer will on & if driver can't stop the buzzer than it will consider as a major accident then SMS will be sent to the predefined number.

III. HARDWARE COMPONENTS AND DESIGN:

A. ARM7TDMI Processor:

ARM7TDMI processor in our model due to its advanced features described below. 32-bit ARM processor is the contemporary general purpose microprocessor in the embedded market used in industrial level applications. ARM7 consists of a number of peripherals interfaced to it. We use keypad matrix, LCD display, UARTS, GPIO

and I2C protocol. ARM7 processor is a link between GPS and GSM modules for communication. The description of ARM7 is discussed in further sections.

FEATURES:

♣ 16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.

♣ 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory. 128 bit wide interface/accelerator enables high speed 60 MHz operation.

♣ USB 2.0 Full Speed compliant Device Controller with 2 kB of endpoint RAM. In addition, the LPC2146/8 provides 8 kB of on-chip RAM accessible to USB by DMA.

♣ One or two (LPC2141/2 vs. LPC2144/6/8) 10-bit A/D converters provide a total of 6/14 analog inputs, with conversion times as low as 2.44 μ s per channel.

♣ Single 10-bit D/A converter provide variable analog output.

♣ Two 32-bit timers/external event counters (with four captures and four compare channels each), PWM unit (six outputs) and watchdog.

♣ Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 Kbit/s), SPI and SSP with buffering and variable data length capabilities.

♣ Vectored interrupt controller with configurable priorities and vector addresses. ♣ Up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.

♣ 60 MHz maximum CPU clock available from programmable on-chip PLL with settling time of 100 μ s.

