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Automatic Medicine Dispenser and Disposer

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Abstract: ***In this project a Automatic Medicine Dispenser and Disposer has been developed. Many old people have the tendency of missing the medicines or taking the medicines at wrong time. Often, they require someone to give them the medicines. Hence it is required to design a Medication Reminder Device that can help old people and many other patients to take medication on schedule. In situations like the CoVid-19 pandemic there is a physical contact between the patient and the caretakers, doctors. So, the device developed is capable of delivering medicine at prescribed time in which care-taker of the patient can store medicine in small boxes (doses) which will drop out according the time entered. Arduino IDE software platform and Arduino Uno along with RTC, servo motors, LCD, voice circuit module, push button as hardware are used to build this project.***
Keywords: Medicine doses, Real Time Clock, Servo motors, Arduino Uno.

I. INTRODUCTION

There is no cure for CoViD-19 yet, although patients are given some medicines by nurses and doctors to ease the pain increase immunity, and reduce symptoms. But this puts our Healthcare warriors at risk when they give the medicine to patients, thus I developed a machine that can take in the Medicine Doses of an Entire week, store them and supply them to the patient at the time set by the doctor once, at the start-up of the machine. This will ensure distancing from patients and nurses won't have to risk their lives to go and give medicine to the infected patient. Once the medicine is on the given rack from where the patient can take it, he/she is alerted via a speaker on the system to take the medicine.

The data of when the medicine is taken is stored in an SD card for further reference by doctors to monitor the effect on symptoms by the given doze. This machine can also be used in houses where old patients forget to take medicines on time and need a caretaker to provide them each dose. For using it in households, there is one more feature added- Exercise and Food times of the patient can be stored and act as a reminder, and the machine can also act as an alarm clock and can store 3 alarms. Food and exercise times help patients since there are certain meds that need to be taken at proper intervals before or after food, thus having food on time is important.

II. LITERATURE SURVEY

1) Automatic Hand Sanitizer Dispenser with Temperature Sensor and Heartbeat Measuring System- International Journal of Applied Engineering Research - Dr.S. Prasad Jones Christydass,Dr.MLSNS .Lakshmi, Dr.V.Nishok Dr.S.Suresh Kumar , Mr.V.Jaikumar - Volume. 6, Issue 1, June-2021.

The purpose of this study is to present the design and development of a low-cost automatic hand dispenser. Infrared sensors are commonly used in automatic hand dispensers to detect the presence of a hand. This project will not necessitate direct human involvement. The IR sensor in this system detects proximity and delivers a signal to the microcontroller. This project entails measuring the temperature and heartbeat rate, which are then displayed on an LCD.This aids in the early detection of any virus symptoms, such as COVID-19, and can be detected in the early stages.

2) A Review on Dispenser Mechanisms of Medicine Dispenser - International Journal of Engineering Research & Technology (IJERT) - Asst. Prof. Sowmya Kini , Sagar S Acharya, Shreeraj Hegde & Ashwitha Sathish Kumar - Volume 10, Issue 03, March-2021.

In the modern age it is difficult for family members to be available all the time to support the aged and in our society most families are nuclear. Caring for the aged is of serious concern in the developing countries. Sometimes despite their best effort, the aged fail to remember to take their medication on time.

There are issues concerning seniors' ability to remember to take and handle their medicine on their own. Automatic medicine dispenser is one approach as a solution to this problem. It dispenses medicines on prescribed time with notifying the caretaker. There are various medicine dispensers with same functionality and IOT but different dispenser mechanism and design. The design and mechanism vary with the type and size of medicine. The main concern is dispenser design as the medicines are in various shapes and sizes.

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Hence a optimal dispensing mechanism for storing and dispensing all types of medicines is required. In this paper, a detailed review of dispensing echanism of the Automatic Medicine Dispensers and its design is presented.

3) Automatic Medicine Dispenser using IoT - International Journal of Engineering Research & Technology (IJERT) - Jyothis Philip, Feba Mary Abraham, Ken Kurian Giboy,B J Feslina and Teena Rajan - Voume 9 Issue 08, August-2020. —

There are several challenges that old people face,and of them is taking their medicines on time. Old people usually forget to take their medication on time and also have a hard time recollecting whether they had their medication, which sometimes could lead to overdose and severe medical complications. There are several expensive medicine dispensers available in the market now. However, most of the elderly people around the world don't even know of such products and still resort to storing the medicines in a box. Several types of medicine dispensers are available commercially worldwide. However, they have several drawbacks that requires to be resolved.

4) Automated Medicine Dispenser in Pharmacy International Journal of Advances in Computer and Electronics Engineering - Dr.Sivakumar Sabapathy Arumugam, Priyanka Dhanapal, Nandhini Shanmugam, Indumathi Balasubramaniam, Pavithra vijayakumar - Volume 4, Issue 8, August-2019.

