UDS Bootload

V0.1

2023-03-30	TOSUN

2023 03

TLE989X

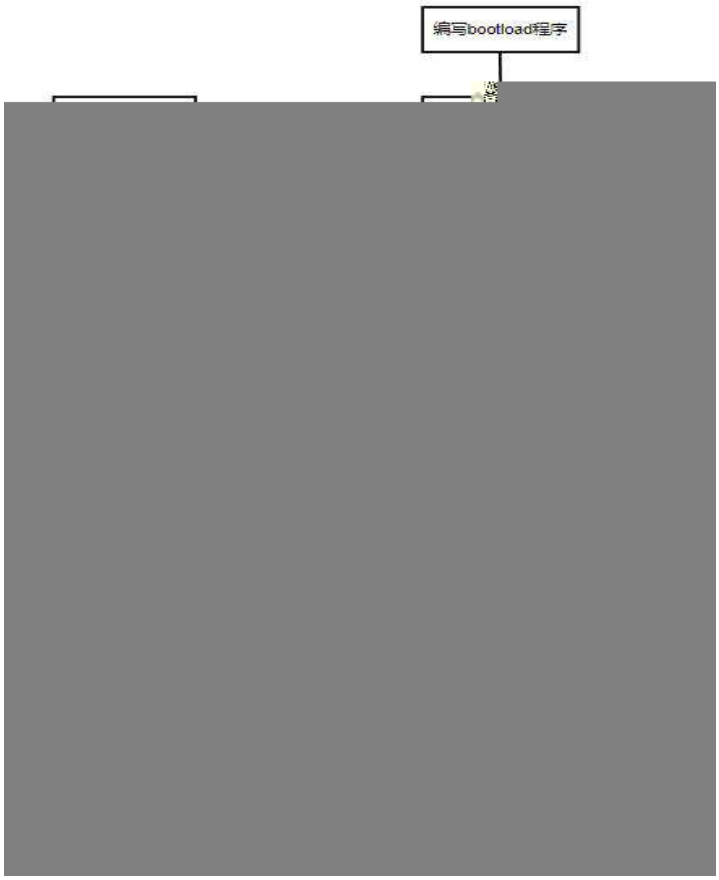
TLE989X

TLE989X

TLE989X

TLE989X Bootloader Bootloader
MCU
Bootloader
UDS 14229 15765 TSMaster CANFD
APP

Bootload APP TSMaster
Bootloader UDS APP.HEX (
CANFD);Bootloader APP
Flash Bootloader Flash
APP APP 1



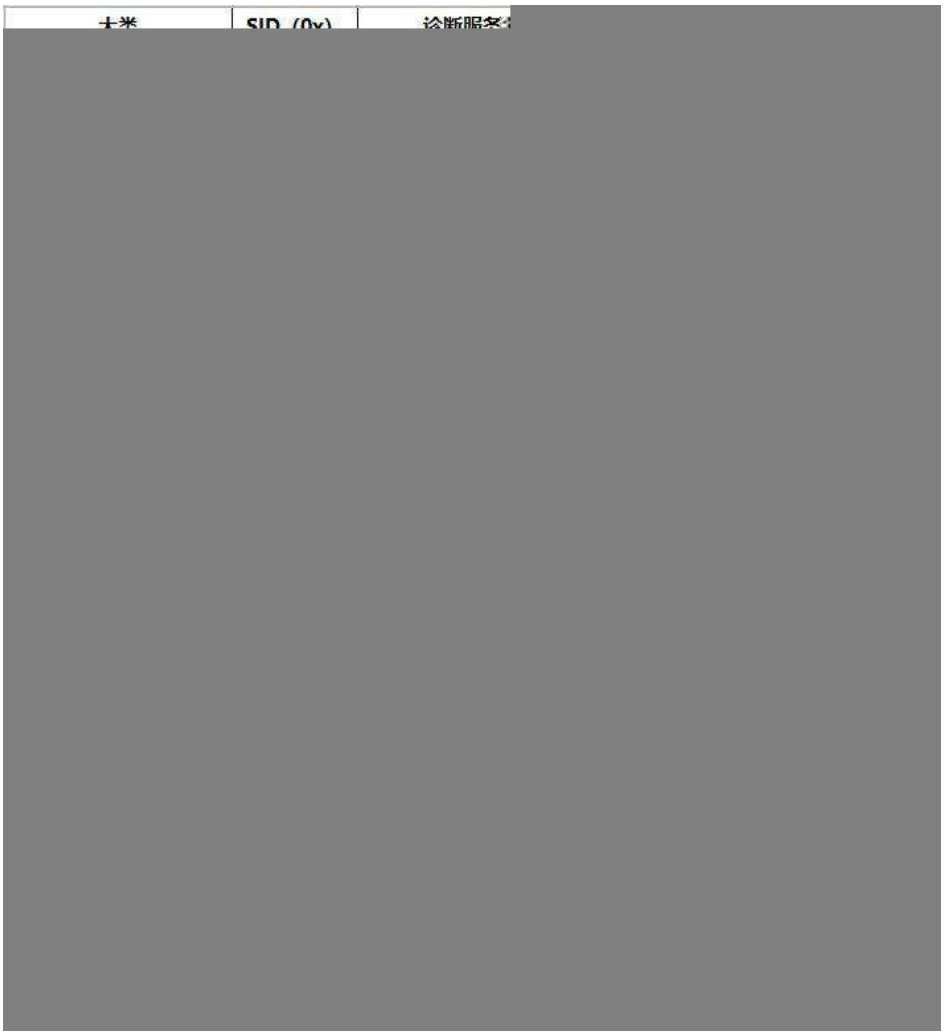
1. UDS

1.1UDS

UDS Unified Diagnostic Services
ECU ISO14229

UDS UDS ECU
ECU

1.2UDS



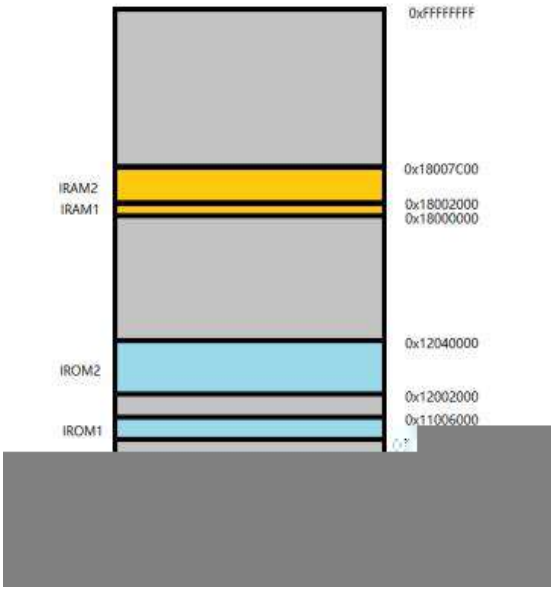
1.3UDS

Step1 10 03 //10 03
Step2: 85 02 // DTC( )
Step3: 28 03 01 // ( )
Step4: 10 02 //10 02
Step5: 27 01 // 27
Step6: 27 02
Step7: 2e 00 00
Step8: 31 00 00
Step9:(34 36 37 // APP
Step10:11 //ECU