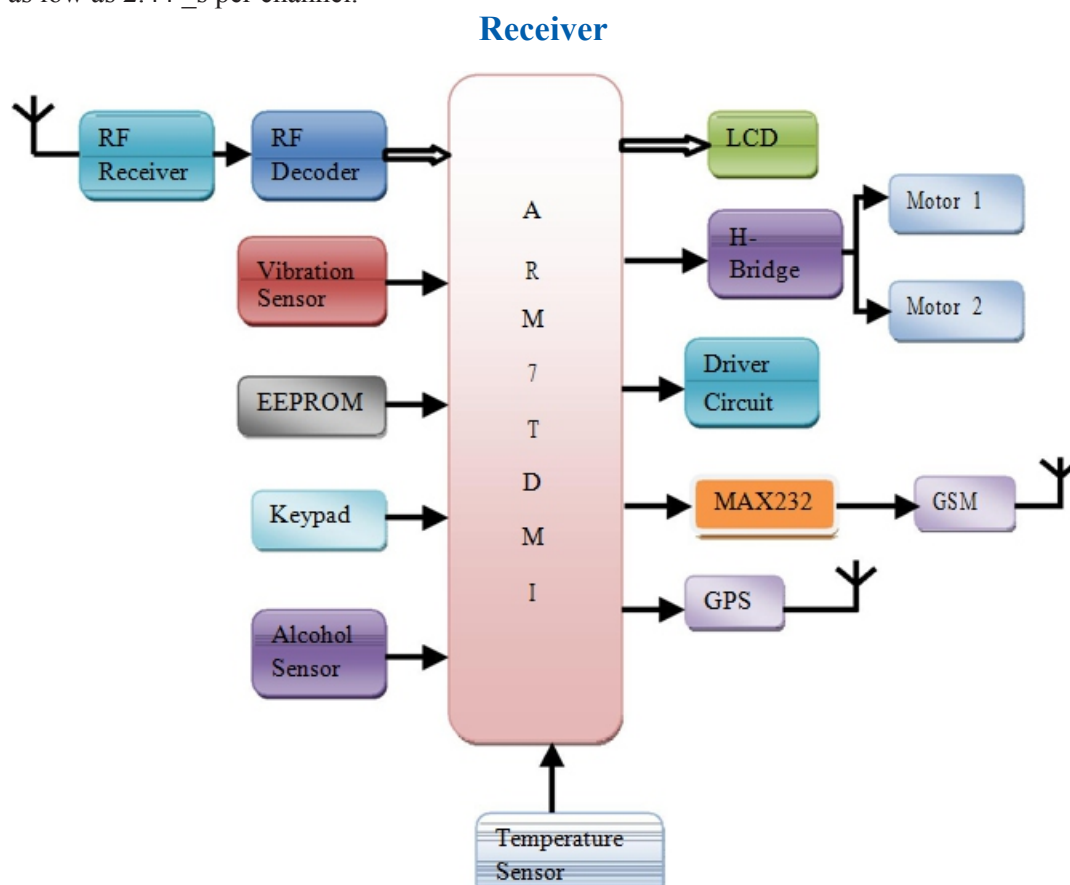
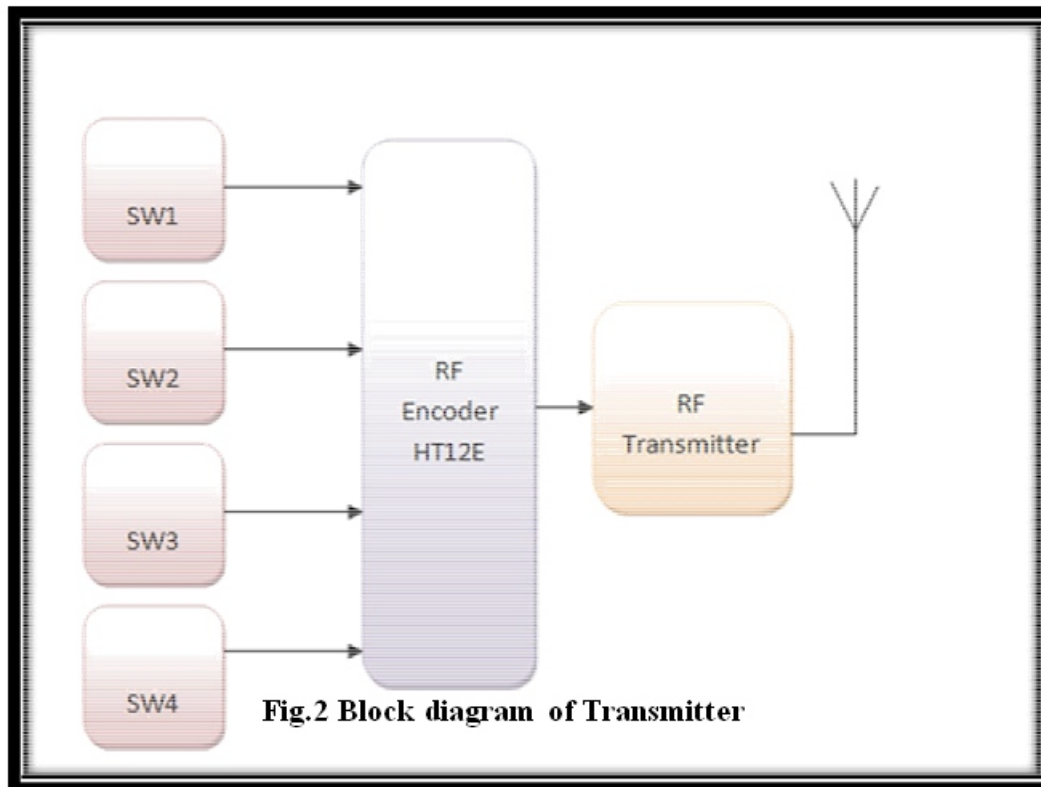


Fig.1 Block diagram of receiver

Transmitter:



GPS:

The GPS is a worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations. GPS uses these “man-made stars” as reference points to calculate positions accurate to a matter of meters. In fact, with advanced forms of GPS you can make measurements to better than a centimetre! In a sense it’s like giving every square meter on the planet a unique address. GPS receivers have been miniaturized to just a few integrated circuits and so are becoming very economical. And that makes the technology accessible to virtually everyone. These days GPS is finding its way into cars, boats, planes, construction equipment, movie making gear, farm machinery, even laptop computers. Soon GPS will become almost as basic as the telephone. Indeed, at Trimble, we think it just may become a universal utility.

