

电子测试

2016
10月

TEST169.COM

总 355 期

www.test169.com

邮发代号：82-870

统一刊号：ISSN 1000-8519 | CN 11-3927/TN

单片机的嵌入式 TCPIP 协议栈设计及其实现路径 基于 BH1750FVI 的绝缘子灰密测量系统设计

模块化智能无功补偿器的研制
GUI 软件的测试用例优化算法的探讨
基于无线通讯的物体运动轨迹测量仪的设计

¥15

ISSN 1000-8519



9 771000 851145



总第 355 期
2016 年 10 月出版

主管单位 北京市科学技术研究院
主办单位 北京自动测试技术研究
出版单位 《电子测试》编辑部
发行单位 《电子测试》发行部
国际标准刊号 ISSN 1000-8519
国内统一刊号 CN11-3927/TN
邮发代号 82-870
定价 15 元

社长 张东
主编 陈晓筱

顾问成员
王勃华 刘利吉 李军 邢卫兵
陆祖良 樊建军 林崇诚 李锦林

编委会主任 刘明亮
编委会副主任 张东

编委
冯建科 郭占山 贺昱耀 姜岩峰
李锦林 李小奇 李森 满庆丰
申晓留 王祖林 王曦 夏洋
阳辉 张剑平 张忠平

市场总监 刘晖
编辑部主任 孙源
编辑部 马旭 孙兴芳 刘健 谭钧峰
尹亚斌 朱潮 张士园
发行部 刘丽
通信地址 北京市100098-002信箱
邮政编码 100098
电话 010-62410551 010-56245897
传真 010-59713453
电子信箱 ed@test169.com dzcszss@163.com
dzcszss@163.com
网址 www.test169.com

国内发行 北京报刊发行局
订阅处 全国各地邮局
国外发行 中国图书进出口总公司
出版日期 每月 5 日、15 日
广告经营许可证 京海工商广字 0059 号
印刷单位 北京鑫鑫印刷有限公司

声明

凡向本编辑部投稿录用后,均视为同意在本编辑网站及 CNKI 中国期刊全文数据库等数据库出版,所付稿酬包含网络出版稿酬。

目 录

2016.20

设计与研发

- 基于BH1750FVI的绝缘子灰密测量系统设计····· 彭警,吴世林 1
基于无线通讯的物体运动轨迹测量仪的设计····· 唐峰,杨利容,高旺 3
单片机的嵌入式TCP/IP协议栈设计及其实现路径····· 李海 5
模块化智能无功补偿器的研制····· 徐祖平 7
智能车载系统的设计与研究····· 白婷婷 11
基于ROB Pro的“六足昆虫”的行走方式程序设计····· 周文彬 14
车库智能通风系统的设计····· 杨立生,杨笑笑,朱勇璋 15
嵌入式视频监控系统设计····· 张璐 17
变电运维现场多目标超声定位系统设计····· 张明清 20
单片机电子时钟设计研究····· 高鹏飞 21
基于AR技术的虚实图书····· 章辉宇,缪文南,傅凯漩,彭培 23
基于电子技术的声光控制照明电路设计研究····· 张英争,陈鹏 26
基于高速微控制器C8051F330单片机的智能安防系统设计与实现·····
····· 郭广明,李力,罗健立 28
移相全桥软开关变换器的研究和设计····· 王鑫 30

理论与算法

- GUI软件的测试用例优化算法的探讨····· 吕冬雪,张宇飞 32
船舶主机轴承温度监测报警系统方案研究····· 张志远 34
Android平台二维码生成技术研究与应用····· 于营,江翠婷 36
X线机高压变压器次级线圈局部短路故障分析检修····· 赵军 39
储油罐清理机器人移动方式的分析研究····· 马金茹,王旭 40
防错技术在电子产品生产线的应用研究····· 王茂茹 42
关于变压器油纸绝缘热老化的时频域介电和空间电荷特性研究·····
····· 张迈 44
关于继电保护系统对一次设备可靠性的影响分析····· 徐群慧 46
基于Matlab的信号处理系统与分析····· 胡明华,李青勇,袁钰 48
基于等值回路平衡方程的变压器保护原理····· 张翔 49
经颅直流电刺激促进汉字音形义加工探究·····
····· 米久永,魏强,童曼,高天娇 50
利用综合监测系统解决配电电缆线路运行监测及故障定位····· 庄韵培 52
配电网电能准确计量方法研究····· 杜宗林,陈明照,刘军志 53
配网自动化系统小电流接地故障定位方法····· 陈楠 56
微功率无线通信常见问题解决办法····· 李绍荣 57
微机继电保护装置电磁兼容研究····· 刘鹏宇 59
一种用于继电保护状态评价的大数据精简方法·····
赵缪敏 60