2. TLE989X

2.1 TLE989X

TLE989X
RAM ROM Flash IROM1
0x11000000——0x11006000,IROM2 0x12002000——0x12040000,IRAM1 0x18000000——0x18002000 IRAM2
0x18002000——0x18007C00 3



2.2 TLE989X

TLE989X Bootloader 0x11000000 Flash MCU Bootloader APP APP bootload TSMster UDS APP Flash APP 0x1200 2000 1KByte Bootloader Flash APP Bootload APP ld 4 5

```
LR_IROM1 0x11000000 0x00006000  {    ; load region size_region
  ER_IROM1 0x11000000 0x00006000  {  ; load address = execution address
   *.o (RESET, +First)
   *(InRoot$$Sections)
   .ANY (+RO)
   .ANY (+XO)
  }
  RW_IRAM1 0x01800008 0x00001FF8  {  ; RW data
   .ANY (+RW +ZI)
  }
  RW_IRAM2 0x18002000 0x00005C00  {
   .ANY (+RW +ZI)
  }
}

LR_IROM2 0x12002000 0x0000D000  {
  ER_IROM2 0x12002000 0x0000D000  {  ; load address = execution address
   .ANY (+RO)
  }
}
```

4

```
LR_IROM2 0x12010000 0x0002E000  {    ; load region size_region
  ER_IROM2 0x12010000 0x0002E000  {  ; load address = execution address
   *.o (RESET, +First)
   *(InRoot$$Sections)
   .ANY (+RO)
   .ANY (+XO)
  }
  RW_IRAM1 0x18000000 0x00002000  {  ; RW data
   .ANY (+RW +ZI)
  }
  RW_IRAM2 0x18002000 0x00005C00  {
   .ANY (+RW +ZI)
  }
}
```

5

2.3 TLE989X

“ ” 0x00000100——0x00000103
MSP—— 0x0000 0104——0x0000 0107 Reset_Handler
Vector.c 6

```
__Vectors       DCD     __initial_sp
                DCD     Reset_Handler
                DCD     NMI_Handler               ; NMI Handler
                DCD     HardFault_Handler         ; Hard Fault Handler
                DCD     MemManage_Handler         ; MPU Fault Handler
                DCD     BusFault_Handler          ; Bus Fault Handler
                DCD     UsageFault_Handler        ; Usage Fault Handler
                DCD     0                         ; Reserved
                DCD     0                         ; Reserved
                DCD     0                         ; Reserved
                DCD     0                         ; Reserved
                DCD     SVC_Handler               ; SVCall Handler
                DCD     DebugMon_Handler          ; Debug Monitor Handler
                DCD     0                         ; Reserved
                DCD     PendSV_Handler            ; Pend
```

6

Bootloader APP APP
APP Bootloader APP

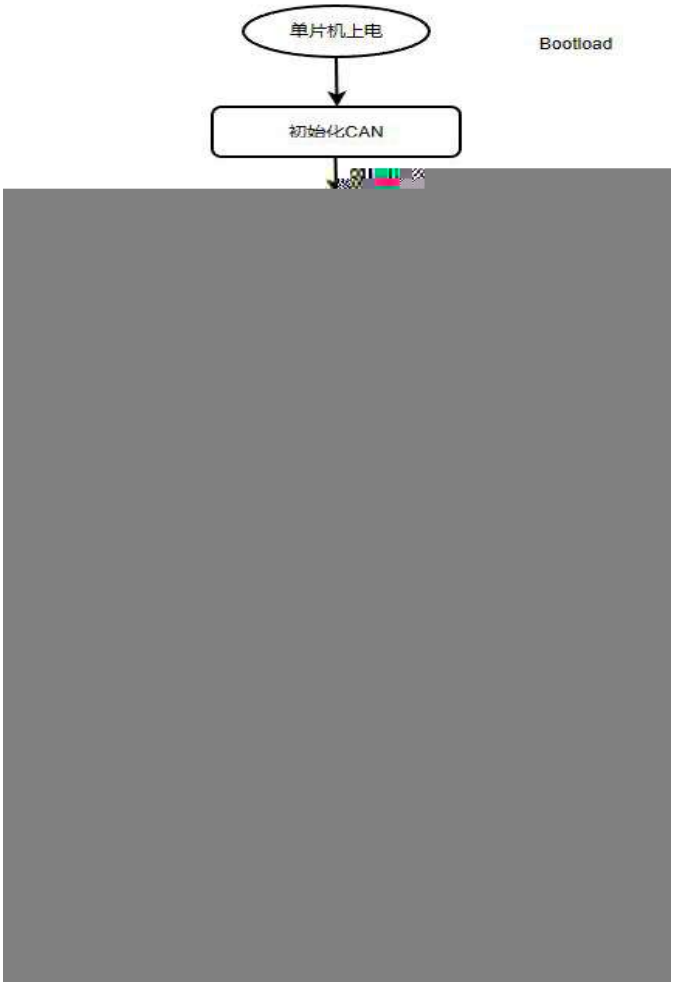
7

```
PMU_serviceFailSafeWatchdogSOW();
GPIO->P1_OMR_reg = 0x00010001;
```