GSM:

Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e., TxD, RxD and GND. In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other.

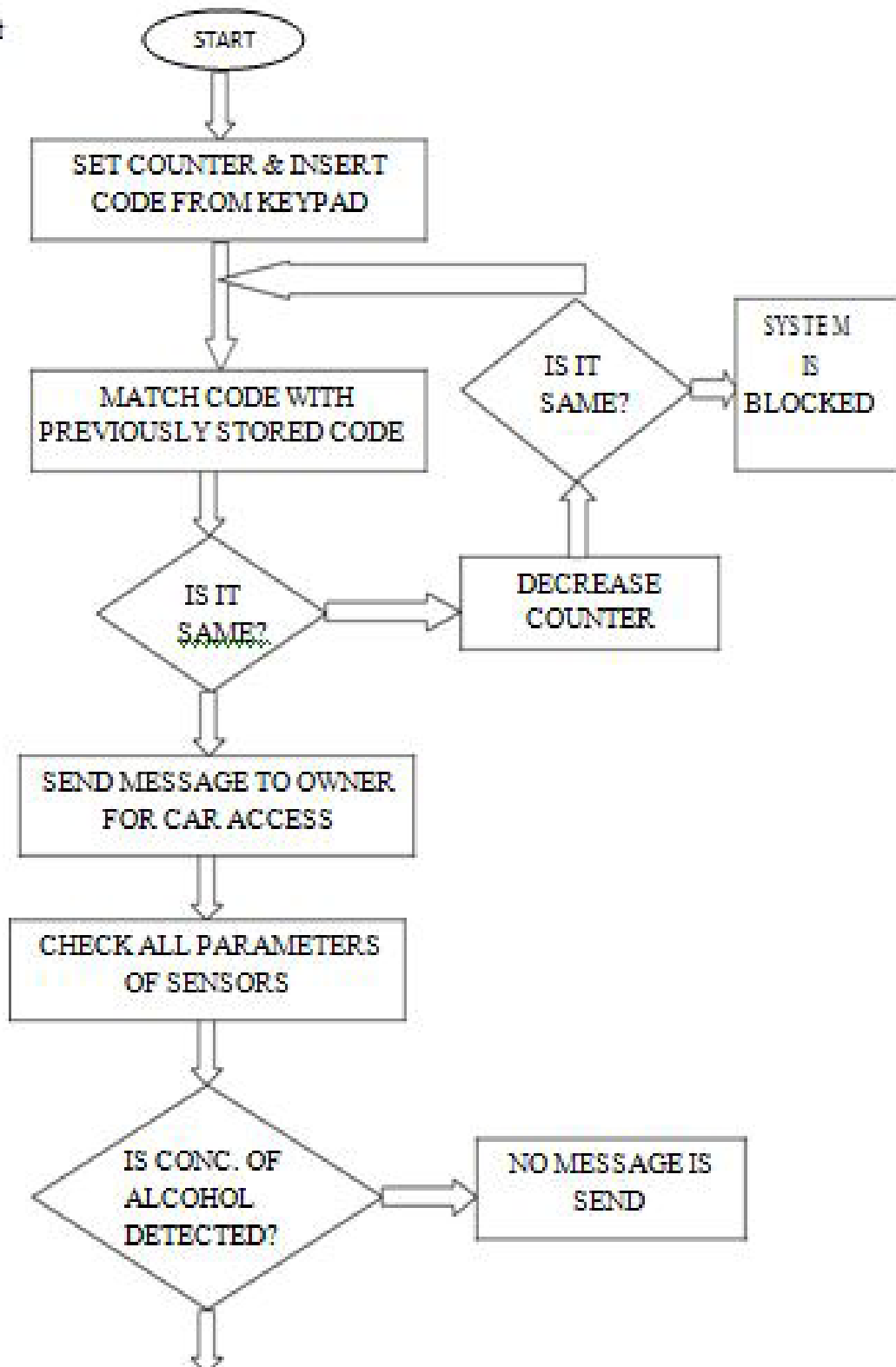
The transmit signal of serial port of ARM7 is connected with transmit signal (TxD) of the serial interface of GSM Modem while receive signal of microcontroller serial port is connected with receive signal (RxD) of serial interface of GSM Modem. The SMS message in text mode can contain only 140 characters at the most. It depends upon the amount of information collected from GPS Engine that we need at the base station for tracking vehicle or person.