网络与信息工程

- 基于互联网技术的田径运动编排管理系统设计及应用····· 马凯 61

CONTENTS

2016.20

Design and development

| | | |
|---|---|----|
| Design of insulator ash density measurement system based on BH1750FVI..... | Peng Jing,Wu Shi Lin | 1 |
| the Design of Object Trajectory Measuring Instrument Based on Wireless Communication..... | | |
| ..... | Tang Feng,Yang Lirong,Gao Wang | 3 |
| Design and implementation of embedded TCP/IP protocol stack based on MCU..... | Li Hai | 5 |
| Development of Var Compensator based on Modular and Intelligent..... | Xu Zuping | 7 |
| Design and research of intelligent vehicle system..... | Bai Tingting | 11 |
| Program design of walking mode of "six legged insect" based on Pro ROB..... | Zhou Wenbin | 14 |
| Design of intelligent ventilation system for garage.... | Yang Lisheng,Yang Xiaoxiao,Zhu Yongzhang | 15 |
| Design of embedded video monitoring system..... | Zhang Lu | 17 |
| Design of multi objective ultrasonic location system for substation operation and maintenance..... | | |
| ..... | Zhang Mingqing | 20 |
| Research on electronic clock design of single chip microcomputer..... | Gao Pengfei | 21 |
| Based on AR technology deficiency of books..... | Zhang Huiyu,Miao Wennan,Fu Kaixuan,Peng Pei | 23 |
| Research on the design of an acoustic optic control lighting circuit based on Electronic Technology | | |
| ..... | Zhang Yingzheng,Chen Peng | 26 |
| Design and Implementation of Intelligent Security System Based on High-Speed Microcontroller | | |
| C8051F330..... | Guo Guangming,Li Li,Luo Jianli | 28 |
| Research and Design of Phase - shifted full - bridge soft - switching converter..... | Wang Xin | 30 |

The theory and algorithm

| | | |
|---|---|----|
| Discussion on Test Case Optimization Algorithm of GUI Software..... | Lv Dongxue,Zhang Yifei | 32 |
| Research on the scheme of temperature monitoring and alarming system for ship main engine bearing.. | | |
| ..... | Zhang Zhiyuan | 34 |
| Research and Utilization of QR Code Generation Based on Android Platform.. | Yu Ying,Jiang Cuiting | 36 |
| Fault analysis and repair of partial short circuit of secondary coil in high voltage transformer of | | |
| X-ray unit..... | Zhao Jun | 39 |
| Analysis and Research on Movement Mode of Storage Robot Cleaning..... | Ma Jinru,Wang Xu | 40 |
| Research on the application of error proofing technology in the production line of electronic | | |
| products..... | Wang Maoru | 42 |
| Study on frequency domain dielectric and space charge characteristics of transformer insulation | | |
| thermal aging..... | Zhang Mai | 44 |
| Analysis on the influence of relay protection system on the reliability of primary equipment..... | | |
| ..... | Xu Qunhui | 46 |
| Signal Processing System and Analysis based on Matlab..... | Hu Minghua,Li Qingyong,Yuan Yu | 48 |
| Principle of transformer protection based on equivalent circuit equilibrium equation..... | | |
| ..... | Zhang Xiang | 49 |
| Research on the processing of Chinese character tone meaning by transcranial direct current | | |
| stimulation..... | Wei Qiang,Wei Qiang,Tong Man,Gao Tianjiao | 50 |
| Using the integrated monitoring system to solve the operation monitoring and fault location of | | |
| distribution cable line..... | Zhuang Yunpei | 52 |
| Research on the accurate measurement method of power distribution network | | |
| ..... | Du Zonglin,Chen Mingzhao,Liu Junzhi | 53 |
| Small current grounding fault location method for distribution network automation..... | | |
| ..... | Chen Nan | 56 |
| Solutions to common problems in micro power wireless communication..... | Li Shaorong | 57 |
| Research on electromagnetic compatibility of microcomputer relay protection device... Liu Pengyu | | 59 |
| A big data reduction method for the state evaluation of relay protection..... | Zhao Miaomin | 60 |

