

Cellcorder Communication Protocol

1. Introduction

1.1 Frame:

Command, ID, Data0, Data1, Data2, Data3, Checksum

1.2 Error Control:

The firmware will do nothing if it detects that the sum of all bytes in one frame is not zero. The software will resend the same command after a 200msec time delay.

2. Host Commands to Meter Unit

Command	ID	DATA	DATA	DATA	DATA	CS	DESCRIPTION
10	0X	00	00	00	00	XX	Reset System
11	0X	00	00	00	00	XX	Read Status
12	YX	00	BATTID	CELL#H	CELL#L	XX	Read Cell
13	YX	00	BATTID	XX	XX	XX	Read Battery
14	0X	ADDRH	ADDRL	BYTE	XX	XX	Write Program
15	0X	00	BATTID	CELL#H	CELL#L	XX	Reset Bat/Cell
16	0X	00	00	00	00	XX	Program Load
17	0X	LOAD#	MUX#	LTIMEH	LTIMEL	XX	Test Data
18	0X	2CALH	2CALL	6CALH	6CALL	XX	Set Calibration
18	1X	12CALH	12CALL	00	00	XX	Set Calibration
18	2X	ICALH	ICALL	ITCALH	ITCALL	XX	Set Calibration
19	XX	XX	XX	XX	XX	XX	Read Memmode

Y = {1,2,3,...}

3. Meter Unit Commands to Host

Command	ID	DATA	DATA	DATA	DATA	CS	DESCRIPTION
11	0X	DIAGH	DIAGL	SYSH	SYSL	XX	Send Status
12	0X	VH	VL	IRH	IRL	XX	Cell Data
12	1X	ICR1H	ICR1L	ICR2H	ICR2L	XX	Cell Data
12	2X	ICR3H	ICR3L	ICR4H	ICR4L	XX	Cell Data
12	3X	SGH	SGL	SCALET	TEMP	XX	Cell Data
13	0X	STATUS	MODE	00	00	XX	Battery Data
13	1X	SGNOMH	SGNOML	OV	OV	XX	Battery Data
13	2X	2CALH	2CALL	6CALH	6CALL	XX	Battery Data
13	3X	12CALH	12CALL	00	00	XX	Battery Data
13	4X	ICALH	ICALL	ITCALH	ITCALL	XX	Battery Data
17	0X	SAMPLEH	SAMPLEL	00	00	XX	Test Data
19	XX	XX	MEMMODE	XX	XX	XX	Read Memmode

$CS = (CMD + ID + DATA0 + DATA1 + DATA2 + DATA3) + 1$

VALUE = (VALUEH << 8) + VALUEL

SYS_STATUS

- BIT 0: 1= NEW ENTRY IN PROGRESS
- BIT 1: 1= SYSTEM IDLE
- BIT 2: 1= PWR ON/OFF ENABLED
- BIT 3: 1= AD SAMPLE AVAIL FOR PROCESS
- BIT 4: 1= BEEPER IS ACTIVE
- BIT 5: 1= BATTERY CHARGE LOW
- BIT 6: 1= TESTING ENABLED (READ)
- BIT 7: 1= TX IS BUSY
- BIT 8: 1= NVPRGM IN USE

DIAG_STATUS

- BIT 0: 1= CPU FAILURE
- BIT 1: 1= PROG RAM FAILURE
- BIT 2: 1= BOOT EPROM FAILURE
- BIT 3: 1= NV PROG FAILURE
- BIT 4: 1= PIO FAILURE
- BIT 5: 1= A/D FAILURE
- BIT 6: 1= DATA RAM FAILURE
- BIT 8: 1= MUX FAILURE
- BIT 9: 1= DISPLAY FAILURE
- BIT A: 1= NV PROGRAM CS FAILURE
- BIT B: 1= NV RAM AVAILABLE
- BIT C: 1= RELAY FAILURE

MEMMODE

- 1 7X256
- 2 28X64

SCALET

- 0x80 C
- 0x00 F

4. Structure of DOS Data File

16 Bytes: Battery Name
2 Bytes: Number of cells in one battery
2 Bytes: Maximum cell-number in one battery
40 Bytes: Test location
40 Bytes: Battery type
3 Bytes: Install date (month, day, year)
3 Bytes: Read-Data date (month, day, year)
2 Bytes: Low Float Voltage* 1000
2 Bytes: High Float Voltage* 1000
2 Bytes: High Internal Resistance
2 Bytes: High Intercell Resistance
2 Bytes: Cell Resistance. % higher than Average Resistance
2 Bytes: High Specific Gravity
2 Bytes: Low Specific Gravity
242 Bytes: 0
2 Bytes: Battery status
2 Bytes: Battery mode
1 Bytes: Memory mode of Cellcorder
(7: 7X256 28: 28X64)
11 Bytes: 0
2 Bytes: Overall Voltage of Battery
256X19 Bytes: 2 Bytes: Cell 1 Voltage
2 Bytes: Cell 1 not used
2 Bytes: Cell 1 Internal Resistance
2 Bytes: Cell 1 Intercell R1
2 Bytes: Cell 1 Intercell R2
2 Bytes: Cell 1 Intercell R3
2 Bytes: Cell 1 Intercell R4
2 Bytes: Cell 1 Specific Gravity
2 Bytes: Cell 1 Temperature
1 Byte: Scale of Temperature (F/C)
. .
2 Bytes: Cell 256 Temperature
1 Byte: Scale of Temperature (F/C)
20X80 Bytes: Comments

5. Structure of PARAM.DEF used with DOS software

2 Bytes: Low Float Voltage *1000
2 Bytes: High Float Voltage* 1000
2 Bytes: High Internal Resistance
2 Bytes: High Intercell Resistance
2 Bytes: Cell Resistance. % higher than Average Resistance.
2 Bytes: High Specific Gravity
2 Bytes: Low Specific Gravity

6. Structure of CAL.DEF used with DOS software

2 Bytes: 2V calibration
2 Bytes: 6V calibration
2 Bytes: 12V calibration
2 Bytes: Test current calibration
2 Bytes: Intercell calibration
2 Bytes: Specific Gravity

7. Communication Between PC and Hydrostick

PC sends 0X55 to Hydrostick to get the SG and Temperature.

PC will receive the following frame:

<byte1> = 18H Signifies start of new data
<byte2> = Cell# 00H . . . FFH Starts at 00H and increments
<byte3> = ABH >
<byte4> = CDH > SG = A.BCD
<byte5> = WXH >
<byte6> = YZH > Temp = WXY.Z
<byte7> = CHKSUM chksum = complement (Σ byte1 . . . byte6)+1

byte1=0X18

Cell number=byte2+1

$SG = (\text{byte3} \gg 4) * 1000 + (\text{byte3} \& 0X0F) * 100 + (\text{byte4} \gg 4) * 10 + (\text{byte4} \& 0X0F)$

$TEMP = ((\text{byte5} \& 0X30) \gg 4) * 1000 + (\text{byte5} \& 0X0F) * 100 + (\text{byte6} \gg 4) * 10 + (\text{byte6} \& 0X0F)$

$TEMP = (TEMP + 5) / 10$

If (byte5&0X80) is not zero, the scale will be F; otherwise will be C.