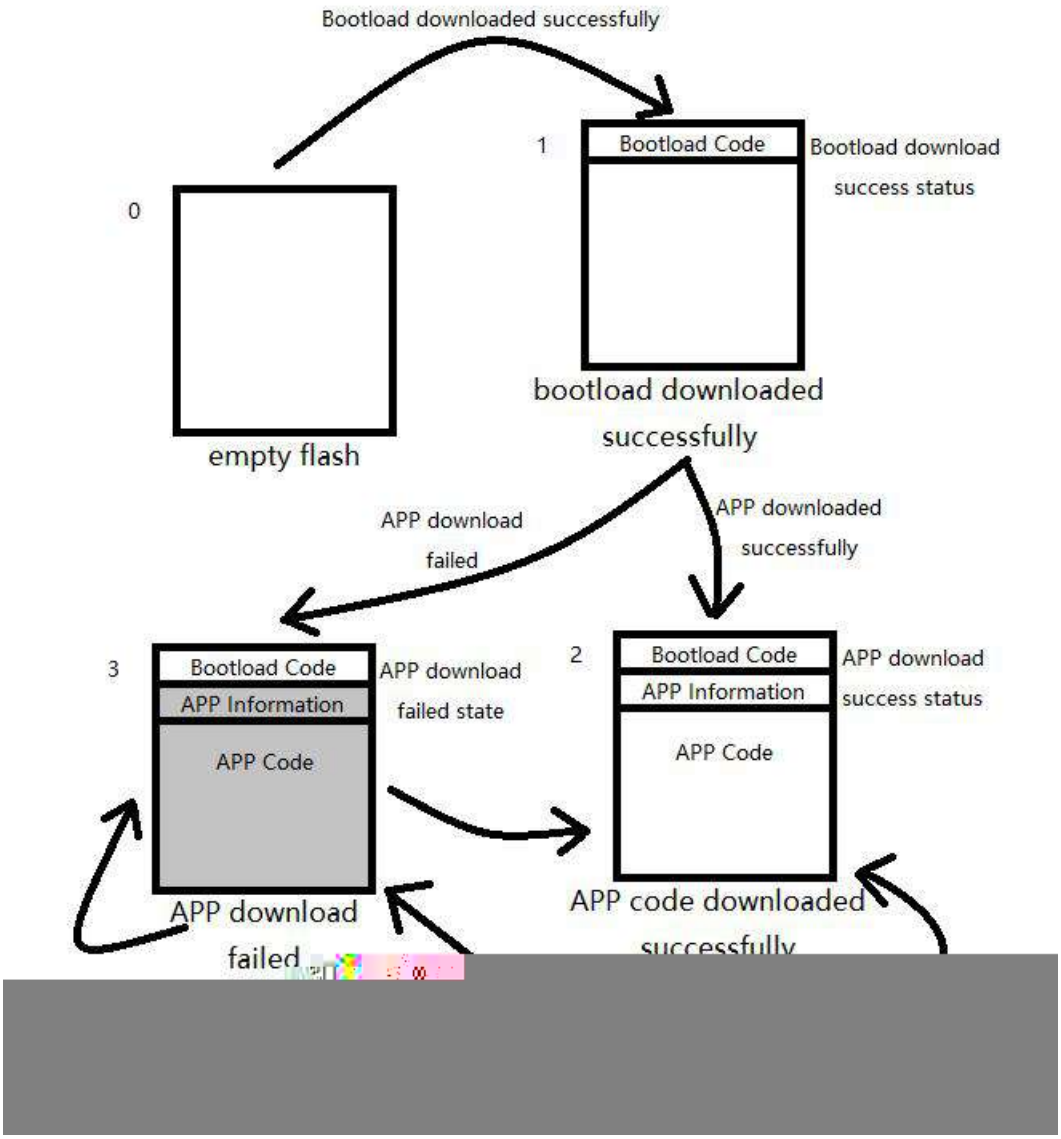
7

2.4 APP

CAN, 50 Bootload
Bootload 0x1200 2000 APP APP
UDS 0x1200 2000 APP
APP UDS Bootload
UDS 24 26 27 11
APP APP
bootload 0x1200 2000 APP
bootload APP
APP APP APP 50ms
bootload APP Bootload APP
8



2.5MCU


Bootload downloaded successfully
0
empty flash
1
Bootload Code
Bootload download
success status
bootload downloaded
successfully
APP download
failed
APP downloaded
successfully
3
Bootload Code
APP Information
APP Code
APP download
failed state
APP download
failed
2
Bootload Code
APP Information
APP Code
APP download
success status
APP code downloaded
successfully

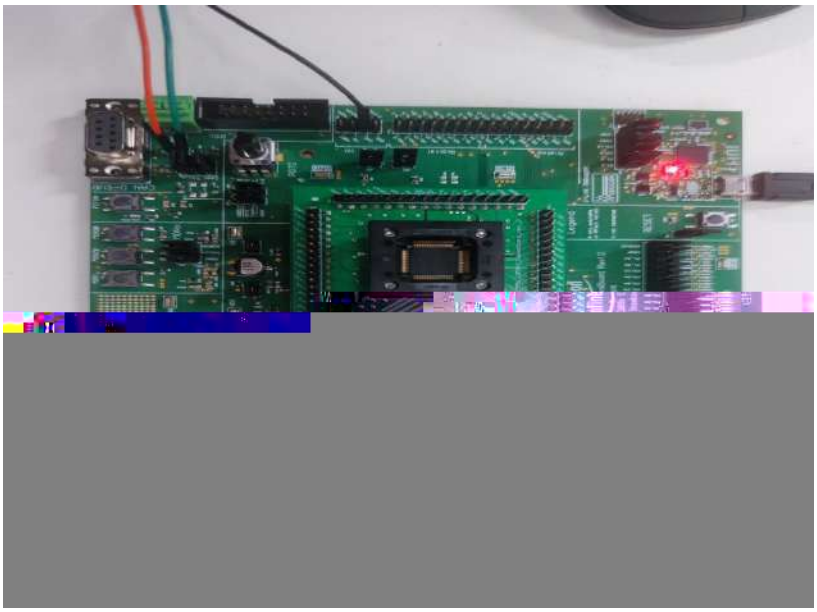
3.