Network and Information Engineering

| | | |
|--|--|----|
| Track and field sports scheduling management system design based on Internet technology and | | |
| applications..... | Ma Kai | 61 |
| Application of Multism simulation software in the classroom teaching of analog electronic technology | | |
| in Higher Vocational Education..... | Liu Li | 63 |
| Application of two dimensional code technology in university informatization..... | Che Wei | 65 |
| Research on the teaching method of combining the theory and practice of mobile communication system | | |
| based on WCDMA..... | Xu Zhiwei,Ni Jie,Wang Gang,Zhao Honglin,Ma Yongkui | 67 |
| Design and implementation of food traceability system based on Internet of things..... | Li Yucai | 68 |
| Research and application of agricultural greenhouse intelligent platform based on Internet of things | | |
| and cloud computing services..... | Yi Yu | 70 |
| On the application of computer network technology in electronic commerce..... | Shao Linlin | 72 |

目 录

2016.20

| | | |
|---------------------------------------|-------------------|-----|
| Multism仿真软件在高职模拟电子技术课堂教学中的应用 | 刘力 | 63 |
| 二维码技术在高校信息化中的应用探究 | 车巍 | 65 |
| 基于WCDMA移动通信系统实践课理论与实践相结合的教学方法研究 | 徐志伟,倪洁,王钢,赵洪林,马永奎 | 67 |
| 基于物联网的食品溯源系统设计与实现 | 李宇才 | 68 |
| 基于物联网与云计算服务的农业温室智能化平台研究与应用 | 易瑜 | 70 |
| 试论计算机网络技术在电子商务中的应用 | 邵琳琳 | 72 |
| “互联网+”背景下集团公司信息化建设的探讨 | 刘东亮 | 74 |
| GIS动态数据集成技术及其在移动网络运维管理中的应用研究 | 姜春娇 | 76 |
| PLC课程在机电专业教学中的应用与分析 | 庄金雨 | 77 |
| 多媒体环境下小微学校:义务教育的新模式 | 李爽 | 79 |
| 高校电工电子实验中心新型器材管理系统的设计与实现 | 聂幸,曹诚伟,戴义保,郭良军 | 81 |
| 互联网时代的自媒体发展分析 | 辛建军 | 82 |
| 基于ATM的宽带多媒体通信卫星系统运维管理技术研究 | 王佳佳 | 83 |
| 基于对集的网约出租车供需优化研究 | 田佳琪 | 84 |
| 基于二分网络的用户聚类电影推荐系统构建 | 李寒芳,吴东月,高强 | 86 |
| 基于翻转课堂的《机械基础》课程教学设计 | 刘悦 | 88 |
| 基于校园卡的高校大型仪器共享服务策略 | 丁蓉,孙晓辉,马志萍 | 89 |
| 计算机网络安全问题中的病毒辐射攻防 | 郭婧 | 91 |
| 面向智能电网的继电保护系统重构研究 | 黄峥 | 93 |
| 浅析10kV配电网线路的建设与改造方法研究 | 邵阳 | 94 |
| 浅析IT运维管理系统的相关技术研究与应用 | 周秋旭 | 95 |
| 网络背景下播音主持模式的创新 | 郑帅 | 96 |
| 网络时代教学方式变革的有效路径 | 张品茹 | 98 |
| 医院计算机网络信息资源管理研究 | 仇惠林 | 100 |
| 智能化变电站的运行维护技术发展趋势研究 | 张小刚 | 102 |

