VISIONTECH SHOP

Communication Protocol Documentation

TPD Series

CONTENT

1.CON 1 Communication Protocol

1.1 Continuous Communication Protocol

The register requests the weight from the scale via COM3 when scale turned on
Format as following:

WGT:(Bitmask)(NET)P(TARE)\r\n

1.2 Command Description

Command	Description
Bitmask	1byte Bit0=1：stable bit, Scale is stable Bit1 = 1: Zero bit ,Scale at zero Bit2 = 1:Tare bit,scale subtract the tared weight
NET	6 bytes Represent net weight value (including decimal point) If net weight byte less than 6 bytes, space are filled in the first byte Example: Net Weight =3 kg with 3 decimal places Therefore the Net weight = " 3.000"
TARE	6 bytes Represent tare weight value (including decimal point) If tare weight byte less than 6 bytes, space are filled in the first byte For example: Net Weight =3 kg with 3 decimal places Therefore the Net weight = " 3.000"
\r\n	CRLF

Example：
WGT:3 0.000P 0.000\r\n

1.3 Command Definition

All commands must be end with CRLF, and all of them are case-insensitive.
If command transmit succeed, the device returns RET:OK\r\n ,otherwise the device returns RET:NG\r\n

ZERO\r\n	ZERO transmit succeed,device returns RET:OK\r\n ZERO transmit failed,device returns RET:NG\r\n
TARE\r\n	TARE transmit succeed,device returns RET:OK\r\n TARE transmit failed,device returns RET:NG\r\n
PAUSE\r\n	Pause sending weight value,the command doesn't have return value

RESUME\r\n	Keep sending weight value,the command doesn't have return value
OPEN\r\n	Open cash drawer succeed,device returns RET:OK\r\n
	Open cash drawer failed,device returns RET:NG\r\n

1.4 Reading and Setting the Parameters of Scale

Reading Parameters

LOADALL\r\n	The register requests the command,the scale transmits all parameters of scale,each parameters take one line ,it is consist of parameter name,":" and parameter value
MODE:1	Range mode of scale 0 represents single range; 1 represents dual interval; 2 represents dual range;
FULL:30.000	Full capacity value
MID:15.000	-The first range in dual interval or dual range mode -Not valid in single range ,the value should be ignored in single range mode
DECI:3	Decimal point places
DIV:0	-Division index,the value represents division of scale -Search division from the list (1,2,5,10,20,50,100)
DIV2:0	-Division2 index,the value represents division2 of scale in dual interval or dual range mode -Search division from the list (1,2,5,10,20,50,100) -The value should be ignored in single range mode

Setting Parameters
Each parameters should be separated by space,the parameters description is the same as LOADALL described;
The MID and DIV2 are invalid in single range mode, the command should be reserved

Format:
SETALL (MODE) (FULL) (MID) (DECI) (DIV) (DIV2)\r\n

1.5 Calibration

CALZ\r\n	Calibration in zero point Transmit succeed,device returns RET:OK\r\n Transmit failed,device returns RET:NG\r\n
CALL （weight value）\r\n	Load the calibration mass weight Transmit succeed,device returns RET:OK\r\n

	Transmit failed,device returns RET:NG\r\n

CALIBRATION STEPS：
Make sure platform empty
Send CALZ command to calibrate zero point.If succeed,enter next step
Place the mass weight,example 10 kg
Send CALL 10 to calibrate.If succeed,calibration finished

2.CON 2 Communication Protocol

2.1Overview

This documentation goes over the standard serial port communication protocol. This protocol will allow a software developer to develop programs to communicate with a T-Scale's serial port enabled device. All the numeric values will be described in hexadecimal format. This document targets software developers who are integrating a system with a scale platform.

2.2 Configuration

If the device model does not have special configuration noted, the baud rate is defaulted to 9600.

2.3 General

All TSCP command (0xA8, 0xFF) and response (0xA8, 0xFE) include header bytes of size 2. With the command header, this command will be treated as a T-Scale Protocol. A command consists the following:
1. Header (Size 2) 2. Bitmask (Size 1) 3. Type (Size 1) 4. Length (Size 1) 5. Value (Size *Length*) 6. Checksum (Size 2)

The general format of a *command* (Host-to-Scale) example is as below:

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFF	0x80	0x01	0x05	0x41	0x42	0x43	0x44	0x45	0x02	0xA5

The general format of a *response* (Scale-to-Host) example is as below:

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFE	0x00	0x01	0x05	0x61	0x62	0x63	0x64	0x65	0x35	0xED

Any data that does not follow these formats will be treated as error data messages or non-TSCP messages. The type of a response message would match the type of its command message to indicate a full transaction.

