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## Electrical System

The 120/240 volt service enters the house via an overhead service drop to a meter located at the south side of the house. The seal on the meter is intact.

The main service panel is a 100-amp Square-D product containing breakers located in the basement. The service disconnect is one 100 amp breaker located here. The panel was opened and examined. The service entrance wire appears to be 2 AWG copper. All breakers appear to be appropriate for the observed wire sizes. There are some unused breaker slots allowing for expansion of the system. The circuits were labeled on an attached list.

The final service rating was determined to be 100 amps.

The service ground was visible connected to the water supply line.

The distribution wiring observed is knob and tube wiring and newer, non-metallic sheathed copper.

All **accessible** receptacles were tested.

Ground Fault Circuit Interrupt (GFCI) protected outlets are located at the upper bathroom only.

Smoke detectors are present at some recommended locations in the house.



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## Observations and Recommendations

**NOTE:** All electrical repairs and/or upgrades should be made by a qualified licensed electrician.

**REPAIR:** The service entrance mast is at an odd angle and I suspect the conduit has bent and is in need of replacement.

**Comment:** The main service panel has a completed circuit directory (labeling) indicating which breakers service which areas of the house. It is strongly recommended that a new owner verify the accuracy of any such directory or labeling as soon as possible after moving in.

**IMPROVE:** 100 amps, for a home of this size, would be considered undersized and the normal upgrade would be to a 200-amp service.

**SAFETY CONCERN INVESTIGATE FURTHER** and **REPAIR:** Although some of the distribution wiring has been upgraded there remains much of the original knob and tube wiring in use. Much of this was visible in the basement and crawl areas while some **remains hidden** and was “deduced” from the ungrounded receptacles (original and ungrounded 3-prong). When in good condition, there is nothing wrong with this older style of wiring other than it does not have a grounding conductor, although care should be taken with insulation and load. Some insurance companies are refusing to issue new policies for homes still wired in this fashion.

In this case there are a number of areas where the rubber insulation is missing, exposing bare and live conductors. There are a number of incorrect splices and some of the support knobs and tubes are misplaced. When KT wiring is in this condition I have no alternative but to **recommend a qualified licensed electrician fully evaluate the wiring and make repairs as needed**. That “repair” will undoubtedly be to fully upgrade the wiring.

**SAFETY CONCERN INVESTIGATE FURTHER** and **REPAIR:** In addition to the older wiring, much of the newer wiring has open junction boxes including one dangling live cable in the basement. This is indicative that the newer wiring was not done by a licensed professional. **I recommend a qualified licensed electrician fully evaluate the newer wiring and make repairs as needed.**

**SAFETY CONCERN** and **PROMPT REPAIR:** The receptacle at the east wall of the kitchen and the east wall of the breakfast nook showed reversed polarity when tested. This can be hazardous. These receptacles should be re-wired. Note that this is another indication of “amateur” splicing into the older wiring.

**SAFETY CONCERN** and **REPAIR:** Some receptacles are three-prong grounded type but have no ground. This is unfortunately typical where receptacles have been replaced but the wiring has not been fully upgraded. This can be addressed in a number of ways ranging from completing the electrical wiring upgrade (**by far the preferred method**), replacement of individual receptacles with GFCI type marked "No Ground", to replacing the original 2 prong receptacles. The outlets that need this attention are...at the pony wall divider in the dining area and two at the south wall of the main floor bedroom.

**Comment:** Receptacles at kitchen countertops, near sinks, in bathrooms, garages, unfinished basements or crawl spaces and any exterior outlets are now required to have GFCI protection. GFCI (ground fault circuit interrupter) receptacles and breakers are modern safety devices designed to help prevent shock hazards by quickly de-energizing a circuit or portion of a circuit. Even on older homes, where these devices were not originally required, we recommend installation by a licensed electrician of these inexpensive devices as an upgrade. **Note that these devices should be tested on a monthly basis to ensure proper function.** This simply involves pushing the test button; the outlet should "click" off at which point you can press the reset button. Any outlet that fails this test should be replaced by a licensed electrician.

**SAFETY CONCERN** and **IMPROVE:** I recommend that the **kitchen countertop, main floor bathroom** and any "accessible" receptacles in the **unfinished basement** be **upgraded** to include GFCI protection.

**INVESTIGATE FURTHER: CONCLUSION:** From the service mast, to the meter box, panel, and distribution wiring, this home is in serious need of electrical upgrade. **I recommend you get a number of estimates from qualified electrical contractors to bring this home's electrical systems up to modern standards.**

**Comment:** All light switches were tested and functioned normally. All other accessible receptacles were tested and showed proper polarity and grounding (where applicable). I do not move furniture or appliances or unplug any electronic devices and therefore some receptacles may be untested.

**SAFETY CONCERN** and **IMPROVE:** Smoke detectors were only located in some parts of the house. Ideally these should be installed in **each bedroom**, as well as at least one on each floor including the basement. Once installed, smoke detectors should be tested on a monthly basis (some manufacturers suggest weekly). Because of this I feel it could lead to a false sense of security if I were to say that I tested them and they were found to be functioning. **You should test all smoke detectors immediately upon occupancy and at the recommended intervals thereafter and take the appropriate steps to remedy any found to be non-functional.** As smoke detectors have a limited lifetime and are reasonably inexpensive, I actually recommend that you **start afresh with all new units.**