测试工具与解决方案

| | | |
|-------------------------------|---------|-----|
| VSAT通信在海洋船舶上的应用研究 | 朱晓敏 | 103 |
| 借用高数浅识城市生活污水处理的流程 | 薛艳霞,李少峰 | 105 |
| 浅谈Air5播出系统在电台的使用 | 李尊峰 | 107 |
| 保护智能化的发展与智能继电器网络的探讨 | 章婷 | 109 |
| 变电站运维一体化实施的问题和处理对策分析 | 蒋丽 | 111 |
| 变电站综合自动化微机继电保护的相关分析 | 郑飞 | 112 |
| 电力系统变电运行安全管理与设备维护研究 | 张磊 | 114 |
| 电气化铁路隧道接触网跳闸及设备烧损原因与预防 | 乔利峰 | 115 |
| 分布式发电对配电网继电保护的影响分析 | 应东阳 | 117 |
| 风电并网对电力系统暂态稳定的影响 | 卢佳 | 118 |
| 高压电气试验过程的变压器应用研究 | 马苏 | 120 |
| 关于变电设备在线监测技术及状态检修的探讨 | 尹明明 | 121 |
| 关于智能化变电站监控与运维的研究 | 朱凯 | 122 |
| 红外测温诊断技术在500kV变电运行维护的应用 | 章继开 | 124 |

CONTENTS

2016.20

| | |
|--|---|
| Discussion on Group Company' s Information Construction under the Background of "Internet+" | |
| ..... | Liu Dongliang 74 |
| GIS dynamic data integration technology and its application in mobile network operation and maintenance management..... | Jiang Chunjiao 76 |
| The application and analysis of PLC course in the teaching of mechanical and electrical specialty.. | |
| ..... | Zhuang Jinyu 77 |
| Small and micro schools under the multimedia environment: a new model of compulsory education..... | |
| ..... | Li Shuang 79 |
| Design and implementation of the new equipment management system for the electronic experiment center of University..... | Nie Xing,Cao Chengwei,Dai Yibao,Guo Liangjun 81 |
| The analysis of self-media development in the Internet era..... | Xin Jianjun 82 |
| Research on the operation and maintenance management technology of broadband multimedia communication satellite system based on ATM..... | Wang Jiajia 83 |
| Matching Set Optimized Supply and Demand of Internet Ordered Taxi..... | Tian Jiaqi 84 |
| Construction of user clustering movie recommendation system based on bipartite graph networks | |
| ..... | Li Hanfang,Wu Dongyue,Gao Qiang 86 |
| The Design of 《Mechanical Foundation》 Course Instructional based on Flipped classroom. Liu Yue | 88 |
| Large-scale Instruments and Equipment in Colleges and Universities Sharing Service Strategy Based on Campus Card..... | Ding Rong,Pei Haikun,Sun Xiaohui,Ma Zhiping 89 |
| Virus radiation attack and defense in computer network security..... | Guo Jing 91 |
| Research on the reconfiguration of relay protection system for smart grid..... | Huang Zheng 93 |
| Analysis of 10kV distribution network line construction and transformation method..... | Shao Yang 94 |
| Analysis of IT operation and maintenance management system related technology research and Implementation..... | |
| ..... | Zhou Qixu 95 |
| On the innovation of broadcasting and hosting mode under the network background..... | Zheng Shuai 96 |
| Effective Ways of Teaching Mode Change in Network..... | Zhang Pinru 98 |
| Study on information resources management of hospital computer network..... | Qiu Huilin 100 |
| Research on the development trend of the operation and maintenance technology of Intelligent Substation..... | Zhang Xiaogang 102 |

Test tools and Solutions

| | |
|---|----------------------------|
| Research on the application of VSAT communication in marine vessels..... | Zhu Xiaomin 103 |
| Use of the high number of city sewage treatment process..... | Xue Yanxia,Li Shaofeng 105 |
| Talking about the use of Air5 broadcasting system in radio station..... | Li Zunfeng 107 |
| Discussion on the development of intelligent protection and intelligent relay network..... | |
| ..... | Zhang Ting 109 |
| Analysis on Problems and solutions of substation operation and maintenance integration..... | |
| ..... | Jiang Li 111 |
| Correlation analysis of microcomputer relay protection in substation integrated automation..... | |
| ..... | Zheng Fei 112 |
| Research on safety management and equipment maintenance of power system substation operation..... | |
| ..... | Zhang Lei 114 |
| Electrified railway tunnel contact the reason and prevention of tripping and burning of network equipment..... | Qiao Lifeng 115 |
| Analysis of the impact of distributed generation on relay protection of distribution network..... | |
| ..... | Ying Dongyang 117 |
| Influence of wind power integration on power system transient stability..... | Lu Jia 118 |
| Application Research of transformer in high voltage electrical test..... | Ma Su 120 |
| Discussion on on line monitoring technology and condition based maintenance of substation equipment | |
| ..... | Yin Mingming 121 |
| Research on intelligent substation monitoring and operation and maintenance..... | Zhu Kai 122 |
| Application of infrared temperature measurement and diagnosis technology in 500kV substation operation and maintenance..... | Zhang Jikai 124 |
| Information integration analysis of substation equipment based on multi agent technology..... | |
| ..... | Hu Peng 125 |
| Analysis on online assessment method of operational risk of hidden danger of relay protection..... | |
| ..... | Zhu Pengyu 126 |
| Research on relay protection scheme for fast fault protection of 220kV transformer..... | |
| ..... | Han Ping 127 |
| A 500kV line four split jumper catenary loose clamp reason analysis and preventive measures..... | |
| ..... | Jiang Yanan,Yan Lei 128 |