Automatic medicine dispenser is designed specifically to reduce manpower and shopping time in pharmacy. Normally when we go to pharmacies, we have to wait for a long time to get our medicines. Hence this project mainly concentrates to avoid the problem. The purpose of the experiment is to deliver the medicine to the customer in minimum time. The system is proposed using embedded systems and PROTEUS software. The detailed working of dispenser machine is demonstrated in this paper.

5) IoT based Automated Medicine Dispenser for Online Health Community using Cloud - International Journal of Recent Technology and Engineering (IJRTE) - Suganya G, Premalatha M, Anushka Sharma, Muktak Pandya, Abhishek Joshi - Volume-7, Issue-5S4, February-2019.

Online health communities generally provide a platform for patients and their families to learn about an illness, seek and suggest support, and connect with other peers in analogous situations. In this paper, an architecture and implementation of an automatic medicine dispenser is proposed to support and extend the online health communities. Through this solution, doctor in the online health community may suggest pills based on the health conditions of their patients as communicated by them through online platform.

III. EXISTING SYSTEM

In a hospital, many patients require many different types of medications throughout the day at various intervals and all of this mundane job has to be done by the caretakers.

Also in a hospital there are different level of communications as to who and when has to give medications to the patient which are changed varied often as per the doctor's prescription.

With a large amount of patients and most probably short amount of time for each patient the caretakers have a very tedious job to behold.

All the above noted crisis are to be faced almost every day at hospitals which increase the risk of human error as to proper storage, allotment and delivery of proper medication and dosage to the concerned patients. As well as the caretakers are exhausted and leaden at the end of the day.

DRAWBACKS:

1) Higher rate of man-made mistake.

2) Unable to take doses in time.

IV. PROPOSED WORK

In this project, we are giving three types of solutions. One is medicine reminding when time arrives and the other is dispensing the right medicine at that time and other is disposing the medicine when the patient is unaware of having the pill.

This will reduce the chances of man-made errors of giving wrong medicines when nurse dealing with multiple patients at a time. With the help of RTC module and switches, we will set the time for three medicine doses at three different times. When the time arrives, servo will activate and release the medicine dose.

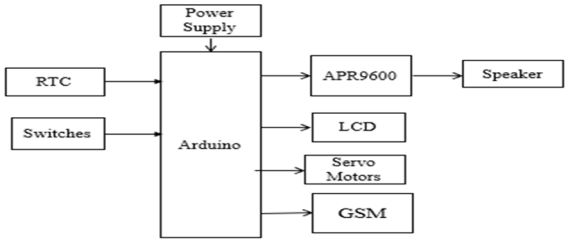
The LCD will continuously display the time. Voice alerts will be generated through speakers like "Time for medicine 1", "Time for medicine 2" or "Time for medicine 3".

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V. METHODOLOGY

BLOCK DIAGRAM

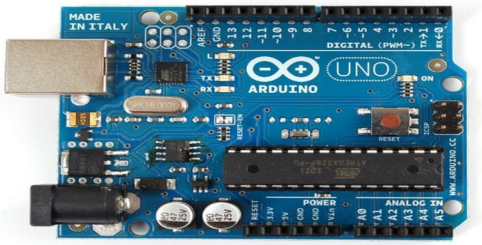


VI. COMPONENTS

A. Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

Each of the 14 digital pins and 6 analog pins on the Uno can be used as an input or output, under software control (using pinMode(), digitalWrite(), and digitalRead() functions). They operate at 5 volts. Each pin can provide or receive 20 mA as the recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50K ohm. A maximum of 40mA must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.

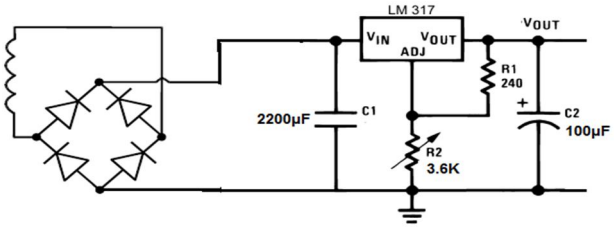


B. Power Supply

A power supply is a component that provides at least one electrical charge with power. It typically converts one type of electrical power to another, but it can also convert a different Energy form in electrical energy, such as solar, mechanical, or chemical.

A power supply provides electrical power to components. Usually the term refers to devices built into the powered component. Computer power supplies, for example, convert AC current to DC current and are generally located along with at least one fan at the back of the computer case.

Most computer power supplies also have an input voltage switch that, depending on the geographic location, can be set to 110v/115v or 220v/240v. Due to the different power voltages supplied by power outlets in different countries, this switch position is crucial.