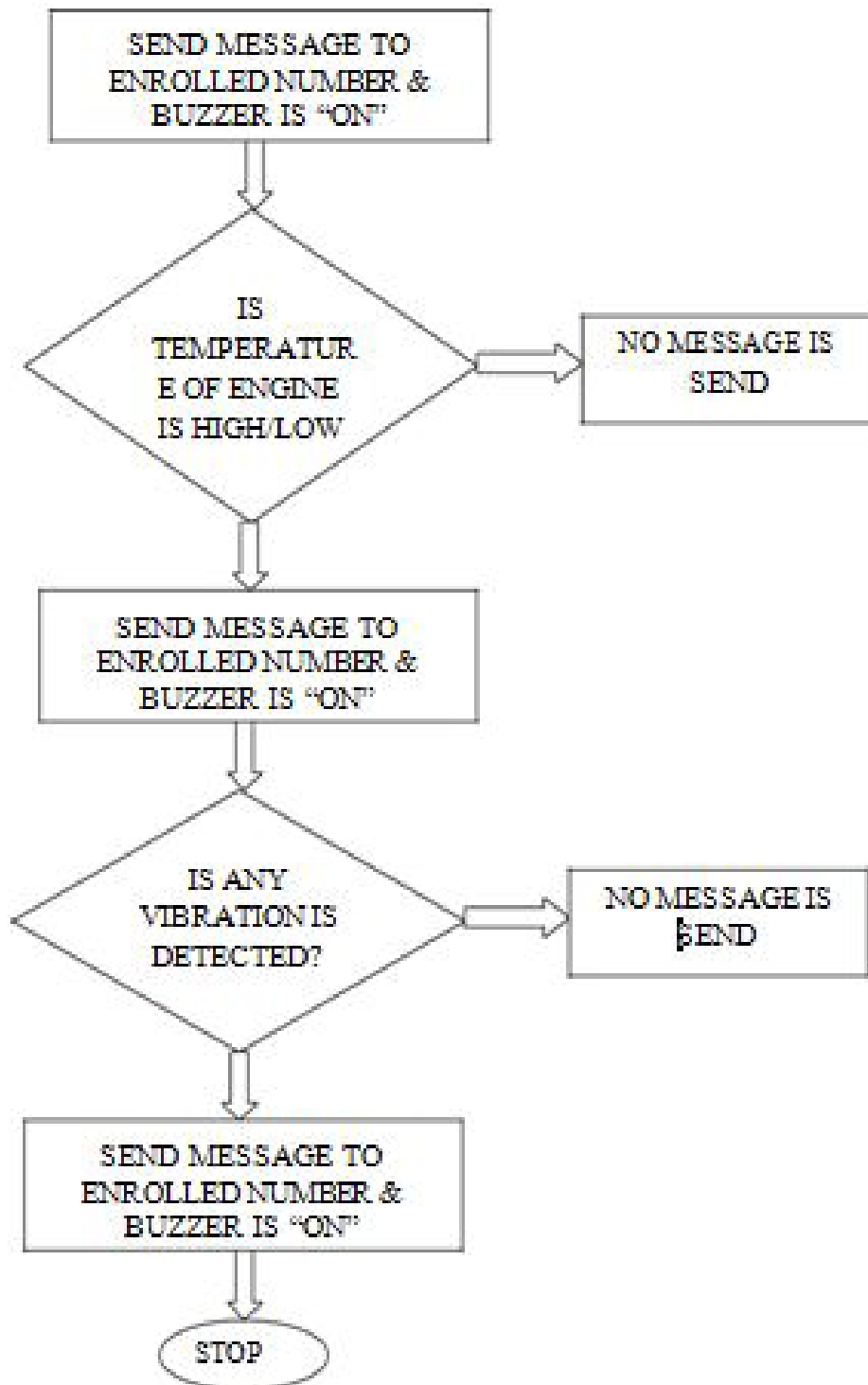
LM35:

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in °C). It has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/°C. The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 °C at room temperature and +/- 0.8 °C over a range of 0 °C to +100 °C. Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a low self-heating capability. The sensor self-heating causes less than 0.1 °C temperature rise in still air.