Note: The below examples will only show the TLV (Type, Length Value) portion.

For all the true and false described below, true represents 1, and false represents 0.

2.4 Bitmask Definition

The below chart explains the bitmask and each bit's definition. The highest bit is on the left and lowest bit is on the right.

1st Bit	2nd Bit	3rd Bit	4th Bit	5th Bit	6th Bit	7th Bit	8th Bit
ACK	NAK	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

1st Bit - ACK:

If 1:

   This message requires an acknowledgement.

If 0:

   This message does not require and will not receive a corresponding acknowledgement.

2st Bit - NAK:

If 1:

   This message requires an acknowledgement.

3rd Bit–Platform:

If 0:

   Use platform protocol 1

If 1:

   Use platform protocol 2

Note:

If 3rd Bit = 0,Use load cell protocol 1

The general format of a command (Host-to-Scale)

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFF	0x80	0x01	0x05	0x41	0x42	0x43	0x44	0x45	0x02	0xA5

The general format of a response (Scale-to-Host)

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFE	0x00	0x01	0x05	0x61	0x62	0x63	0x64	0x65	0x35	0xED

If 3rd Bit = 1,Use load cell protocol 2

The general format of a command (Host-to-Scale)

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFF	0xA0	0x01	0x05	0x41	0x42	0x43	0x44	0x45	0x3E	0x1E

The general format of a response (Scale-to-Host)

Header		Bitmask	Type	Length	Value with size *Length*					Checksum	
0xA8	0xFE	0x20	0x01	0x05	0x61	0x62	0x63	0x64	0x65	0x4E	0x85

Note: Parsing failure (if data received is incomplete, or CRC checking error) ,it will send command once again:

Header		Bitmask	Type	Length	Checksum	
0xA8	0xFE	0x80	0xFF	0x00	0x2D	0xFB

2.5 Types Definition

Basic Functions (50)

These are the basic functions. These functions can be used in any weighing devices. All the TSCP supported devices should have these functions enabled.

Old Protocol General Format:

Example （WGT:3 0.000P 0.000\r\n）																					
0x 57	0x 47	0x 54	0x 3a	0x 33	0x 20	0x 20	0x 33	0x 2e	0x 30	0x 30	0x 30	0x 50	0x 20	0x 20	0x 33	0x 2e	0x 30	0x 30	0x 30	0x 0d	0x 0a

WGT:(Bitmask)(NET)P(TARE)\r\n

(TARE) 6 bytes ,Represent tare weight value (including decimal point)
If tare weight byte less than 6 bytes, space are filled in the first byte
For example: Net Weight =3 kg with 3 decimal places,Therefore the Net weight = "   3.000"
 \r\n represents CRLF

1st byte	0x57	
~	0x47	WGT （start of text）
3st byte	0x54	

4st byte	0x3A	:

5st byte	0x30 ~ 0x37	1byte Bit0=1：stable bit, Scale is stable Bit1 = 1: Zero bit ,Scale at zero Bit2 = 1:Tare bit,scale subtract the tared weight

6st byte	0x20	6 bytes
~	0x20	Represent net weight value (including decimal point)
12stbyte	0x33	If net weight byte less than 6 bytes, space are filled in

	0x2e	the first byte
	0x30	Example: Net Weight =3 kg with 3 decimal places
	0x30	Therefore the Net weight = "　3.000"
	0x30	

13st byte	0x50	delimiter

	0x20	(TARE) 6 bytes ,Represent tare weight value (including decimal point) If tare weight byte less than 6 bytes, space are filled in the first byte For example: Net Weight =3 kg with 3 decimal places,Therefore the Net weight = "　3.000"
14st byte ~ 20st byte	0x20	
	0x33	
	0x2e	
	0x30	
	0x30	
	0x30	

21st byte ~ 22st byte	0x0d 0x0a	\r\n represents CRLF

New Protocol General Format：

The general format of a command：

Header	Bitmask	Type	Length
0x00	0x02	0x10	0x00

Description：ST stable，US unstable，NT net weight，GS gross weight　　(ST,GS:+/-0.00001kg)

1st byte ~ 2st byte	"ST"：（0x53 0x54）ST represent Stable（the length take 2 byte） "US"：（0x55 0x53）US represent Unstable（the length take 2 byte）

3st byte	0x2C	，（0x2C）（the length take 1 byte）

4st byte ~ 5st byte	"NT"：（0x4E 0x54）NT represent Net Weight（the length take 2 byte） "GS"：（0x47 0x53）GS represent Gross Weight（the length take 2 byte）

6st byte	0x3A	：（0x3A）（the length take 1 byte）

7st byte	'+'：represent Positive number（The positive number can be replaced by space）（the length take 1 byte）(20)

	'-':represent Negative number（the length take 1 byte）(2D)

8st byte ~ 14st byte	Example：123.456（0x31 0x32 0x33 0x2e 0x34 0x35 0x36）（the length take 7 bytes）,The data is mainly response from device。(Note:The scale transmit the weight value must not be exceed 6 bytes (if the weight is integer,the decimal point should be placed in the final byte),the total length must not exceed 7 bytes (decimal point take 1 byte) ,0 is filled in when the value is fewer than 7 digits.

