Twin Fixed 50G Internal Protocol

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| --- | --- |
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**Command Structure**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Byte | **1** | **2** | **4** |  | **N+3** | **N+4** |
| *Description* | Code | Data Length (N) | D1 | … | DN | Checksum |

**Response Structure**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Byte | **1** | **2** | **4** |  | **N+3** | **N+4** |
| *Description* | Status | Data Length (N) | D1 | … | DN | Checksum |

**Command/Response Definition**

|  |  |
| --- | --- |
| **Byte** | **Description** |
| Code | Command Code as defined in Command Code Table |
| Status | Communication Status:  0x00 ⎯ Success, Bit-0 ⎯ Checksum Error, Bit-1 ⎯ Syntax Error |
| Data Length | Number of Data Bytes |
| Dn, n = 1~N | Data |
| Checksum | Communication Error Check (Sum of all bytes, including checksum byte, is zero) |

# Command Code Table

|  |  |
| --- | --- |
| **Code** | **Description** |
|  | Module Information |
| 0x01 | Read Module Serial Number  Command: <0x01> <0x00><CS>  Response: <Status> <0x04> <D1-4> <CS>  S/N = <D1> <D2><D3><D4> |
| 0x02 | Read Module Type  Command: <0x02> <0x00> <CS>  Response: <Status> <0x01> <D> <CS>  Type = <D>  1-WB, 2-DCE, 3-DSE, 4-WSS |
| 0x04 | Set RS232 Baud Rate  <D1-2> = Baud Rate (b/s) / 100  Command: <0x04> <0x02> <D1-2> <CS>  Response: <Status> <0x00> <CS>  Valid Baud Rate: 9600, 14400, 19200, 28800, 38400, 57600, 115200 (b/s)  Any invalid number will set baud rate to default value of 115200 b/s  New baud rate is effective after reset or at next power-up |
|  | **Attenuation/Port Control** |
| 0x11 | Set Attenuation/Port of a Specified Channel  <C> = Channel Number (1~Max Channel Number)  <P> = Output Port Number, 1 ≤ P ≤ Max Port Number  <D> = 10 × Attenuation (dB), 0 ≤ Attenuation (dB) ≤ 25.5 (25.5 for Block)  Command: <0x11> <0x04><ID> <C> <P> <D> <CS>  Response: <Status> <0x01> <ID><CS>  ID: 1-----WSS-1 2----WSS-2 |
| 0x12 | Read Status of a Specified Channel  <C> = Channel Number (1~Max Channel Number)  Command: <0x12> <0x02><ID> <C> <CS>  Response: <Status> <0x03><ID><P> <D> <CS>  Output Port Number = <P>  Attenuation (dB) = <D> / 10 (25.5 for Block)  ID: 1-----WSS-1 2----WSS-2 |
| 0x13 | Set Attenuation/Port of All Channels  <P1>…<PN> = Output Port Number, 1 ≤ P ≤ Max Port Number  <D1>…<DN> = 10 × Attenuation (dB), 0 ≤ Attenuation (dB) ≤ 25.5 (25.5 for Block)  N = Max Channel Number  Command: <0x13> <2×N+1><ID> <P1…PN> <D1…DN> <CS>  Response: <Status> <0x01> <ID><CS>  ID: 1-----WSS-1 2----WSS-2 |
| 0x14 | Read Status of All Channels  Command: <0x14> <0x01><ID> <CS>  Response: <Status> <2×N+1><ID> <P1…PN> <D1…DN> <CS>  N = Max Channel Number  Output Port Number = <P1>…<PN>  Attenuation = <D1>…<DN> / 10 (25.5 for Block)  ID: 1-----WSS-1 2----WSS-2 |
|  | **Module Operation Status** |
| 0x21 | Read Alarm  Command: <0x21> <0x00> <CS>  Response: <Status> <0x01> <A> <CS>  Alarm = <A>  Bit-0 ⎯ P/S Voltage Out of Range  Bit-1 ⎯ Module Temperature Out of Range  Bit-2 ~ Bit-7 ⎯ Reserved |
| 0x22 | Read Power Supply Voltage  Command: <0x22> <0x00><CS>  Response: <Status> <0x02><D1-2> <CS>  V (mV) = <D1><D2> |
| 0x23 | Read Temperature  Command: <0x23> <0x00> <CS>  Response: <Status> <0x02><D1-2> <CS>  T (°C) = <D1><D2> / 10 |
|  | Alarm Conditions |
| 0x31 | Set Low Temperature Alarm Threshold  <D1><D2> = 10 × T (low) (°C)  Command: <0x31> <0x02> <D1-2> <CS>  Response: <Status> <0x00><CS> |