目 录

2016.20

| | | |
|---------------------------------|--------|-----|
| 基于多智能体技术的变电站设备信息集成分析 | 胡鹏 | 125 |
| 继电保护隐患的运行风险在线评估方法分析 | 朱鹏宇 | 126 |
| 快速切除220kV变压器死区故障的继电保护方案的研究 | 韩萍 | 127 |
| 某500kV线路四分裂跳线悬垂线夹松脱原因分析及预防措施 | 姜亚南,严雷 | 128 |
| 皮带运输机的温度与烟雾监测系统研究 | 焦灵侠 | 130 |
| 浅谈厂用电继电保护配置与整定的重要性 | 曹森 | 132 |
| 浅析10kV氧化锌避雷器常见故障及安装注意事项 | 姜洪斌,于华 | 134 |
| 浅析110kV输电线路规划设计中杆塔定位及路径选择 | 范玉森 | 136 |
| 浅析变电站六氟化硫封闭式组合电器(GIS)运维技术在现场的应用 | 曹小暘 | 138 |
| 浅析自适应继电保护及其前景展望 | 戴建峰 | 140 |
| 浅议电化学沉积法修复钢筋混凝土裂缝的应用 | 柴焕芳 | 141 |
| 智能变电站与常规变电站运行维护的比较研究 | 邵建新 | 143 |
| 智能电网二次设备运维技术的研究 | 刘伟 | 144 |
| 智能配电系统架构分析及技术的研究 | 施苏林 | 145 |

科技论坛

| | | |
|-------------------------|--------|-----|
| 国际化视角下的高职管理专业教育教学研究 | 鲁桃珍 | 147 |
| 基于云计算混合式学习的教学设计 | 蔡艳婧 | 149 |
| “数字化校园”向“智慧校园”发展的探索 | 李雯雯 | 151 |
| 变电运维一体化作业风险管控的实践 | 吴施超 | 153 |
| 变电运维中隐患风险分析与应对技术 | 薛中华 | 154 |
| 城市轨道交通运营管理专业岗位能力及课程设置探究 | 王宇阳 | 156 |
| 创新变电运维值班模式提升电力系统运维效率 | 戴劲峰 | 157 |
| 大数据背景下电力企业营销管理创新研究 | 王聪 | 158 |
| 电网变电运维风险及技术检修的研究 | 张德 | 159 |
| 高校视觉传达设计专业毕业设计展改革与发展研究 | 黄婷 | 160 |
| 高职院校三维动画课程教学改革研究 | 刘亮 | 162 |
| 关于变电电气设备安装调试与运行维护技术的探讨 | 褚磊 | 164 |
| 关于无人值守变电站的运维管理技术的探讨 | 陈晓翎 | 165 |
| 光电技术类课程群的建设与研究 | 何修军 | 166 |
| 互联网背景下的美日体育保险制度对我国的启示 | 王璟,任平社 | 168 |
| 基于知识管理的电力工程合同管理研究 | 周单丹 | 170 |
| 配网工程项目管理创优中的控制策略探讨 | 崔树伟 | 171 |
| 基于互联网+电子信息技术现状及未来发展趋势 | 吴钊佐 | 173 |
| 软件工程专业校企协同育人机制的探索与实践 | 邓一星 | 174 |
| 输电线路状态巡视标准研究建立与探索应用 | 严雷 | 176 |
| 谈配电带电作业中的危险源 | 代占红 | 178 |
| 新形势下电力企业的人力资源规划问题的相关分析 | 周文斐 | 180 |
| 信息科技下北海职业学院人力资源开发与管理的研究 | 孙碧玉 | 181 |
| 信息科技下建筑工程项目进度控制管理研究 | 陈恩善 | 183 |

