# Spider发起的与服务器的通信协议

## 发送包结构

|  |  |  |  |
| --- | --- | --- | --- |
| 名称 | 英文名称 | 长度(BYTE) | 说明 |
| 起始字 | STX | 1 | 0x88 |
| 业务类型 | TYPE | 1 | 高两位为0x40 |
| 路段代码 | HSC | 8 | 路段或路口代码 |
| 数据长度 | DL | 2 | DATA的长度 |
| 传送组号 | CN | 2 | 可以发生多组数据，一组数据一般在ARM中保存一条记录 |
| 结束字 | ETX | 1 | 0x99 |
| 校验字 | CRC | 1 | 从STX到ETX的XOR校验和DATA的XOR校验。不包括STX和ETX。 |
| 数据 | DATA | DL |  |

注释：业务类型(TYPE)：0xC0& TYPE 来自客户端，0x40& TYPE 来自路口或来自路段，0x80&TYPE来自信号控制器。0x00&TYPE来自服务器。

88403230353030303132000000009944

884032303530303031320100000099DC99

## 回馈包结构

|  |  |  |  |
| --- | --- | --- | --- |
| 名称 | 英文名称 | 长度(BYTE) | 说明 |
| 起始字 | STX | 1 | 0x88 |
| 业务类型 | TYPE | 1 | 与发送包类型相同 |
| 路段代码 | HSC | 8 | 与发送包相同 |
| 数据长度 | DL | 2 | 1 |
| 传送组号 | CN | 2 | 与发送包相同 |
| 结束字 | ETX | 1 | 0x99 |
| 校验字 | CRC | 1 | 从STX到ETX的XOR校验和DATA的XOR校验。不包括STX和ETX。 |
| 数据 | DATA | 1 | 0x99—OK  0x00失败 |

## 数据结构

Spider发起的数据传输类型为0x00-0x0f，当发送数据中有多条记录时数据由以下部分构成：

记录条数（1BYTE）+数据包1+数据包2+……+数据包N

其中，流水号为数据大排行，当流水号达到65535后，下一条流水号为0。

结构体总共110字节，由于对齐关系，一帧数据112字节，后面加了两个00字节。

88413230303030303637e1000000994202010000008ba2085604000100000000000300000000000000000000000000000088760100040b000034b1010000009642efbdf741c8a254436c02000040010000f406000088760100b009000034ac0100abaa4e4168a2894058f9d7410000000000000000000000000000333032010000020000008ba20856040000000000000000000000000000000000000000000000e85d00002c0b0000c89600005b117443b32ccb412635a743a40100006801000088040000e85d00009c090000409200000000000000000000000000000000000000000000000000000000323031010000

## 业务数据类型

以下是协议中的数据（DATA）部分所用到的数据结构。

### Spider注册到服务器

类型0x00

Spider发起。Spider开始加电工作以后，首先连接服务器，连接成功，发送注册信息。

struct SHeadPackage

{

BYTE STX; //头

BYTE TYPE; //类型

CHAR HSC[8]; //路段代码

USHORT DL; //数据长度

USHORT CN; //该TYPE类型上报组号

BYTE ETX; //结束

BYTE CRC; //XOR校验

};