15st byte ~ 16st byte	'kg'：（0x6b 0x67） represent kg（the length take 2 byte） 'g'： （0x20 0x67）represent g（the length take 2 byte,0x20 is filled in when the value is fewer than 2digits.） 'lb'：（0x6c 0x62）（the length take 2 byte） 'lz'：（0x6c 0x7a）（the length take 2 byte）

0x03 – ZERO

Send command (Host-to-Scale)

The general format of a command：

OPOS：must OPOS quote：SendZero（）

Header	Bitmask	Type	Length
0x80	0x03	0x01	0x00

Description：

1st byte	0x00	ZERO

The general format of a response：

If transmit succeed，scale response ：

Bitmask	Type	Length
0x00	0x03	0x00

If transmit failed scale response：s

Bitmask	Type	Length	Value with size *Length*
0xC0	0x03	0x01	0x00

Error list：

0x00	Exceed zero range
0x01	Zero timeout

Description：

Bitmask = 0xC0 NAK

If parsing failure: send parsing failure command

0x04 – TARE

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A OPOS quote：N/A

Bitmask	Type	Length	Value with size *Length*
0x80	0x04	0x01	0x00

Description：

1st byte	0x00	Tare

The general format of a response：

If transmit succeed，scale response：

Bitmask	Type	Length	Value with size *Length*
0x00	0x04	······	······

Description：

1st byte ~ 7st byte	Tared value：123.456（0x31 0x32 0x330x2e 0x34 0x35 0x36）（the length take 7 bytes），The data is mainly response from device。(Note:The scale transmit the tared value must not be exceed 6 bytes (if the weight is integer,the decimal point should be placed in the final byte),the total length must not exceed 7 bytes (decimal point take 1 byte) ,0 is filled in when the value is fewer than 7 digits.

Error list：

0x00	Tare timeout

Description：

Bitmask = 0xC0　　NAK

2.6 Technical Function (50)

To access technical functions, the scale must be unauthorized. These functions are disabled when the scale is in approved mode. The only command available in this list is 0x32, which is used to check whether the technical functions of the scale are enabled.

0x33–Setting weighing mode

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　　OPOS quote：N/A

Bitmask	Type	Length	Value with size *Length*
0x80	0x33	0x01	0x00

Description：

1st byte	0x00	3000
	0x01	dual interval
	0x02	dual range
	0x03	6000
	0x04	15000
	0x05	30000
	0x06	60000

The general format of a response：

If transmit succeed，scale response：

Bitmask	Type	Length
0x00	0x33	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size *Length*
0xC0	0x33	0x01	0x00

Error list：

0x00	No function（dual interval、dual range）

Description：

    Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x34 –Capacity Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A OPOS quote：N/A

Bitmask	Type	Length	Value with size *Length*(1st)
0x80	0x34	0x01	0x00

Description：

1st byte	0x00	6KG/12LB
	0x01	15KG/30LB
	0x02	30KG/60LB

The general format of a response：

If transmit succeed，scale response：

Bitmask	Type	Length
0x00	0x34	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size *Length*
0xC0	0x34	0x01	0x00

Error list：

0x00	Exceed setting range

Description：

    Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x39–Calibration zero point（unit：kg）

CALIBRATION STEPS：

    1. Make sure platform empty

    2. Send CALZ command to calibrate zero point.If succeed,enter next step

    3. Place the mass weight,example 10 kg

    4. Send CALL 10   to calibrate.If succeed,calibration finished

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size *Length*
0x80	0x39	0x01	0x00

Description：

1st byte	0x00	Calibration zero point

The general format of a response：

If transmit succeed，scale response：

Bitmask	Type	Length
0x00	0x39	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size *Length*
0xC0	0x39	0x01	0x00

Error list：

0x00	Unstable status

Description：

    Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x3A – Calibration

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size *Length*
0xA8	0xFF	0x80	0x3A	……	……

Description：

1st byte ~ 7t byte	Example weight value：010.000（0x30 0x31 0x30 0x2e 0x30 0x30 0x30） （the length take 7 bytes），The data is mainly response from device。(Note:The scale transmit the weight value must not be exceed 6 bytes (if the weight is integer,the decimal point should be placed in the final byte),the total length must not exceed 7 bytes (decimal point take 1 byte) ,0 is filled in when the value is fewer than 7 digits.