| 0x32 | Read Low Temperature Alarm Threshold  Command: <0x32> <0x00><CS>  Response: <Status> <0x02> <D1-2> <CS>  T (low) (°C) = <D1><D2> / 10 |
| 0x33 | Set High Temperature Alarm Threshold  <D1><D2> = 10 × T (high) (°C)  Command: <0x33> <0x02> <D1-2> <CS>  Response: <Status> <0x00><CS> |
| 0x34 | Read High Temperature Alarm Threshold  Command: <0x34> <0x00> <CS>  Response: <Status> <0x02> <D1-2> <CS>  T (high) (°C) = <D1><D2> / 10 |
|  | Firmware Upgrade |
| 0x41 | Start Firmware Loading  Command: <0x41> <0x02> <0xA5> <0xC3> <CS>  Response: <Status> <0x00><CS> |
| 0x43 | Switch to New Firmware  Command: <0x43> <0x00> <CS>  Response: <Status> <0x00><CS> |
|  | Attenuation/Port Control (Traditional WSS) and Firmware Upgrade |
| 0x54 | Load New Firmware  Command: <0x54> <0x10> <D1-16> <CS>  Response: <Status> <0x00> <CS>  Continue Sending new firmware data file in 16 byte groups. Fill in zeros if the last group has less than 16 bytes |
| 0x55 | Save Current Channel Configuration to Startup Profile  Command: <0x55> <0x00> <CS>  Response: <Status> <0x01> <D> <CS>  EEPROM allows 10,000,000 save operations (about 20 years for one save operation per minute)  <D> = D % of Memory Wear  <D> = 100 means results of save operation are not guaranteed anymore |
| 0xAA | Manufacture ID  Command:<0xaa><0x00><cs>  Response : <Status> <0x08><name1> <name2> <HardWare Version Major> < HardWare Version Minor > < FirmWare Version Major > < FirmWare Version Minor >< band type > < odd or even type ><CS>  name1=ID1 ID1 is a fixed number defined by HuaWei to identify the different vender  name2= ID2 ID2 is a fixed number defined by HuaWei to identify the different vender.  band type: C\_BAND=1  odd or even type: CBAND\_ODD=1, CBAND\_ALL=0, CBAND\_EVEN=2 |
| 0x50 | GET:VOLTAGE  Command:<0x50><0x01><Voltage Index><cs>  Response : <Status> <0x8> < standardH > < standardL> < maxH > < maxL>< min H > < minL>< curH > < curL><CS>  StandardVol(0.1V)= < standardH > < standardL>/10  maxVol(0.1V)= < maxH > < maxL >/10  minVol(0.1V)= < min H > < minL >/10  curVol(0.1V)= < curH > < curL >/10 |
| 0x51 | GET: CURRENT  Command:<0x51><0x01><Current Index><cs>  Response : <Status> <0x8> < standardH > < standardL> < maxH > < maxL>< min H > < minL>< curH > < curL><CS>  StandardCur(mA)= < standardH > < standardL>  maxCur (mA)= < maxH > < maxL >  minCur (mA)= < min H > < minL >  curCur(mA)= < curH > < curL > |
| 0x52 | GET:ERRCODE  Command:<0x52><0x01><ErrorCode Index><cs>  Response : <Status> <0x4> < ErrorCodeH1 > < ErrorCodeH2 > < ErrorCodeL1 > < ErrorCodeL2 ><CS>  ErrorCode = < ErrorCodeH1 > < ErrorCodeH2 > < ErrorCodeL1 > < ErrorCodeL2 >  Get every bit in errorcode at table below(若不支持，则填0)  Note：  1 refers to current recoverable (by hard pin reset) ERRCODE  2 refers to history recoverable (by hard pin reset)ERRCODE  3 refer to current unrecoverable (by hard pin reset) ERRCODE  4 refer to history unrecoverable (by hard pin reset) ERRCODE |
| 0x53 | GET:ERRLOG  Command:<0x53><0><cs>  Response : <Status><0x11>  <ResetCountH ><ResetCountL >  <LastResetType >< ResetTimestampH><ResetTimestampL>  < TempErr >< TempErrTimestampH>< TempErrTimestampL>  < ChipErr >< ChipErrTimestampH >< ChipErr TimestampL>  <ChipErr >< CurrentErrTimestampH>< CurrentErrTimestampL>  < VolErr >< VolErrTimestampH>< VolErrTimestampL>  <CS>  (若不支持，则填0) |
|  | Internal Commands |
| 0xF1 | Set Control Voltage to One Sub-Band on One LC Cell  <CH> = Channel Number (1~96)  <CN> = Cell Number (0 ⎯ Attenuation; 1~5 ⎯ Switch-A~E; 255 ⎯ TCLL )  <D1-2> = Control Voltage (mV), 0 ≤ Control Voltage ≤ 10,000 mV  Command: <0xF1> <0x05> <ID> <CH> <CN> <D1-2> <CS>  Response: <Status> <0x01> <ID> <CS> |
