

LIST OF IMAGES

Figure 1. 1 CAN Work System Illustration	4
Figure 1. 2 Electrical Vehicle Network Block Diagram for CAN	5
Figure 1. 3 Design of Public Electric Vehicle Charging Stations in the Environment	7
Figure 3. 1 Overall Function EVPLC (Electrical Vehicle Power Line Communication)	13
Figure 3. 2 Function tree EVPLC (Electrical Vehicle Power Line Communication)	14
Figure 3. 3 Block Diagram EVPLC (Electrical Vehicle Power Line Communication)	15
Figure 3. 4 Block Diagram Electrical Vehicle Powerline Communication Level 1	16
Figure 3. 5 Block Diagram EVPLC Level 2 EV to EVCS	18
Figure 3. 6 Block Diagram EVPLC Level 2 EVCS to EV	19
Figure 3. 7 Module 1 of EVPLC Design	25
Figure 3. 8 Module 2 of EVPLC Design	26
Figure 3. 9 Gantt Chart Part 1	27
Figure 3. 10 Gantt Chart Part 2	27
Figure 3. 11 Gantt Chart Part 3	28
Figure 3. 12 Gantt Chart Table	29
Figure 4. 1 KQ330 PLC Module	33
Figure 4. 2 Oscilloscope Testing Result of KQ330 PLC Module	33
Figure 4. 3 KQ330 Transmitter Test Wiring	34
Figure 4. 4 KQ330 Receiver Test Wiring	35
Figure 4. 5 Serial Monitor of KQ330 Testing	36
Figure 4. 6 KQ330 Bidirectional LCD and Temperature Sensor Test	37
Figure 4. 7 KQ330 Bidirectional LCD and Ultrasonic Sensor Test	38
Figure 4. 8 Wiring Diagram of EVPLC Module	41
Figure 4. 9 Wiring Diagram of EVCS Demo Module	42
Figure 4. 10 3D Design of EVCS Demo Module Casing	42
Figure 4. 11 Wiring Diagram of Full System of EVPLC Module	46
Figure 4. 12 Result of Temperature Sensor	46
Figure 4. 13 Wiring Diagram of EVPLC Module	47
Figure 4. 14 PCB Design for EVPLC Module	47
Figure 4. 15 3D Design of EVPLC Module Casing	48

Figure 5. 1 HMI of EVCAN Simulator	50
Figure 5. 2 Serial Monitor Results of Bidirectional Communication	53
Figure 5. 3 HMI of EVCS Demo Module	53

LIST OF TABLES

Table 1. 1 List of Constraint	8
Table 2. 1 Mapping requirements and connections to specifications	10
Table 2. 2 First Verification from Specification	11
Table 2. 3 Second Verification from Specification	11
Table 3. 1 Level 0 Diagram Block Details	15
Table 3. 2 Level 1 Block Diagram Details	17
Table 3. 3 Electrical Vehicle Powerline Communication Level 2 EV to EVCS Details	18
Table 3. 4 Electrical Vehicle Powerline Communication Level 2 EVCS to EV Details	19
Table 3. 5 Material Case Comparison	21
Table 3. 6 Microcontroller Comparison	21
Table 3. 7 HMI Comparison	22
Table 3. 8 PLC Module Comparison	23
Table 3. 9 Selected Components	24
Table 4. 1 Coding for KQ330 Communication Test	35
Table 4. 2 System Implementation Work Analysis	43