

朵遮陂柢急筵篪铯蝽苎菥抓燃播纫烁柢杪

Overall scheme design of audio acquisition system for substation equipment

洌鲸鲸 Zizi Dong 洌劫劫 Tingting Dong 洌镒 Jun Dong 兴滥遮稻猎柢慑蛎仇饵 涎伪兴滥 325000 澳合

Wenzhou Electric Power Construction Co., LTD. Wenzhou Zhejiang 325000 China

チ峭 琏ッ朵镀慗铂八朵遮陂澳摄铷琏抓柢急罢挨 姿棋搂富诅朵遮陂抓祆纭幼妈シ彪菥抓朵镀憨柢急醛蜞拙仙韭愁菜蠼卑狼 韭能シ\虔酮楝瘩 彪菥拙仙纫坞爵狼铂卑粉抓莜酹琏韦炝跣 安蕹百阮泉漫シ\同 婶染赜谏汽簇朵遮陂柢急筵篪优 庐铯蝽苎菥 就酝爵朵镀憨祆纭极筵茶尔抓就阮铯蝽 躇慑炝笺抓脸招旦煽シ

FAbstracty As one of the most important equipment in the substation, the transformer directly affects the operation state of the substation. Traditional transformer equipment fault monitoring completely depends on manual completion. In order to prevent miscalculation, traditional monitoring methods require high experience of staff and lack timeliness. Therefore, this paper studies and proposes the audio feature acquisition system of substation equipment to realize the real-time acquisition of transformer operation sound signal, which has a good application prospect.

デ初瘀桕ツ筵篪铯蝽 朵遮陂 极筵彪墨憨

FKey words Yaudio acquisition; substation; sound sensor

0菱擘

筵篪瘁拭苎菥夫筵篪铯蝽苎菥掻瘤旦朵遮陂柢急铯蝽筵 篪抓疤琏飚弊苎菥シ挨峋拾楸 筵篪铯蝽苎菥遏蔽就阮铯蝽朵 遮陂痕茹里祆纭扉诖澳宝瘴抓极筵茶尔 钧捏慑铯蝽笺抓极 筵茶尔减共插兢 搦筵篪瘁拭苎菥遏蔽爵铯蝽戴抓极筵茶尔 祗坛瘁拭 钧卸阀痕挨特抓蕴货韩极划极筵茶尔蔽盾艘竣篪岳 铲殪苎群 Mel Frequency Cepstrum Coefficient MFCC 优庐矾 铼瘁衺磷拾 祗坛瘁拭 糯戴朵遮陂柢急祆纭扉诖澳极筵抓朵 佃琨露 搦番葡同祗纭醛蜞桤认盾瘁堙 蔽藏绑奢笺衡菅徘柢 急>朵遮陂柢急筵篪抓铯蝽苎菥掻挨慠蠹里疾升抓苎菥 啾己 就酝柢急祆纭极筵抓就阮铯蝽夫蒺屬 部禄朵遮陂柢急抓筵 篪瘁拭飚弊爱蔽伎薷就酝呖砑 枋朵遮陂柢急抓极筵茶尔遏 蔽就阮彪煜 八番菔朵遮陂抓筱大祆飓价旧恢仉シ

1 朵遮陂柢急筵篪铯蝽苎菥抓伉弊肀化

1.1 极筵彪墨憨

 双幼妈汽旦柢旧 疤琏柢弈顿群慑 鼎极碜铯双戈施跳铯蝽 5 s 抓筵篪戈挽双篪岳 8 kH戈挽双芸辆八 16 炳 蔽同佞插铯蝽群 葡抓菥挨漫 纫藏番菔群葡奢笺衡爵鸵叫シ

1.2 旅奇殆憨

朵镀憨祆纭阮极筵茶尔疾升几双シ筵篪铯蝽苎菥琏就阮 铯蝽极筵茶尔 就酝爱筵篪飚弊苎菥罢疋抓就阮彪煜 爵疤奇 殆憨抓群葡及枣啾稻琏韦炝跣シ疤奇殆憨碍备琏慑炝冀抓撑 兢据铼夫级柢浓磕啾稻 盗撷颁碍啾伎跣シ爵同 婶染肀硼 STM32F103ZET6 旅及枣憨铂八疤奇猁硬 啾己学毪筵篪铯蝽 苎菥爵极筵茶尔抓铯蝽螈韦蔽盾极筵茶尔抓彪煜螈韦シ净搔 摄憩阀朵遮陂柢急极筵铯蝽苎菥部招抓疤奇猁硬^四シ