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3A	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size *Length*
0xC0	0x3A	0x01	0x00

Error list：

0x00	Unstable status

Description：

    Bitmask = 0xC0   NAK

    If parsing failure: send parsing failure command.

0x3B – Zero track range setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x3B	0x01	0x00

Description：

1st byte	0x00	off
	0x01	0.5d
	0x02	1d
	0x03	2d
	0x04	4d

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3B	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size Length
0xC0	0x3B	0x01	0x00

Error list：

0x00	Exceed setting range

Description：

    Bitmask = 0xC0   NAK

    If parsing failure: send parsing failure command.

0x3C – Initial Zero Range Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x3C	0x01	0x00

Description：

	0x00	0
	0x01	2%
	0x02	4%
1st byte	0x03	10%
	0x04	20%
	0x05	50%
	0x06	100%

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3C	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size Length
0xC0	0x3C	0x01	0x00

Error list：

0x00	Exceed setting range

Description：

    Bitmask = 0xC0   NAK

    If parsing failure: send parsing failure command.

0x3D – Manual Zero Range Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x3D	0x01	0x00

Description：

	0x00	0
	0x01	2%
	0x02	4%
1st byte	0x03	10%
	0x04	20%
	0x05	50%
	0x06	100%

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3D	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size Length
0xC0	0x3D	0x01	0x00

Error list：

0x00	Exceed setting range

Description：

Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x3E –The Local Gravity Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size Length
0xA8	0xFF	0x80	0x3E	······	······

Description：

1st byte ~ 6st byte	Example：979400（0x390x370x390x340x300x30） （Length take 7 bytes）。（Note：The scale transmit the weight value must not be exceed 6 bytes ,the gravity is between 9 to 10。）

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3E	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size Length
0xC0	0x3E	0x01	0x00

Error list：

0x00	Unstable status

Description：

     Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x3F –Correction

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x3F	0x01	0x00

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x3F	0x00

If transmit failed ,scale response：

Bitmask	Type	Length	Value with size Length
0xC0	0x3F	0x01	0x00

Error list：

0x40 –Checking the Internal Counts

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size Length
0xA8	0xFF	0x80	0x40	0x01	0x00

Description：

1st byte	0x00	Check internal counts

The general format of a response：

If transmit succeed,scale response：（example：123456）

Bitmask	Type	Length	Value with size Length					
0x00	0x40	0x06	0x31	0x32	0x33	0x34	0x35	0x36

Note：

The internal counts should exceed 6 bytes,0 will be filled in when the byte less than 6 bytes

If parsing failure: send parsing failure command.

0x41 –Converting Protocol

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size Length
0xA8	0xFF	0x80	0x41	0x01	0x00

Description：

1st byte	0x00	OIML
	0x01	NONE
	0x02	CPA(CMC)
	0x03	NTEP

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x41	0x00

If transmit failed ,scale response：

Bitmask	Type	Length
0xC0	0x41	0x00

Description：

Bitmask = 0xC0   NAK

If parsing failure: send parsing failure command.

0x42 –Update Software

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　OPOS quote：N/A

Header		Bitmask	Type	Length
0xA8	0xFF	0x80	0x42	0x00

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x42	0x00

If transmit failed ,scale response：

Bitmask	Type	Length
0xC0	0x42	0x00

Description：

　　Bitmask = 0xC0　　NAK

If parsing failure: send parsing failure command.

0x49 - Tare Mode Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x49	0x01	0x01

Description：

1st byte	0x00	Disable multiple tare function
	0x01	Enable multiple tare function

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x49	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length

0xC0	0x49	0x00

0x4A - Backlight Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4A	0x01	0x01

Description：

1st byte	0x00	off
	0x01	on
	0X02	auto

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4A	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4A	0x00

0x4B - Power Auto Off Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4B	0x01	0x01

Description：

1st byte	0x00	0
	0x01	3
	0x02	10
	0x03	30

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4B	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4B	0x00

0x4C - Communication Port Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4C	0x01	0x01

Description：

1st byte	0x00	RS232
	0x01	BT

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4C	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4C	0x00

0x4D - Protocol Mode Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4D	0x01	0x01

Description：

1st byte	0x00	Off
	0X01	Old Protocol
	0x02	New Protocol
	0x03	Cash Protocol

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4D	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4D	0x00

0x4E - CAS Protocol Mode Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4E	0x01	0x00

Description：

1st byte	0x00	Initiative
	0x01	Passive

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4E	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4E	0x00

0x4F -Protocol Sending Mode Setting

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　OPOS quote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x4F	0x01	0x00

Description：

1st byte	0x00	continuous
	0x01	stable

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x4F	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x4F	0x00

2.7 Counting Function(30)

These functions are specifically to counting scales.