CONTENTS

2016.20

| | | |
|---|-----------------------|-----|
| Research of Conveyor Belt Temperature and Smoke Detector System..... | Jiao Lingxia | 130 |
| Discussion of unit auxiliary power system relays configuration and calculation' s importance from an accident..... | Cao Sen | 132 |
| Shallow of 10 kv zinc oxide lightning arrester common faults and installation considerations..... | Jiang Hongbin, Yu Hua | 134 |
| Shallow of 110 kv transmission line tower located in planning and design and path selection..... | Fan Yusen | 136 |
| An analysis of the application of six sulfur fluoride closed combined electric appliance (GIS) operation and maintenance technology in the field..... | Cao Xiaoyang | 138 |
| Analysis of adaptive relay protection and its prospect..... | Dai Jianfeng | 140 |
| The Applications of Electrochemical deposition to repair cracks in concrete..... | Chai Huanfang | 141 |
| Comparative study on operation and maintenance of intelligent substation and conventional substation..... | Shao Jianxin | 143 |
| Research on operation and maintenance technology of intelligent power grid two times..... | Liu Wei | 144 |
| Research on architecture analysis and technology of intelligent power distribution system..... | Shi Sulin | 145 |

Science and Technology Forum

| | | |
|--|------------------------|-----|
| Research on the teaching of Higher Vocational Education under the perspective of internationalization..... | Lu Taozhen | 147 |
| Based on cloud computing the teaching design of blended learning..... | Cai Yanjing | 149 |
| Exploration of the development of "Digital Campus" to "smart campus"..... | Li Wenwen | 151 |
| Practice of risk management and control in substation operation and maintenance integration..... | Wu Shichao | 153 |
| Risk analysis and Countermeasures of the hidden dangers in substation operation and maintenance..... | Xue Zhonghua | 154 |
| The research on the occupation ability and curriculum provision of city railway transit management majors..... | Wang Yuyang | 156 |
| Innovation of operation and maintenance on duty mode to improve the efficiency of power system operation and maintenance..... | Dai Jingfeng | 157 |
| Research on the innovation of marketing management of electric power enterprises under the background of large data..... | Wang Cong | 158 |
| Research on risk and technical maintenance of substation operation and maintenance of power grid..... | Zhang De | 159 |
| Research on the Reform and Development of Graduate Exhibition of Visual Communication Design Major..... | Huang Ting | 160 |
| Research on teaching reform of three dimensional animation course in Higher Vocational Colleges..... | Liu Liang | 162 |
| Discussion on the installation and commissioning and operation and maintenance of the electrical equipment..... | Chu Lei | 164 |
| Discussion on operation and maintenance management technology of unattended substation..... | Chen Xiaoling | 165 |
| Construction and Research on photoelectric technology Course Group..... | He Xiujun | 166 |
| Summary of American and Japanese sports insurance system in the context of the Internet and Its Inspiration to China..... | Wang Jing, Ren Pingshe | 168 |
| Research on power engineering contract management based on Knowledge Management..... | Zhou Dandan | 170 |
| To explore the control strategy of engineering project management excellence in distribution network..... | Cui Shuwei | 171 |
| The present situation of electronic information technology and the future development trend based on Internet plus..... | Wu Yizuo | 173 |
| Exploration and practice of school enterprise cooperative education mechanism in software engineering..... | Deng Yixing | 174 |
| Research Establishment and exploration application of transmission line state inspection standard..... | Yan Lei | 176 |
| Talk about distribution of charged in hazards..... | Dai Zhanhong | 178 |
| Analysis on human resource planning of electric power enterprises under the new situation..... | Zhou Wenfei | 180 |
| Research on the development and management of human resources in Beihai Vocational College under the information technology..... | Sun Biyu | 181 |
| Study on schedule control and management of construction project under the information technology..... | Chen Enshan | 183 |