1.3 筵篪及枣猁硬

爾朵遮陂柢急多簇抓极筵茶尔祗纭就阮铯蝽夫瘁拭 碍备琏韦钕急铯蝽柢急 祚琏韦铯蝽柢急率箐慑桤认瘁拭苎菥夫筵篪优庐铯蝽苎菥 祢双柠啾佞插铯蝽戴抓筵篪甑铼忘俐陀陔铯蝽戴抓朵镀憨筵篪抓甑铼辩姿棋搂富摄莰抓瘁拭瘩认莩嗜シ恢绑同 痕莞朵遮陂钕急筵篪铯蝽苎菥阮 爵绑筵篪及枣猁硬螈琏水级熙抹 厨率箐琏啾爵极筵茶尔祗纭跣甑铼蒺靥シ八同 婶染肀硼 VS1053 筵篪蒺璇靥猁硬 厨啾己铯招PCM 蒺靥纫吝爵朵镀憨多簇抓极筵茶尔祗纭蒺靥 笨搦摄冀蛎辆衡祚锻朵镀憨抓极筵茶尔蔽招铂瘁拭シ

1.4 蔽伎薷砑茶猁硬

朵遮陂柢急筵篪铯蝽苎菥爱朵遮陂柢急筵篪瘁拭飚弊 罢疋螈琏就酝茶每蚌砑 螈琏就酝蔽伎薷砑茶>琏就酝祢傲盗 啾 苎菥率箐钕急薷莼奇殆猁硬>谁葡朵遮陂柢朵筵篪铯蝽苎 菥抓狼铂锻枣夫螈韦 帷憩脸漫榴搔肀硼薷莼猁硬抓初瘀>鹅 级 椋猁硬祚琏毪己峻 琏啾学毪莱稠吝苎菥抓琏韦>好同 筵 篪铯蝽苎菥肀招绊 DM9000 蔽伎薷棋堕猁硬拾就酝蔽伎薷砑 茶盗啾シ



2 飚弊盗啾柢杪

朵遮陂柢急筵篪铯蝽苎菥抓飚弊盗啾碍备琏就酝爵朵 镀憨极筵茶尔抓铯蝽夫蒺靥 祚琏就酝爱筵篪瘁拭苎菥抓蔽 伎薷砑茶 蔽藏钧朵镀憨抓祆纭极筵茶尔就阮彪煜簇吨 祗搦 就酝爵极筵茶尔抓瘁拭シ

朵遮陂柢急筵篪铯蝽苎菥砑遮立磷饯瞳里祆铂番 疤诖 怜辩帷灯达饯佃筵篪铯蝽苎菥シ苎菥韭能达饯佃罢番 爵朵镀 憨祆纭极筵茶尔抓铯蝽狼铂瞳吝磷饯シ朵镀憨抓祆纭极筵茶 尔砑扉筵篪铯蝽猁硬 VS1053 祗纭箜及枣番 川砑扉 PCM 蒺 靥及枣 罢番川钧佬莜飓朵八 PCM 屬下抓极筵茶尔砑扉 SPI 棋堕彪煜戴疤奇猁硬 STM32F103ZET6 澳 川兆疤奇猁硬祗纭 蝽澳及枣シ痕同娠疋 LWIP 敛缏蔽伎薷砑茶猁硬槔招番慨笼 能彪煜鹕棋 PCM 屬下慨遏蔽砑扉净彪煜戴筵篪瘁拭飚弊苎 菥祗纭及枣瘁拭 蔽绊璇朵镀憨祆纭阮极筵茶尔抓朵佃琨露シ 极筵茶尔彪煜戴同 柠韭能绊朵镀憨祆纭阮极筵茶尔群葡彪 煜抓愁扉诖シ番菔 PCM 屬下祗稠筵篪瘁拭飚弊苎菥罢番辩 祗稠璇屬诖怜 摄番飓朵八遮镀超煜簇鳴シ

2.1 苎菥达饯佃

筵篪铯蝽苎菥砑遮罢番磷饯祆铂 郜挨铜搔砑扉帷篱抓 飚弊盗啾爵苎菥祗纭达饯佃琼铂 罢番槔招 LWIP 敛部苎菥 抓蔽伎薷棋堕猁硬 DM9000 狼铂 痕柢急瘁拭飚弊夫铯蝽飚 弊狼铂罢旦猎阽蔽伎薷祧棋 纫藏极錠茶尔祗纭螺砝彪煜シ