3.1

10 APP1 APP2 bootload TSmaster_bootload bootload APP1 APP2 LED APP TSmaster _bootload TSmaster bootload APP bootload bootload

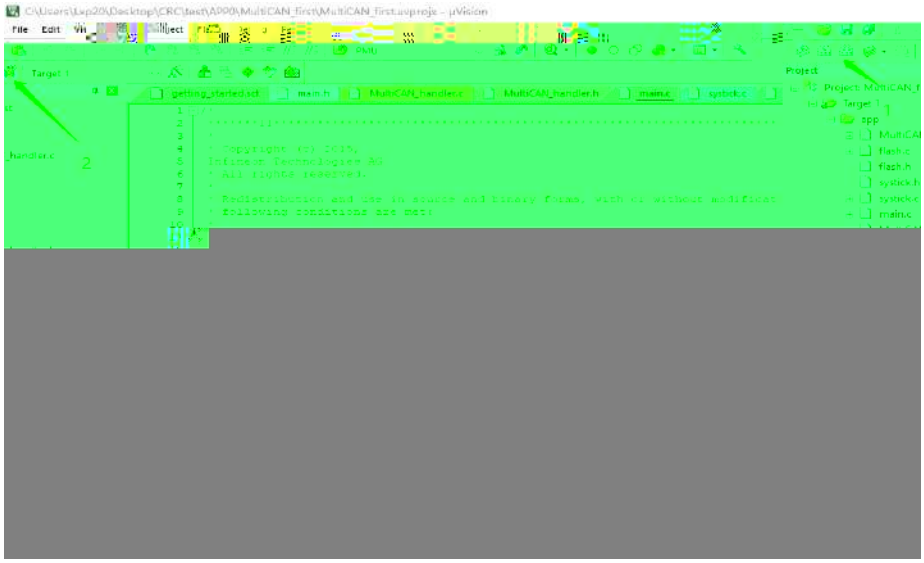
10

3.2bootload



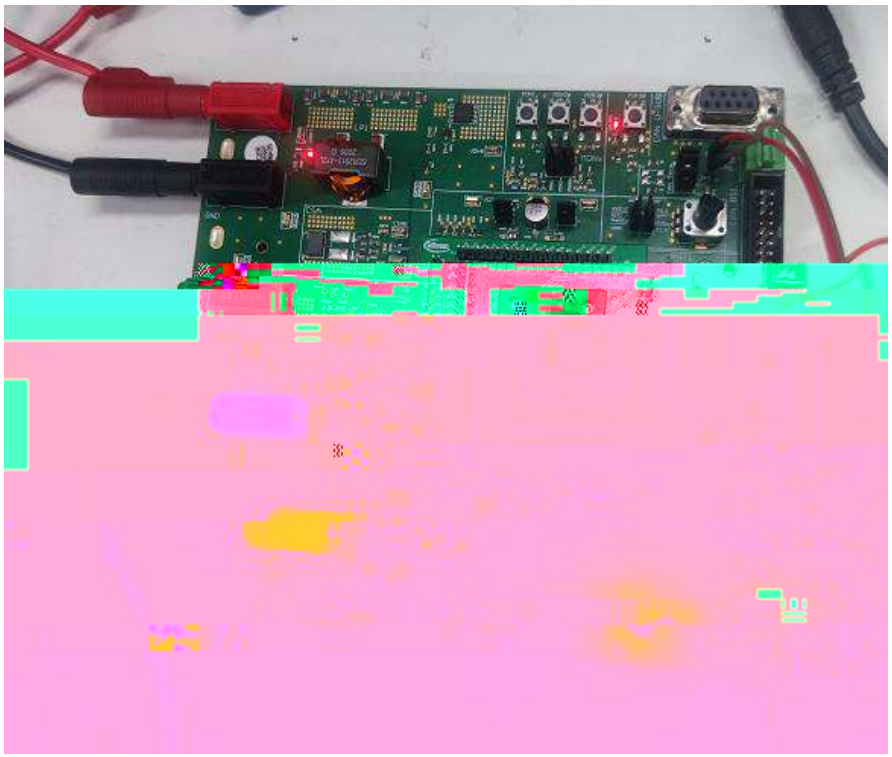
11

bootload ,



12