### 定时交通数据

类型0x01

Spider发起，服务器接收。

//上报数据结构（1m）

struct DrivewayDataStruct //以车道为单位的数据信息

{

INT RecordNo; //流水号

time\_t SendTime; //上报时间

SHORT VehicleCount; //一分钟内通过的车辆

SHORT LargerVehicleCount; //一分钟内通过的大车车辆数

SHORT MidVehicleCount; //中型车

SHORT SmallVehicleCount; //小型车

SHORT MiniVehicleCount; //微型车

SHORT Moto; //摩托车

SHORT ReserverType1; //预留车型1

SHORT ReserverType2; //预留车型2

SHORT ReserverType3; //预留车型3

SHORT ReserverType4; //预留车型4

SHORT ReserverType5; //预留车型5

SHORT ReserverType6; //预留车型6

INT MaxHeadInterval; //最大车头时距

INT MinHeadInterval; //最小车头时距

INT AccumulateHeadInterval; //累计车头时距

FLOAT MaxVelocity; //最大车速

FLOAT MinVelocity; //最小车速

FLOAT AccumulateVelocity; //累计速度

INT MaxOccupancy; //最大占有时间

INT MinOccupancy; //最小占有时间

INT AccumulateOccupancy; //累计占有时间

INT MaxInterval; //最大间隔时间

INT MinInterval; //最小间隔时间

INT AccumulateInterval; //累计间隔时间

FLOAT MaxVehicleLength; //最大车长

FLOAT MinVehicleLength; //最小车长

FLOAT AccumulateVehicleLength; //累计车长

SHORT MaxQueueLength; //最大排队长度

SHORT MinQueueLength; //最小排队长度

INT AccumulateQueueLength; //累计排队长度

SHORT AccumulateQueueTime; //排队时间累计（秒）

SHORT RunRedLightCount; //闯红灯触发次数

SHORT PrecedingWayFullTime; //前方车道满累计时间

CHAR DrivewayCode[3]; //车道代码

CHAR STATUS; //状态：0-未启用，1-启用

};

### 发送心跳包

类型0x0f

Spider发起，服务器接收。目的是当不上报定时数据的时候，1分钟发送一次，保证socket连接。

数据长度：0。

### 要求校时

类型0x04

Spider发起，服务器接收。

数据长度：0。

返回数据结构

struct SSpiderTime

{

BYTE Y;

BYTE m;

BYTE D;

BYTE H;

BYTE M;

BYTE S;

};

# Spider工作流程

Spider（即路口数据采集中心）上电后，首先连接服务器；连上服务器后，发送注册包，等待接收注册回馈包，如果失败，继续注册；注册成功后请求校时，等待校时返回，校时后，如果检测器全不在线，则每分钟发送一个心跳包，如果有检测器在线，则每分钟发送一包交通统计数据，每一包数据发送后，等待返回，返回失败会再次发送数据，直到返回成功。

2.4.8交通流数据

记录条数（1BYTE）+流水数据信息位图（5BYTE）+流水信息1 +流水信息2 + ............... +流水信息n



解析完的数据如下（和上面的数据序号是反的，倒序排列的）：

"INTERSECTIONCODE","SUBFLOWID","DRIVEWAYCODE","SENDTIME","VEHICLECOUNT","LARGERVEHICLECOUNT","MIDSIZEVEHICLECOUNT","SMALLVEHICLECOUNT","MINITYPEVEHICLECOUNT","MOTOVEHICLECOUNT","AVERAGEHEADINTERVAL","MAXHEADINTERVAL","MINHEADINTERVAL","ACCUMULATEHEADINTERVAL","AVERAGEVELOCITY","MAXVELOCITY","MINVELOCITY","ACCUMULATEVELOCITY","AVERAGEOCCUPANCY","MAXOCCUPANCY","MINOCCUPANCY","ACCUMULATEOCCUPANCY","AVERAGEINTERVAL","MAXINTERVAL","MININTERVAL","ACCUMULATEINTERVAL","AVERAGEVEHICLELENGTH","MAXVEHICLELENGTH","MINVEHICLELENGTH","ACCUMULATEVEHICLELENGTH"

"20050024","2446378","304","2017/4/10 12:58:54","1","0","0","0","1","0","960","960","960","960","0","0","0","0","440","440","440","440","520","520","520","520","0","0","0","0"

"20050024","2446377","401","2017/4/10 12:58:54","1","0","0","0","1","0","1000","1000","1000","1000","0","0","0","0","460","460","460","460","420","420","420","420","0","0","0","0"

"20050024","2446376","303","2017/4/10 12:58:54","1","0","0","0","1","0","940","940","940","940","0","0","0","0","400","400","400","400","500","500","500","500","0","0","0","0"