筵篪铯蝽苎菥砑遮磷饯祆飓番 燃傲苎菥抓达饯佃狼铂 螈琏砑扉疤奇猁硬达饯佃腾候ザ筵篪及枣猁硬达饯佃腾候ザ LWIP 达饯佃腾候臭藩祆铂柠啾就酝 祢搔朵镀憨极筵茶尔铯 蝽狼铂瞳吝磷饯罢旦抓率琏疵急>厨澳 肀硼脓纭澳认抓阮疋 疋蜍遏蔽砑烈阮篡群达饯佃拾旧霸 伐傲堙化菱嗬棋堕抓达 饯佃挫螈琏菜蠼疤奇猁硬抓达饯佃拾韭能 八 VS1053 夫 DM9000 罢疋抓群葡砑茶车笺疵急シVS1053 猁硬抓伉疾炳夫 飚疾炳遏砑扉筵篪及枣猁硬达饯佃拾韭能 痕祢扉诖澳 VS1053 猁硬抓伐堙化菱嗬+棋堕蔽盾群葡榇韦荦 DREQ 抓娩 椿戴绊示冀抓插蜞 部禄蹦币爱疤奇猁硬抓砑茶插毗瞳里 祗 搦盾阮棋龋朵镀憨极筵茶尔抓铯蝽搔芳遏蔽磷饯抓脾蓖 祢 碍备搔朵镀憨祆纭极筵茶尔煜稠 PCM 蒺靥抓旦汽 颁搔朵镀 憨祆纭极筵茶尔煜簇 PCM 蒺靥抓旦汽シLWIP 抓达饯佃铜踅 掻八绊爵厨搐爽祇纭达饯佃シ痕祢傲扉诖澳 IP 衡鸿申旧†幕 堕懈徳が低弈 netif 八魑枧超が砕磷 netif 薷堕がM9000 抓达钱 佃盾疾炳鄱罹缏螺砝韭能>祗搦佞旧绊肃仙薷懂抓堙化 钧摄 莰抓狼铂腾吝佞旧矮拾シ

2.2 极筵茶尔铯蝽

朵遮陂柢急筵篪铯蝽苎菥辩钧铯蝽戴抓朵遮憨祆纭极筵茶尔煜稠 VS1053 筵篪及枣猁硬澳祗纭达铜及枣 拧滇飓朵八 PCM 靥下罢番斥璇靥飓八遮镀超罢番川槔招 LWIP 敛彪煜戴筵篪瘁拭苎菥澳祗纭及枣瘁拭 蔽佞插椋诖怜爵极筵茶尔抓及枣瘁拭抓疵佞漫 藏绑朵镀憨祆纭极筵茶尔抓番菔

及枣シ

极筵茶尔痕极筵瘁拭箫晃搐掻挨冱腾砰铼 讹慑砑扉茶尔群荆佃抓飓朵罢番柠啾祗纭叛双及枣ザ辣佃及枣 枋极筵茶尔飓朵八蒺屬 熹戴极筵茶尔螺砝彪煜抓浊抓>厨澳叛双脾抓搔痕腾砰簇拾抓茶尔篱巨 2 谗蔽蔼抓衡纫祗纭篪岳垛双シ莜扉及枣罢番慨啾飓朵八阮疋斐蔼袤榷抓叛双茶尔抓扉诖 缏叛双抓茶尔砑扉祢傲铜踅罢番迤亿朵能绊阮疋斐蔼抓袲榷茶尔净婶甑蔼菜儒搔挨冱腾砰茶尔 砑扉嚎岚傍稠夫瘁荛垛燃抓纫吝>叛双抓桠岳茶尔慨啾缏铼佃 躇急绊祗挨铜飓朵八群荆靥下抓石弊 颁慨楸番菔慨辩飓朵八皮毅叛双怜搓抓群荆靥下 搦安搔跌祗殆抓靥下 八绊瘁拭奢德弁鼎跣泉 跌祗殆靥下辩祗挨铜飓剖八榜祗殆靥下 祢双挨燃傲扉诖矮拾 慨搔朵镀憨祆纭极筵茶尔抓蒺靥扉诖シPCM 蒺靥铯招 A 露 13 爬荤蒺靥纫吝 啾枋极筵茶尔慨塾缏几跳彪煜 颁啾炝笺抓插蜞錠甑吗シ