DEMONSTRATION

5.1 Flow chart





5.2 ALGORITHM:

STEP 1: START THE PROCESS
 STEP 2: SET COUNTER = 3
 STEP 3: ENTER CODE FROM KEYPAD
 STEP 4: CHECK CODE WITH PREVIOUSLY STORED NUMBER
 STEP 5: IS IT SAME?
 IF "YES" THEN GO TO STEP 8.
 IF "NO" THEN GO TO STEP 6
 STEP 6: DECREASE COUNTER
 STEP 7: IS COUNTER = 0
 IF "YES" THEN INFORM TO ENROLLED NUMBER "SYSTEM IS BLOCKED".
 IF "NO" THEN GO TO STEP 3.
 STEP 8: SEND TEXT MESSAGE TO ENROLLED NUMBER FOR CAR ACCESS
 STEP 9: CHECK ALL PARAMETERS.
 STEP 10: IS CONCENTRATION OF ALCOHOL IS DETECTED.
 IF "YES" THEN SEND MESSAGE TO ENROLLED NUMBER.
 IF "NO" THEN MESSAGE WILL NOT BE SEND TO MOBILE.
 STEP 11: BUZZER "ON"
 STEP 12: IS TEMPERATURE IS HIGH/LOW?
 IF "YES" THEN SEND MESSAGE TO ENROLLED NUMBER AS "HIGH TEMPERATURE IS DETECTED"
 IF "NO" THEN MESSAGE WILL NOT BE SEND TO MOBILE.
 STEP 13: GO TO STEP 11.
 STEP 14: IS ANY VIBRATION IS DETECTED?
 IF "YES" THEN SEND MESSAGE TO ENROLLED NUMBER AS "ACCIDENT DETECTED"
 IF "NO" THEN MESSAGE WILL NOT BE SEND TO MOBILE.
 STEP 15: STOP

ADVANTAGES & FUTURE SCOPE

Advantages:

♣ This system is used for theft control as well as accident detection and prevention system.

♣ Various sensors are placed which indicates the occurrence of an accident just like gas sensor, alcohol sensor, accelerometer, temperature sensor.

♣ This system can help to save precious human lives by reporting the driver's activity/about accident.

♣ Easy to operate

♣ Sophisticated security

♣ Isolates both GSM and GPS signal ♣ Monitors all hazards and threats

♣ Alert message to mobile phone for remote information

♣ Mobile number can be changed at any time

Future scope:

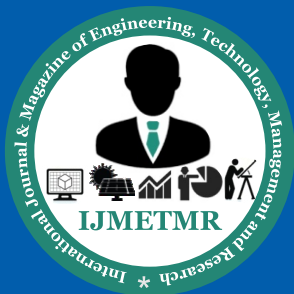
In future, adding the driver's activity like using mobile phone, feeling sleepy while driving are monitor and control. This may avoid many accidents on the spot as the life of human beings is more important than anything.

CONCLUSION:

This project presents vehicle accident detection and alert system with SMS to the user defined mobile numbers. The GPS tracking and GSM alert based algorithm is designed and implemented with LPC2148 Microcontroller in embedded system domain. The proposed Vehicle accident detection system can track geographical information automatically and sends an alert SMS on accident condition. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy is indeed achieved using the project. A keypad is also provided to enter the user defined mobile numbers of his choice. EEPROM is interfaced to store the mobile numbers permanently. This made the project more user-friendly and reliable. The proposed method is verified to be highly beneficial for the automotive industry.

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