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C. LCD

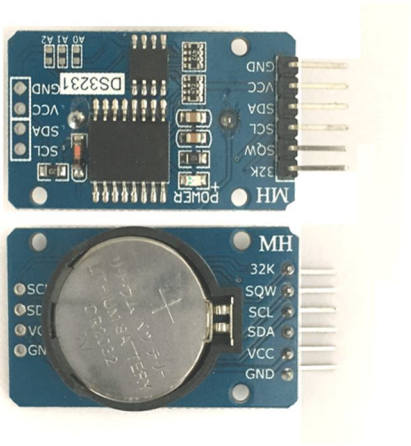
LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life, either at PCO's or calculators. The appearance and the pinouts have already been visualized above now let us get a bit technical.

16×2 LCD is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots. A Single character with all its Pixels is shown in the below picture.



D. RTC Module

Real Time Clocks, as the name suggests are clock modules. They are available as integrated circuits (ICs) and manages timing like a clock. Some RTC ICs also manages date like a calendar. The main advantage is that they have a system of battery backup which keeps the clock/ca lender running even in case of power failure. A very small current is required for keeping the RTC alive. This in most case is provided by a miniature 3v lithium coin cell. So even if the embedded system with RTC is powered off the RTC module is up and running by the backup cell. his same technique is used in PC timing also. If you have opened your computer case you will notice a small coin cell in the mother board. The DS1307 is a low-power clock/calendar with 56 bytes of battery-backed SRAM. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The date at the end of the month is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The DS1307 operates as a slave device on the I2C bus.



E. Servo Motor

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a servo mechanism**.** If motor is powered by a DC power supply, then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor. Apart from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics.

A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to these features, they are being used in many applications like toy car, RC helicopters and planes, Robotics, etc.

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Servo motors are rated in kg/cm (kilogram per centimeter) most hobby servo motors are rated at 3kg/cm or 6kg/cm or 12kg/cm. This kg/cm tells you how much weight your servo motor can lift at a particular distance. For example: A 6kg/cm Servo motor should be able to lift 6kg if the load is suspended 1cm away from the motors shaft, the greater the distance the lesser the weight carrying capacity.

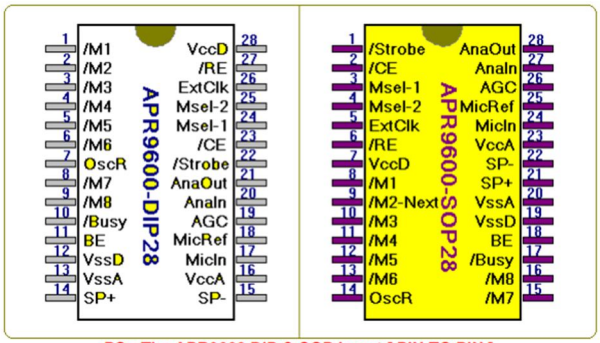
The position of a servo motor is decided by electrical pulse and its circuitry is placed beside the motor.



F. Voice Module

The APR9600 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. The device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications.

APLUS integrated achieves these high levels of storage capability by using its proprietary analog/multilevel storage technology implemented in an advanced Flash non-volatile memory process, where each memory cell can store 256 voltage levels. This technology enables the APR9600 device to reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion.



PS : The APR9600 DIP & SOP is not [PIN TO PIN]

VII. SOFTWARE REQUIREMENT

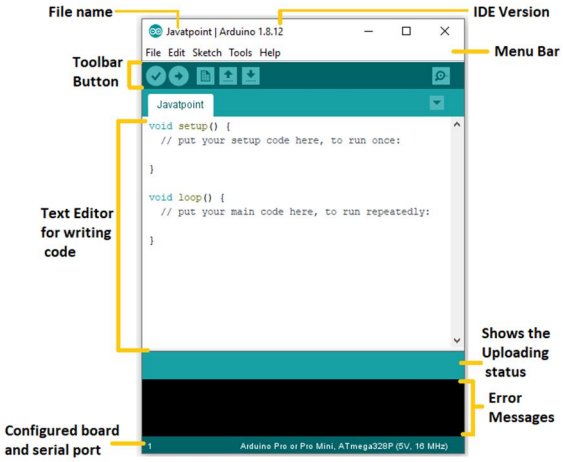
A. Arduino IDE

By default, NodeMCU and Arduino UNO uses Lua scripting language to program NodeMCU. Here, we are going to learn how to program NodeMCU using Arduino C++ language. Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

When you use the NodeMCU with the Arduino IDE, it will write directly to the firmware, of NodeMCU erasing the original firmware, so if you want back the Lua SDK, and use the “flasher” to re-install the firmware. For installing the flasher you need to follow the steps discussed in 4.5.6 NODEMCU ESP8266.