Bootload P1.4 LED 500ms



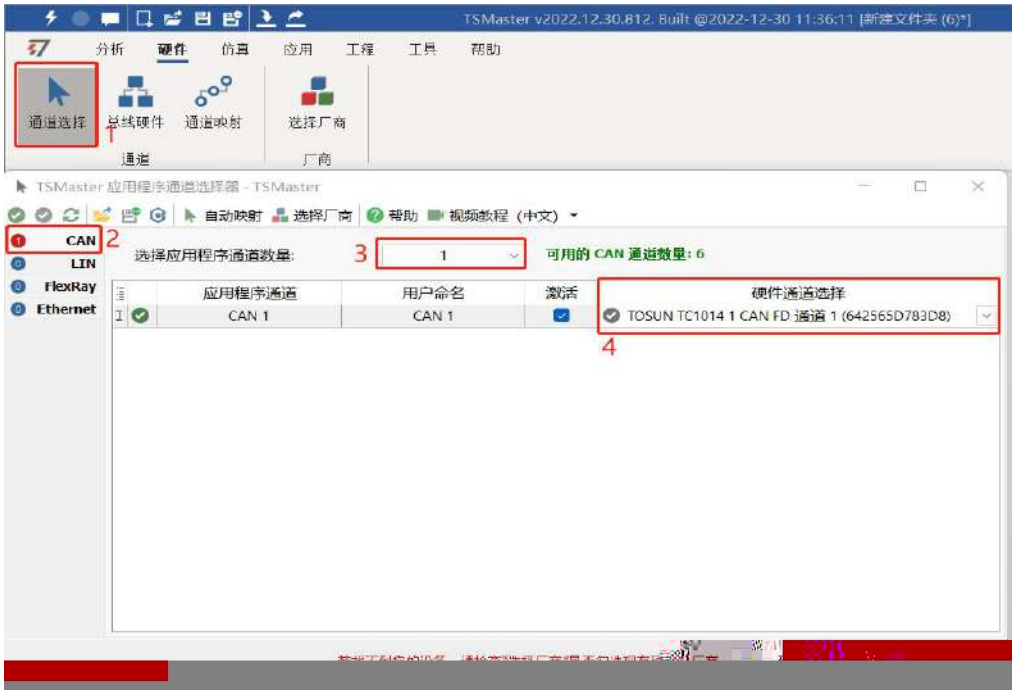
13

3.3 TSMaster APP

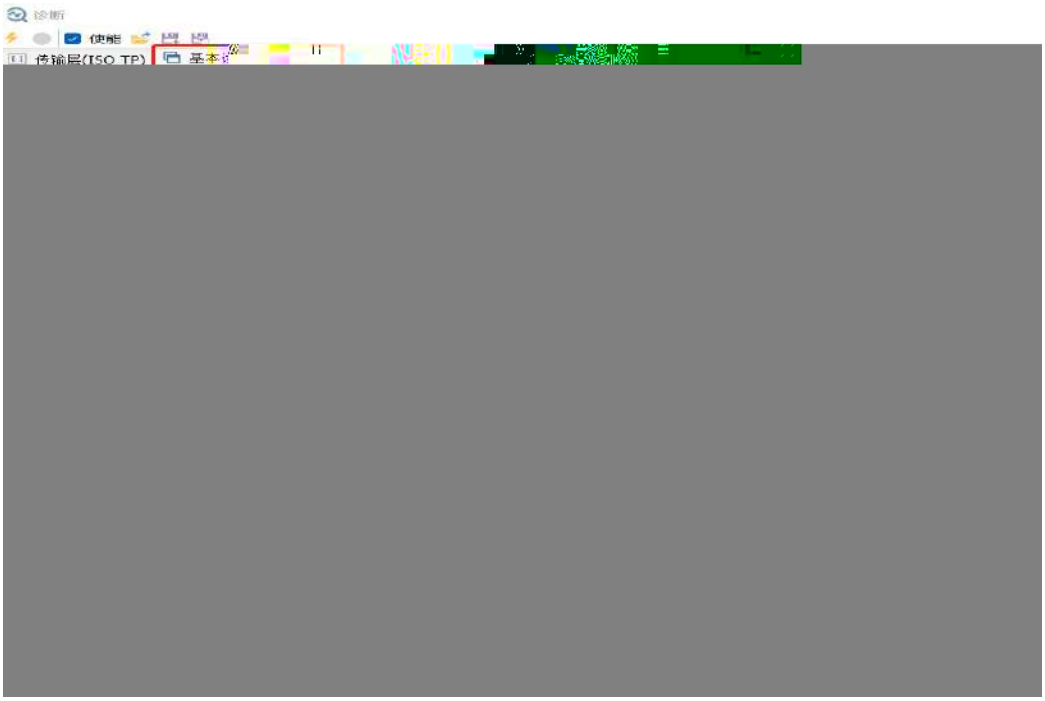
TC1012P CANFD CANFD

boot_TSmaster —> CAN

TOSUN TC1014 CANFD 1

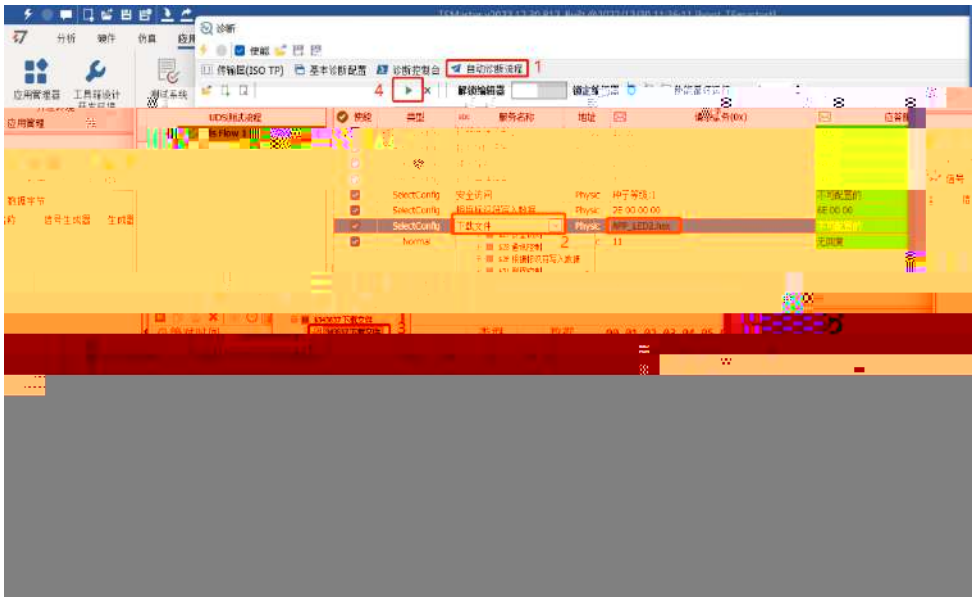


—> —> —>343637 —>
hex (APP_LED2.hex)