| 0xF2 | Read Control Voltage of One Sub-Band on One LC Cell  <CH> = Channel Number (1~96)  <CN> = Cell Number (0 ⎯ Attenuation; 1~5 ⎯ Switch-A~E; 255 ⎯ TCLL )  Command: <0xF2> <0x03> <ID> <CH> <CN> <CS>  Response: <Status> <0x03> <ID> <D1-2> <CS>  Control Voltage (mV)= <D1-2> |
| 0xF3 | Set Operation Parameters as a Group  <D1…D128> = Operation Parameters as Defined in EEPROM Map  Command: <0xF3> <0x80> <D1…D128> <CS>  Response: <Status> <0x00> <CS> |
| 0xF4 | Read Operation Parameters as a Group  Command: <0xF4> <0x00> <CS>  Response: <Status> <0x80> <D1…D128> <CS>  Operation Parameters as Defined in EEPROM Map = <D1…D128> |
| 0xF5 | Set Calibration Coefficients of a Specified Channel  <CH> = Channel Number, 1~96  <B> = Batch Number (1~30)  <E1…E128×B>: Calibration Coefficients of a Specified Sub-Band  <D1…D128> = <EM+1…EM+128> where M=128×(B-1)  Command: <0xF5> <0x82> <CH> <B> <D1…D128> <CS>  Response: <Status> <0x00> <CS> |
| 0xF6 | Read Calibration Coefficients of a Specified Sub-Band  <CH> = Channel Number, 1~96  <B> = Batch Number (1~30)  Command: <0xF6> <0x02> <CH> <B> <CS>  Response: <Status> <0x80> <D1…D128> <CS>  Calibration Coefficients of a Specified Channel:  <EM+1…EM+128> = <D1…D128> where M = 128×(B-1) |
| 0xF7 | Enable/Disable Time Delay in Hitless Switching  <D> = 0 for Disabling Hitless  = 1 for Enabling Hitless (Default at Power Up)  Command: <0xF7> <0x01> <D> <CS>  Response: <Status> <0x00> <CS> |
| 0xF8 | Reserved |
| 0xF9 | Set Configuration Parameters as a Group  <D1…D128> = Configuration Parameters as Defined in EEPROM Map  Command: <0xF9> <0x80> <D1…D128> <CS>  Response: <Status> <0x00> <CS> |
| 0xFA | Read Configuration Parameters as a Group  Command: <0xFA> <0x00> <CS>  Response: <Status> <0x80> <D1…D128> <CS>  Configuration Parameters as Defined in EEPROM Map = <D1…D128> |
| 0xFB | Read Test Data  Command: <0xFB> <0x02> <G> <B> <CS>  <G> = Group Number (1~96)  <B> = Batch Number (1~4)  Response: <Status> <0x10> <D1-16> <CS> |
| 0xFC | Read DC Offset Voltage of One ASIC Output  <CH> = Channel Number (1~96)  <CN> = Cell Number (0 ⎯ Attenuation; 1~5 ⎯ Switch-A~E; 6⎯ TCLL )  Command: <0xFC> <0x03> <ID> <CH> <CN> <CS>  Response: <Status> <0x03> <ID> <D1-2> <CS>  D = <D1-2> in 2’s complement format and 0≤D<1024  DC Offset = D if D<512  DC Offset = − (1024−D) if D≥512 |
| 0xFD | Start ADC conversion of a specified cell  <C1-2> = Sub-Band Number (1~384)  <CN> = Cell Number  ( 0 ⎯ Attenuation; 1 ⎯ Switch-A; 2 ⎯ Switch-B; ---; 5 ⎯ Switch-E, 6 ⎯ TCLL cell)  Command: <0xFD> <0x03> <ID> <CH> <CN> <CS>  Response: <Status> <0x01> <ID> <CS> |
| 0xFE | Set positive and negative voltages to one cell of a specified sub-Band respectively  <CH> = Channel Number (1~96)  <CN> = Cell Number  <D1-2> = Positive Control Voltage (mV), 0 ≤ Control Voltage ≤ 10,000 mV  <D3-4> = Negative Control Voltage (mV), 0 ≤ Control Voltage ≤ 10,000 mV  ( 0 ⎯ Attenuation; 1 ⎯ Switch-A; 2 ⎯ Switch-B; ---; 5 ⎯ Switch-E, 6 ⎯ TCLL cell)  Command: <0xFE> <0x07> <C1-2> <CN> <D1-4> <CS>  Response: <Status> <0x00> <CS> |
| 0xFF | Read internal DAC positive and negative voltages of a specified sub-Band from one cell  <CH> = Channel Number (1~96)  <CN> = Cell Number  ( 0 ⎯ Attenuation; 1 ⎯ Switch-A; 2 ⎯ Switch-B; ---; 5 ⎯ Switch-E; 6 ⎯ TCLL cell )  Command: <0xFF> <0x03> <C1-2> <CN> <CS>  Response: <Status> <0x04> <D1-4> <CS>  Positive Voltage (mV)= <D1-2>\*(10k/2^14)  Negative Voltage (mV)= <D3-4>\*(10k/2^14) |