The NodeMCU automatically draw power from either, the USB connection to the computer or an external power supply. Connect the NodeMCU board to your computer using the USB cable. The power LED (labeled PWR) should glow.

After your Arduino IDE software is downloaded, you need to unzip the folder. Inside the folder, you can find the application icon with an infinity label (application.exe). Double-click the icon to start the IDE.



B. Embedded C

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded.

VIII. CONCLUSIONS

Proposed prototype demonstrates that our system adequately tracks adherence to medication while also being extremely user friendly. Thus no person can forget to take medicine on time. This will also be helpful in hospitals so that doctors/nurses no need to be in contact with patients to give medicines.

IX. ACKNOWLEDGMENT

The heading of the Acknowledgment section and the References section must not be numbered. Causal Productions wishes to acknowledge Michael Shell and other contributors for developing and maintaining the IEEE LaTeX style files which have been used in the preparation of this template. To see the list of contributors, please refer to the top of file IEEETran.cls in the IEEE LaTeX distribution.

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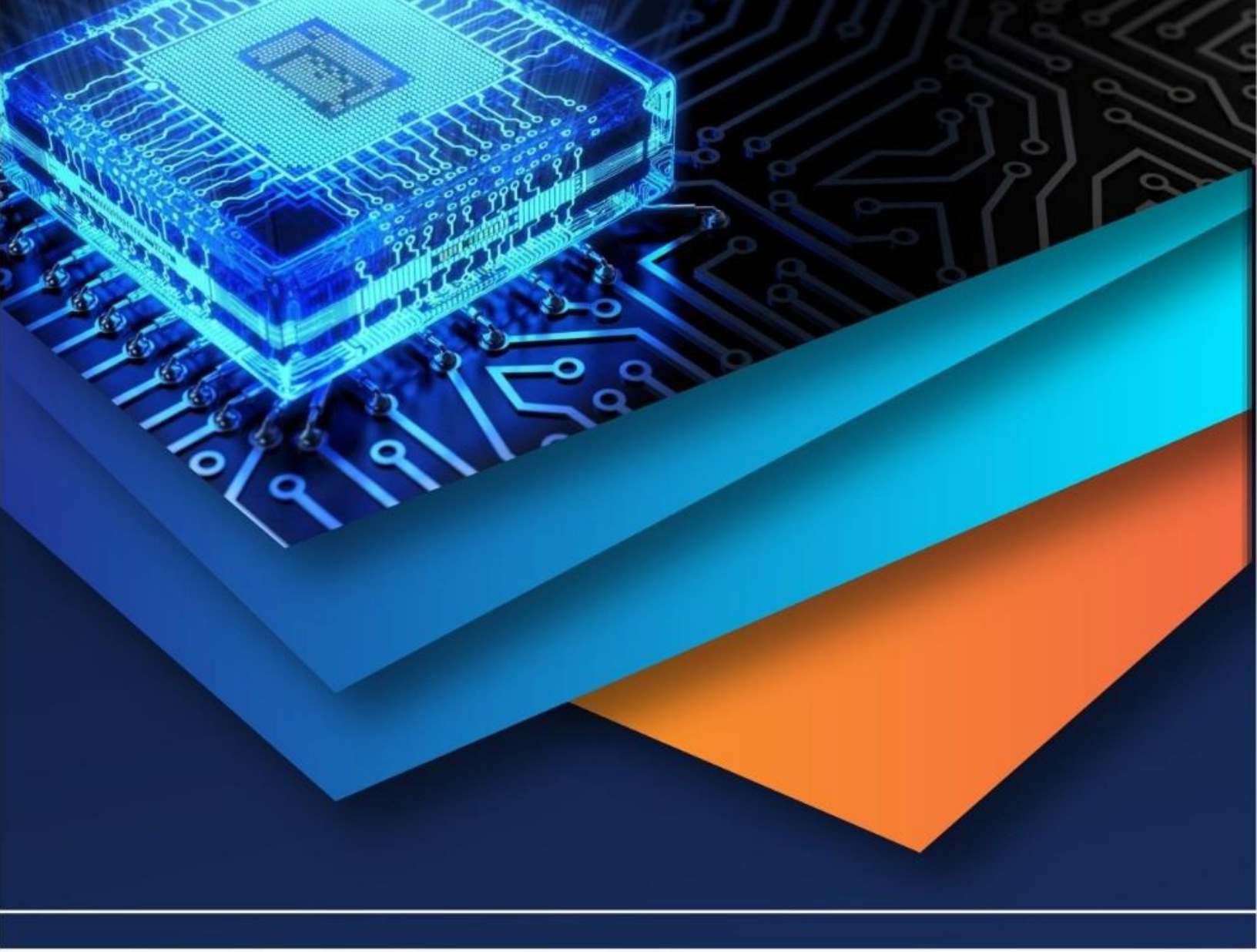
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