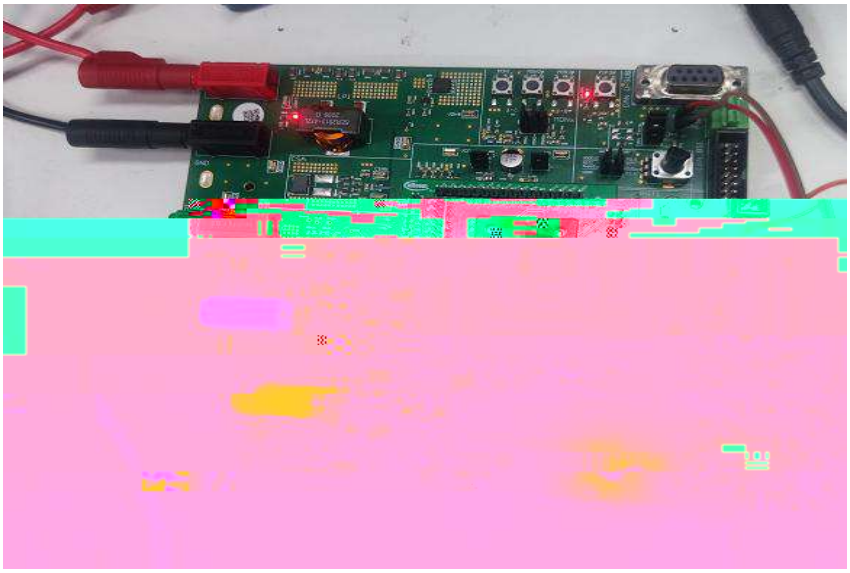
16

—> —>343637 —> 4
APP_LED2.hex



17

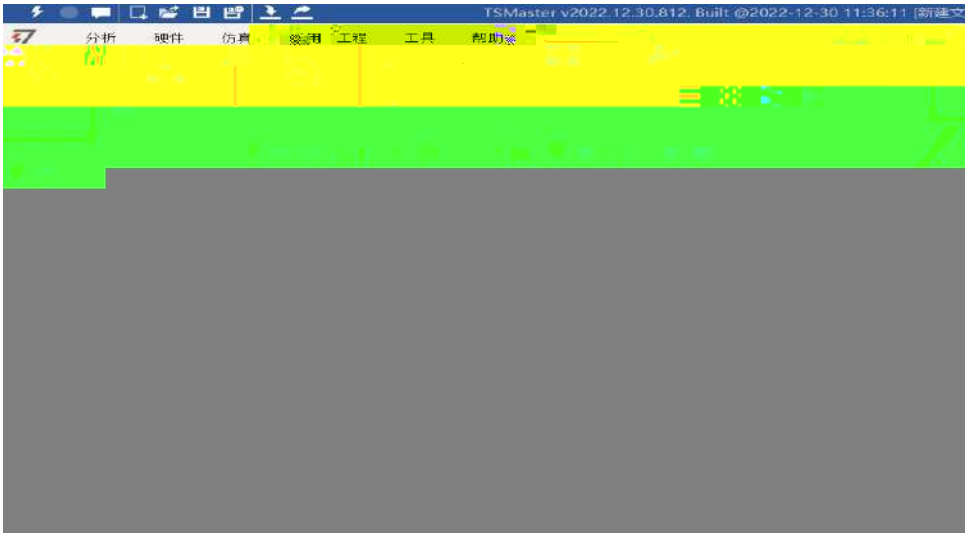
APP P.13 P.14 LED



4.TSMaster APP

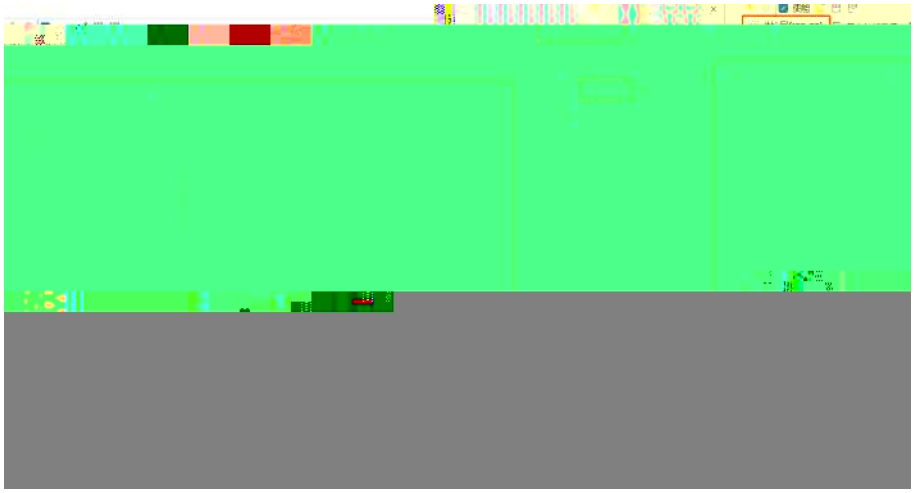
4.1

TSMaster



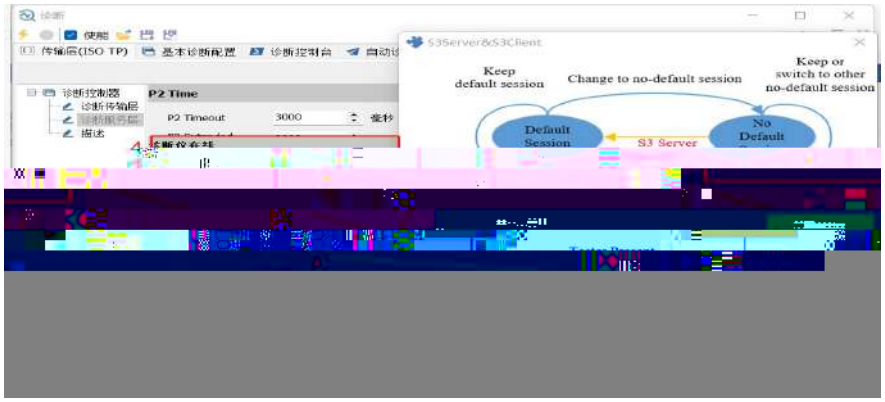
4.2

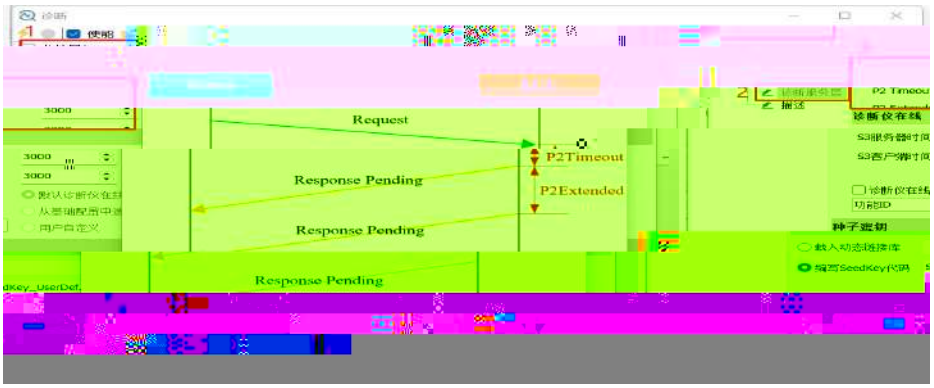
ISO TP
CAN/CANFD; Channel1 ; ID 0x701; ID Standard; ID 0x755; ID Standard; ID 0x7DD ID Standard; FC DLC [15]64Bytes;FD