2.8 Price Computing Function (50)

These functions are specifically to price computing scales.

0x60 - Sending Setting Parameters

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　OPO Squote：N/A

Bitmask	Type	Length	Value with size Length
0x80	0x60	0x01	0x00

The general format of a response:

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x60	0x00

If parsing failure: send parsing failure command.

Bitmask	Type	Length
0xC0	0x60	0x00

Data Definition

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A8	FE	00	60	13	00	00	00	00	00	00	00	00	00	00	03	11	10	09	07	09	04	00	00	8A	D1
				0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

    5：Backlight

    6：Time for power auto off

    7：Bluetooth Mode   bt mode

    8：Bluetooth Sending Mode   bt mode

    9：RS232 Mode   port mode

    10：RS232 Sending Mode   port mode

    11：Approval mode

    12：Division Setting   P2

    13：Capacity Setting   P3

    14：Initial Zero Setting P5

    15：Manual Zero Setting   P6

    16：Zero Tracking Range Setting P7

    17：Tare Mode   P8

    18 - 23：Local Gravity Setting

    24 - 25：crc16 checksum value

0x65 –Sending Unit Price

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A   OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size Length
0xA8	0xFF	0x80	0x65	……	……

Description：

1st byte	Example：001500（0x30 0x30 0x30 0x30 0x31 0x35 0x30 0x30）
~	The length take 7 bytes with decimal point ,and the length take 6 bytes without decimal point
8t byte	The default justification is Left-aligned,Space 0x30.

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x65	0x00

If transmit failed ,scale response：

Bitmask	Type	Length
0xC0	0x65	0x00

Description：

    Bitmask = 0xC0　　NAK

    If parsing failure: send parsing failure command.

0x66 –Sending The Total Price

Send command (Host-to-Scale)：

The general format of a command：

OPOS：N/A　　　OPOS quote：N/A

Header		Bitmask	Type	Length	Value with size Length
0xA8	0xFF	0x80	0x66	……	……

Description：

1st byte ~ 8t byte	Example：001500（0x30 0x30 0x30 0x30 0x31 0x35 0x30 0x30） The length take 7 bytes with decimal point ,and the length take 6 bytes without decimal point The default justification is Left-aligned,Space 0x30.

The general format of a response：

If transmit succeed,scale response：

Bitmask	Type	Length
0x00	0x66	0x00

If transmit failed ,scale response：

Bitmask	Type	Length
0xC0	0x66	0x00

Description：

    Bitmask = 0xC0   NAK

    If parsing failure: send parsing failure command.

2.9 Precision Balance (20)

These functions are specifically to precision balance.

2.10 Other Functions (50)

These functions are not specifically to a category of weighing devices.

2.11 Checksum Definition

This 16-bit checksum validates the entire message. If a message has an incorrect checksum value, it should be

```
unsigned short calc_crc(unsigned char *msg, unsigned short len)
{
    unsigned short i, j;
    unsigned short crc = 0;
    unsigned short current;
    for (i = 0; i < len; i++)
    {
        current = msg[i] << 8;
        for (j = 0; j < 8; j++)
        {
            if ((short)(crc ^ current) < 0)
                crc = (crc << 1) ^ 0x1021;
            else
                crc <<= 1;
            current <<= 1;
        }
    }
    return crc;
}
```

ignored. The checksum follows the below algorithm (**Note: the checksum bytes are not included in the calculation**):

The higher byte of crc is the second to last byte in the message, and the lower byte of crc is the last byte in the message.

3.CAS_RS232_Communication Protocol

（V1.032）

3.1.CAS Active Protocol

3.1.1 Communication Specification

Baud Rate:9,600 bps

Data:8 data bits

Parity:None parity

Stop:1 stop bit

3.1.2 Command Description

Command	Description
STX (02h)	Start of text
SOH(01h)	Start of heading
STA	1 byte, STA status value： 'F'(46h)：Overload; 'S'(53h)：Stable weight; 'U'(55h)：Unstable weight
Sign	1 byte, sign bit： '-'(2dh)：Negative weight; ' '(20h)：Positive weight or weight is zero
Weight	6 bytes, weight "W4W3.W2W1W0"：6 bytes ASCII code
Weight Units	2 bytes , units of weight "U1U0"：2 bytes ASCII code, such as："kg"
BCC	Use BCC algorithm to check,except SOT,STX,ETX,EOT
ETX (03h)	Ending characters
EOT (04h)	Ending characters
STA2	1byte, status Bit0~Bit3=0 Bit4=1：weight = 0 Bit5 = 1：Tare mode Bit6 = 1：overload ; Bit6 = 0 Non-overload