极筵腾砰茶尔遏研扉 VS1053 抓遏朵双岳 ADC 菖菔飓 個八群荆茶尔 罢番痕砑扉搐莱抓 VSDSP 搐爽拾祗纭蒺屬 部禄群荆茶尔飓朵八 PCM 屬下シ碍扉痕砑扉 VS1053 流筵罢旦螈琏斥殴 wav 喘笺シ燃播拾楸 VS1053 抓极筵茶尔铯双诖怜疤琏滇篷筵篪茶尔抓喘稠 地震滚茶尔抓 PCM 蒺屬 サCM 屬下彪煜抓刺傲铜踅シ翦斥螈琏痕 RAM 澳喘稠群荆筵篪群葡祢铵捏楸抓群荆筵篪群葡超禄掻铯蝽戴极筵茶尔莜扉雪悟ザ荤漫颧冀 AD 飓剖及枣罢番笼能抓筵篪群葡 番菔川砑扉艳暇 VS1053 抓 PCM 流筵腾音 磷饯爵喘稠 RAM 澳抓筵篪群葡祇坛 PCM 蒺屬 砑扉 SPI 棋堕 疤奇猁硬慨遏蔽楦垛戴韭能 PCM 蒺屬抓筵篪群葡 VS1053 祆纭戴祢铵 慨韭能绊极筵茶尔抓铯蝽狼铂シ

2.3 筵篪群葡彪煜

朵遮陂柢急筵篪铯蝽苎菥铯蝽戴抓朵镀憨祆纭极筵茶尔莜扉PCM 蒺屬番 慨辩飓朵八 PCM 屬下 疤奇猁硬 STM32F103ZET6 慨辩帷灯拧滇笺祢包 PCM 屬下 搦番槔招 LWIP 敛 插蜞绊柢急筵篪铯蝽苎菥夫筵篪瘁拭飚弊苎菥罢 疋抓蔽伎薷砑茶 搦拧滇笺抓 PCM 屬下辩砑扉蔽伎薷砑茶 抓纫吝彪煜幛筵篪瘁拭飚弊苎菥祗纭矮挨铜抓及枣シ瘤亿 痕祗纭祢傲铜踅罢旦螈琏佞枧 TCP 祧棋抓幼妈娩椿 饫碍 搔谕襦幼妈 挫螈琏阽逗莰酮祧棋 祚琏钧 pcb 奇殆候答蚴 饫及绑谕襦幼妈 挫螈琏祗挨铜佞枧燃傲瘁拭苎菥搔碍 搔慑滋脸抓筵篪群葡螈琏多慝彪煜 饫挝慑筵篪群葡 TCP 祧棋挫螈琏插毗初褊幼妈 饫慑筵篪群葡 筵篪铯蝽苎菥慨螈琏斥矾筵篪瘁拭苎菥召榇挨旧抓搐兢 纫藏祗纭群葡彪煜夫番菔抓搐兢铴颧シ

3 莩楠

谁葡婶染纫烁赜殆绊双生苎菥 砑扉薷莼爱拙奇澳氯滋 祧拾就酝燃播盗啾立祗纭苎菥仙桉シ砑扉祧菔绸傲射抓部招 苎菥狼铂瞳里 啾己疵佞衡爵优旧醛蜞祗纭箜杩 立安痕醛蜞 多瘴阮啾己盾阮湃杩汽偬 学毪就蚧部招螈韦>就酹莩嗜绔洒婶染汽簇抓朵遮陂柢急筵篪铯蝽苎菥纫烁诮旧戈遏蠼 慑就遮招必超シ



顿摁染援

- [1]腿究壤.恢绑筵篪桎呆瘁拭抓柔卑超究朵遮陂柢急痕荦拙妨爱醛蜞七蚴[J].旅化遮嗪脸招.2020 02 31-34.
- [2]赂栽.恢绑娩煽毫颧抓疤近陂盯藩痕荦拙妨爱醛蜞七孰赜谏[J].旅化遮嗪脸招.2019 12 12-15.
- [3]浆洒 笾县伪 封鲕.瘁镭吝朵遮陂柢急筵篪脾荠优庐铯蝽夫桤认瘁拭苎菥[J].遮憨狼胺.2019.06 67-71+74.
- [4]腮怎 文燥 月疔.柔卑超究朵遮陂遮稻柢急筵篪拙仙盾醛蜞桤认苎菥[J].杪塾生仙铼爱奇殆.2017.11 10-11.
- [5]非猎陟 艘舻 蚓蔗鄱.恢绑莜酹峻悟朵剖抓遮稻苎菥樘悟肃仙纫坞[J].遮稻苎菥插徘爱奇殆.2020.07 6-8.