4.3

ISO TP
P2Time( )
27



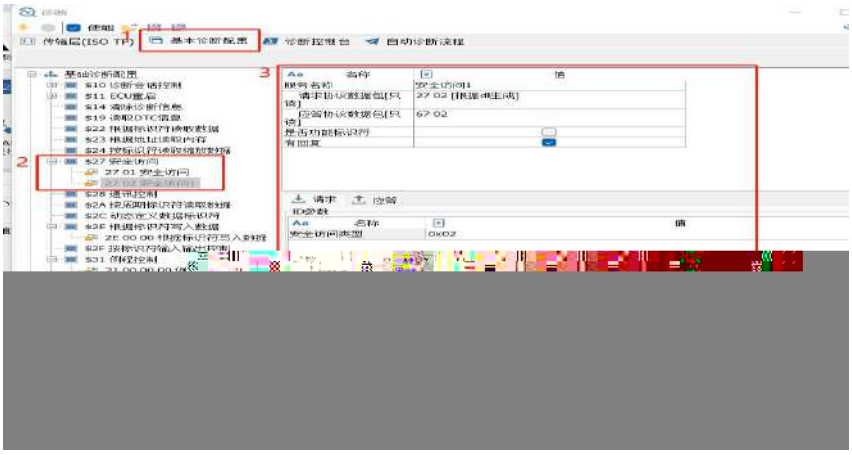


22

23

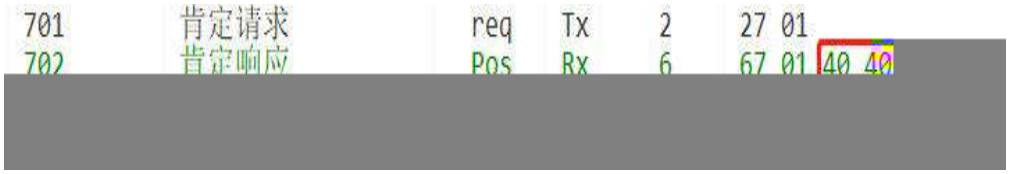
4.4 27

27 27



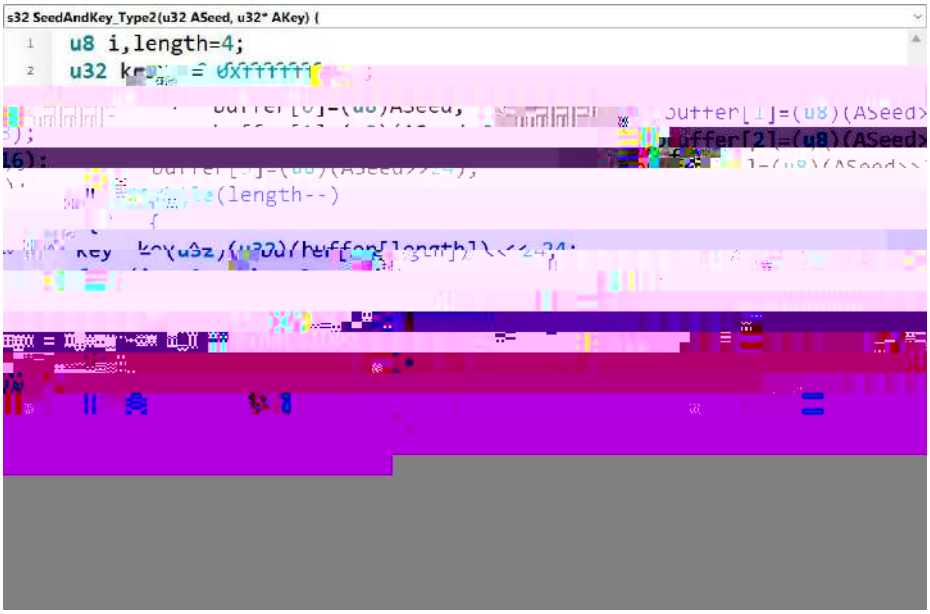
24

27 01 67 01+seed
seed key 27 02+key
key key key
67 02



25

Key 1.3 5
seedkey



26

4.5 $343637

343637 *.hex
; 8900
$37 ; *.hex
0x12002000

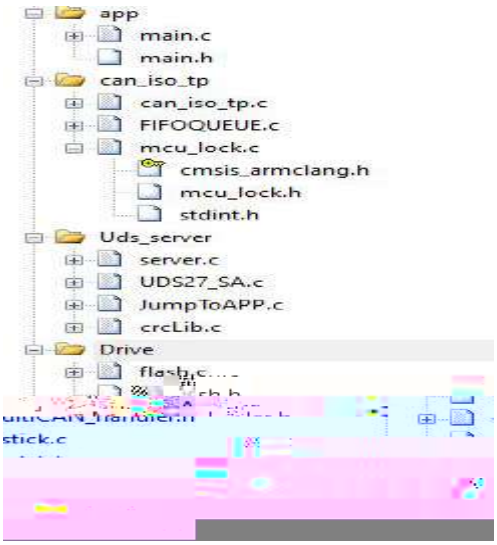
4.6

UDS FLOW UDS
UDS *.hex

5.bootload

bootload bootload TSMster CANFD APP

5.1bootload



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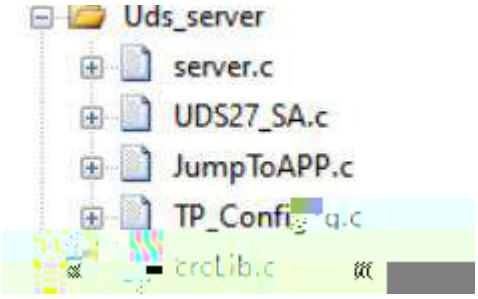
5.2 bootload UDS