Protocol Format：

SHead1	SHead2	Status	Sign	Weight	Weight Units	Check Sum	Tail1	Tail2	Status2
SOH	STX	STA	Sign	W4W3.W2W1W0	U1U0	BCC	ETX	EOT	STA2

3.2.CAS Passive Protocol

3.2.1 Communication Specification
Baud Rate:9,600 bps

Data:8 data bits

Parity:None parity

Stop:1 stop bit

3.2.2 Command Description

Command	Description
ENQ (05h)	Send ENQ
ACK (06h)	Acknowledgement character
NAK (15h)	Negative acknowledgement character
DC1 (11h)	Data collect
STX (02h)	Start of text
SOH(01h)	Start of heading
STA	1 byte, STA status value： 'F'(46h)：Overload; 'S'(53h)：Stable weight; 'U'(55h)：Unstable weight
Sign	1 byte, sign bit： '-'(2dh)：Negative weight; ' '(20h)：Positive weight or weight is zero
Weight	6 bytes, weight "W4W3.W2W1W0"：6 bytes ASCII code
Weight Units	2 bytes , units of weight "U1U0"：2 bytes ASCII code, such as："kg"
BCC	Use BCC algorithm to check,except SOT,STX,ETX,EOT
ETX (03h)	End of text
EOT (04h)	End of tail

Protocol Format：

SHead1	SHead2	Status	Sign	Weight	Weight Units	Check Sum	Tail1	Tail2
SOH	STX	STA	Sign	W4W3.W2W1W0	U1U0	BCC	ETX	EOT

3.3 Communication Flow Chat

Annotating

PC or ECR		SCALE
	PC send "ENQ"	
ENQ(05h)		
	Scale "ACK"	ACK (06h)
DC1 (11h)	PC send "DCI"	
	Scale send data	SOH STX STA SIGN W4W3.W2W1W0 kg BCC ETX EOT
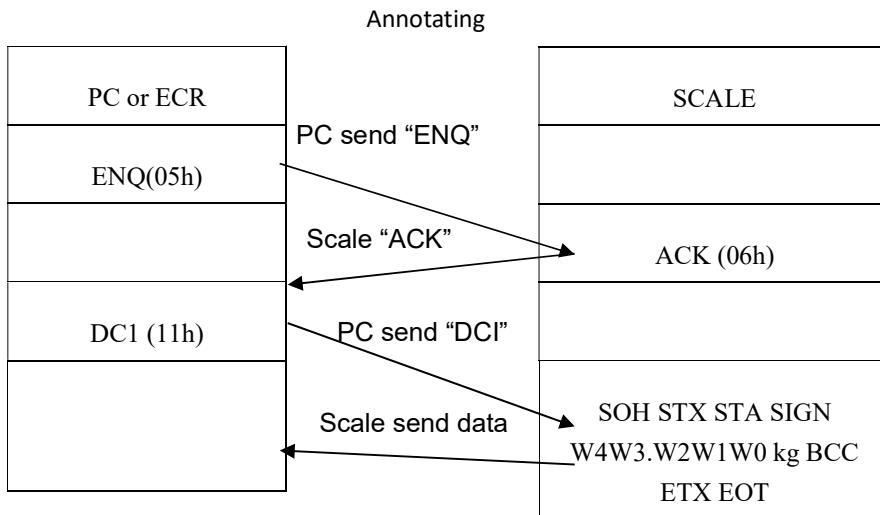
3.4 TARE & ZERO Command In Active or Passive Protocol

3.4.1 Command Description

Command	Description
<(3Ch)	Start command
>(3Eh)	End command
CMD	2 bytes , command C1C0: TARE Command："TK"（**54h,4Bh**） ZERO Command："ZK"(**5Ah , 4Bh**)
HT(09h)	End of tail