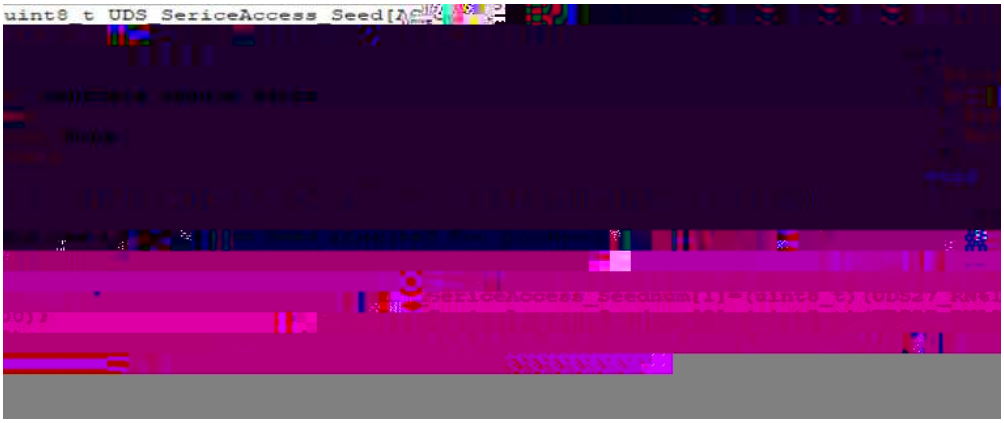
UDS_serice server.c UDS

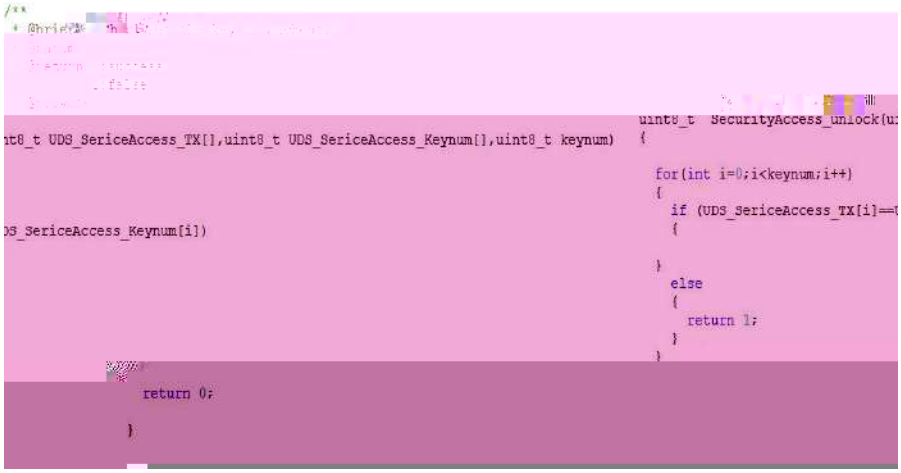


30

UDS uint8_t udsServer_requestProcess(const uint8_t payload[],uint32_t size) UDS payload[] buffer size

Seed key;UDS_SericeAccess_Key[Access_num]
key,Access_num key PasswordGenerator(){}
key UDS_SericeAccess_Key[Access_num]
0 1





```
uint8_t UDS_SericeAccess_TX[],uint8_t UDS_SericeAccess_Keynum[],uint8_t keynum)
uint8_t  SecurityAccess_unlock(u
{
  for(int i=0;i<keynum;i++)
  {
    if (UDS_SericeAccess_TX[i]==
    {
    }
    else
    {
      return 1;
    }
  }
DS_SericeAccess_Keynum[i])
    return 0;
}
```

6.

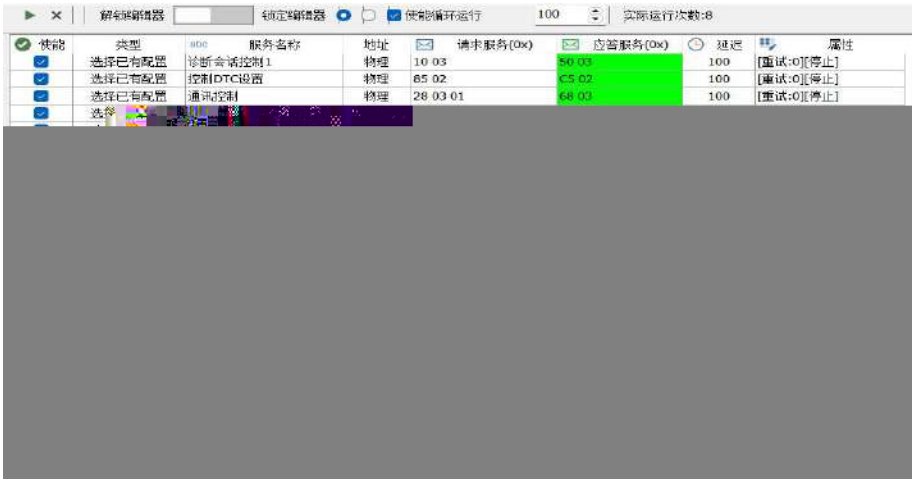
6.1

			/
TSMaster APP	APP		
APP 5	APP	5	
bootloader App	APP		0x12002000 12040000
App ECU	APP		
App APP Flash ECU	APP		
App APP ECU	APP		
ECU BusOFF ECU	APP		

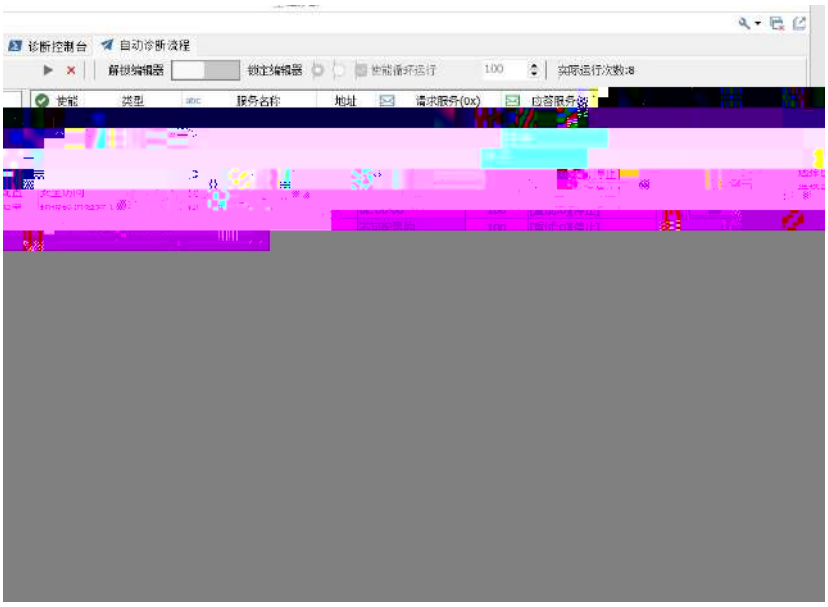
APP CAN USBCAN (: CAN USBCAN)	APP		
APP Flash	APP		
CANH,	APP		
CANH ,	APP		

6.2

1. test.Hex 0x12002000 12040000


解锁编辑器
锁定编辑器
使能循环运行
100
实际运行次数:8
使能
类型
服务名称
地址
请求服务(0x)
应答服务(0x)
延迟
属性
选择已有配置
诊断会话控制1
物理
10 03
50 03
100
[重试:0][停止]
选择已有配置
控制DTC设置
物理
85 02
C5 02
100
[重试:0][停止]
选择已有配置
通讯控制
物理
28 03 01
68 03
100
[重试:0][停止]

2. test.Hex , 5


诊断控制台
自动诊断流程
解锁编辑器
锁定编辑器
使能循环运行
100
实际运行次数:8
使能
类型
服务名称
地址
请求服务(0x)
应答服务(0x)