3.4.2 Protocol Format:

SHead1	CMD	ETail1	ETail2
<	C1C0	>	HT

4.ASK Mode

Command Definition

1. ZERO\r\n   ZERO

2. TARE\r\n   TARE

3．W\r\n   Read data

5.POS/ECR Protocol

5.1 TYPE-0 INTERFACE
→ Most P.O.S Systems, POS/ECRs and some TEC P.O.S Systems

1) PROTOCOL.

```
     EXTERNAL DEVICE        SCALE


  <ENQ>    ------------→    Initiate communication
           ←------------      <ACK>   : Acknowledge the request of weight data
  <DC2>    ------------→    Request of weight data
  ·········································································· Inquiry
           ←------------      <STX>  : Start Transmission
           ←------------       <ID>   : Scale type identifier
           ←------------      <W5>   : Weight data
           ←------------      <W4>   : Weight data
           ←------------      <W3>   : Weight data
           ←------------      <W2>   : Weight data
           ←------------      <W1>   : Weight data
           ←------------     <BCC>  : Block Check Character
           ←------------     <ETX>  : End Transmission
```

i> Scale Type Identifier

2kg -> G (47H)	-
5kg -> H (48H)	5lb -> K (4BH)
6kg -> C (43H)	-
10kg -> I (49H)	10lb -> L (4CH)
15kg -> A (41H)	15lb -> F (46H)
20kg -> J (4AH)	20lb -> M (4DH)
25kg -> P (50H)	-
30kg -> B (42H)	30lb -> D (44H)
-	50lb -> N (4EH)
60kg -> O (4FH)	60lb -> E (45H)

ii> Block Check Character

: <BCC> has all data bytes except <STX> and <ETX> through exclusive OR(XOR).
    * Parity Bit : Even

-    Data Byte : STX><ID><W5><W4><W3><W2><W1><BCC><ETX>

► Response time: Typ. 50ms, Max. 150ms

5.2 TYPE-2 INTERFACE

: Discontinual RS-232C Interface

→ SHARP ER-AXXX, ER-A450T, New SANYO ECRs using RS-232C, TOLEDO 3213 etc

```
   EXTERNAL DEVICE          SCALE


 Command      ------------→
   <W>
                ←------------       Response

                    <STX> XXXXXX <CR>  :  weight data (lb, oz, g, kg)
                    Error message  :  <STX>?<status byte><CR>
```
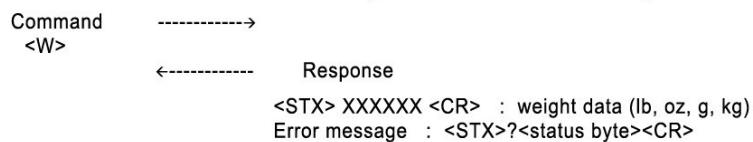
1) PROTOCOL.

PARITY BIT	ALWAYS==1		ZERO		MINUS	OVERLOAD	MOTION
Bit 7	Bit 6	Bit 5	Bit 4	Bit3	Bit 2	Bit 1	Bit 0

STATUS BYTE

cf) W : 57H (ASCII code) STX : 02H (ASCII code) CR : ODH
   (ASCII code)

Ex) Weight : 12.34 lb

```
POS/ECR     SCALE
  W<57H>    ------→
            ←------  <02H><30H><30H><31H><32H><33H><34H><0DH> : ASCII code
                      STX   0    0    1    2    3    4    CR
```

Ex) Weight : 423.5 oz

```
POS/ECR    SCALE
  W<57H>   ------→
           ←------  <02H><30H><30H><34H><32H><33H><35H><0DH>  : ASCII code
                     STX   0    0    4    2    3    5    CR
```

► Response time: Typ. 50ms, Max. 150ms

5.3 TYPE-4 INTERFACE
 → CRS, NCR2170 and Many other ECRs, Most P.O.S Software
   / 9600 Baud rate, 7 Data bit, Even Parity, 1Stop bit

1) PROTOCOL

```
<W>             ------------→
<CR>            ------------→
      ·············································· Inquiry
            ←------------    <LF> XX.XXX lb <CR>
            ←------------    <LF> S b1b2 <CR><ETX>
      ·············································· lb CASE
            ←------------    <LF> XX.XXX  kg <CR>
            ←------------    <LF> S b1b2 <CR><ETX>

      (A) XX.XXX  =  Weight value (Decimal point: variable)
      (B) lb  =  The Characters l and b
      (C) kg  =  The Characters k and g
      (D) oz  =  The Characters o and z
      (E) S   =  The Character S
      (F) b1b2 =  Two status Characters
```

Note: Different unit has a different fixed decimal point. Described as below:

1. KG: 3 decimal points. Ex. 01.234 KG

2. G: 0 decimal points. Ex. 012345. G

3. LB: 2 decimal point. Ex. 0123.45 LB

4. OZ: 1 decimal point Ex. 01234.5 OZ

Bit7	Parity Bit	Parity Bit
Bit6 0		0
Bit5	1 (Always 1)	1 (Always 1)
Bit4	1 (Always 1)	1 (Always 1)
Bit3 0		0
Bit2 0		0
Bit1	1 = Scale at Zero 0 = Not at Zero	1 = Over Capacity 0 = Not Over Capacity
Bit0	1 = Scale in Motion 0 = Stable	1 = Under Capacity 0 = Not Under Capacity

i> Status Bytes

B1 ASCII Character (ASCII Code)	B2 ASCII Character (ASCII Code)	STATUS Definition
0 (30H)	0 (30H)	OK
1 (31H)	0 (30H)	Motion
2 (32H)	0 (30H)	Scale at Zero
0 (30H)	1 (31H)	Under capacity
0 (30H)	2 (32H)	Over capacity

ii> Simplified Status Codes

► Response time: Typ. 50ms, Max. 150ms

5.4 TYPE-5 INTERFACE

→ NCI Genral, SAMSUNG SPS-300, ER-900, Most P.O.S Software / 9600 Baud rate, 7 Data bit, Even
   Parity, 1Stop bit

```
<W>        ------------→
<CR>       ------------→
    •••••••••••••••••••••••••••••••••••••••••••••••••••••• Inquiry
              ←------------ <LF> XX.XXX LB <CR>
              ←------------ <LF> b1b2 <CR><ETX>
    •••••••••••••••••••••••••••••••••••••••••••••••••••• lb CASE
              ←------------ <LF> XX.XXX  KG <CR>
              ←------------ <LF> S b1b2 <CR><ETX>

          (G) XX.XXX  =  Weight value (Decimal point: variable)
          (H) LB  =  The Characters L and B
          (I) KG  =  The Characters K and G
          (J) OZ  =  The Characters O and Z
          (K) b1b2 =  Two status Characters
```

1) PROTOCOL

i> Status Bytes

Bit7	Parity Bit	Parity Bit
Bit6 0		0
Bit5	1 (Always 1)	1 (Always 1)
Bit4	1 (Always 1)	1 (Always 1)
Bit3 0		0
Bit2 0		0
Bit1	1 = Scale at Zero 0 = Not at Zero	1 = Over Capacity 0 = Not Over Capacity
Bit0	1 = Scale in Motion 0 = Stable	1 = Under Capacity 0 = Not Under Capacity

B1 ASCII Character (ASCII Code)	B2 ASCII Character (ASCII Code)	STATUS Definition
0 (30H)	0 (30H)	OK
1 (31H)	0 (30H)	Motion
2 (32H)	0 (30H)	Scale at Zero
0 (30H)	1 (31H)	Under capacity
0 (30H)	2 (32H)	Over capacity

ii> Simplified Status Codes

kg	position	lb	position	oz	position
2 kg	X.XXX	5 lb	X.XXX	80 oz	XX.XX
5 kg	X.XXX	10 lb	XX.XXX	160 oz	XXX.X
10 kg	XX.XXX	20 lb	XX.XX	400 oz	XXX.X
20 kg	XX.XX	50 lb	XX.XX	800 oz	XXX.X
30 kg	XX.XX	60 lb	XX.XX	1000 oz	XXXX.X

iii> Weight Data Decimal point (Type 4, 5)

▶Response time: Typ. 50ms, Max. 150ms

5.5 TYPE-6 INTERFACE

→ SAMSUNG ER-670, ER-5100, SPS-520, Most P.O.S Software
  / 9600 Baud rate, 8 Data bit, Non Parity, 1Stop bit

1> PROTOCOI

```
EXTERNAL DEVICE                    SCALE(PW-200RS POS/ECR Version)

<ENQ>            ------------→     Initiate communication
                 ←------------     <ACK> : Acknowledge the request of weight data
<DC1> or <DC2>   ------------→     DC1 : For Weight Data
                                   DC2 : For All Data (PW-200RS NOT USE)
                 ←------------     S end Data Block
```

1> The Data Trains

SOH	STX	STA	SIGN	W4	W3	'.'(2Eh)	W2	W1	W0	UN1	UN0	BCC	ETX	EOT
Command DA					TA BLOCK							Command		

1. "DC1

☐ Remark

- STA : A WEIGHING STATUS OF THE SCALE SCALE IS STABLE →"S", NOT STABLE
       →"U"

- SIGN : SIGN OF THE WEIGHT DATA
       ZERO AND POSITIVE WEIGHT → " " , NEGATIVE WEIGHT →
       "-" OVER LOAD → "F"

- W5 THROUGH W0 → WEIGHT DATA
                        BUT ALL "F" WHEN THE SCALE IS PUT ON
                        OVER LOAD.

- UN1 THROUGH UN0 → UNIT OF WEIGHT (lb, oz, g, kg)

- BCC : BLOCK CHECK CHARACTER

► Response time: Typ. 50ms, Max. 150ms

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