
**Wireless Production Test Reference – Protocol
Specification Document**

Atmel MCU Wireless

Description

This document explains the serial protocol used for communication between various blocks of the Wireless Production Test Reference setup. This setup is targeted to run production tests on Atmel® Wireless devices.

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1. Terms and Abbreviations

DUT: Device Under Test.

SoC: System on Chip.

2. Document Overview

The following sections explain the protocol used for communication between various blocks in a typical WPTR production system such as:

- TEST PC Command Line Tool: “pdt_runner.exe”
- ATmega256RFR2 Xplained PRO
- Production XPRO containing:
 - ATmega1284P
 - DUT
- ZigBit® USB Stick:
 - ATZB-X-233-USB
 - ATZB-X-212B-USB

3. Protocol Format

WPTR uses a common message format for all the communications in the test setup, similar to Atmel Performance Analyzer protocol.

- Between Test PC and ATmega256RFR2-XPRO
- Between Test PC and ZigBit USB
- Between ATmega256RFR2-XPRO and DUT
- Between ATmega256RFR2-XPRO and ATmega1284P (on Production XPRO)

RX/TX message format:

SOT	Msg. length	Protocol ID	Msg. ID	Msg. payload	EOT
(1 byte)	(1 byte)	(1 byte)	(1 byte)	(Msg. length – 2) bytes	(1 byte)

The details of message format are as below:

Field	Size	Values	Description
SOT	1 byte	0x01	Start of the Transmission
Msg. length	1 byte	0- 255	Length of the message including Protocol ID, Msg. ID and Msg. Payload
Protocol ID	1 byte	0x00-0xFF	Protocol usage based on the Application for WPTR – 0xF0
Msg. ID	1 byte	0x00-0xFF	Identification of Message
Msg. payload	(Msg. length – 2) bytes	...	Payload for the message. This does not includes Protocol ID and Msg. ID
EOT	1 byte	0x04	End of Transmission

3.1 Messages for Communication between Test PC (pdt_runner) and ATmega256RFR2 Xplained PRO

FIXTURE_STATUS_REQ:

Message used to request the status of Test Fixture's Lid, if it is open or close.

Message ID: <0x51>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

FIXTURE_STATUS_CONFIRM:

Message ID: <0x71>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
Fixture Status	unsigned integer / 1 byte	0x00-0xFF	0x00- FIXTURE OPEN 0x01- FIXTURE CLOSE

PWRM_REQ:

Message used to read the registers of current sensor, INA226.

Message ID: <0x52>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

PWRM_CONFIRM:

Message ID: <0x72>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
Bus Voltage	2 byte	0x0000-0xFFFF	Bus voltage measurement data. Actual bus Voltage = 1.25mV * value
Shunt Voltage	2 byte	0x0000-0xFFFF	Shunt voltage measurement data. Actual Shunt Voltage = 2.5µV * value
Current Measured	2 byte	0x0000-0xFFFF	Current measured value with MSB first, Actual Current = (value * 100)µA
Power	2 byte	0x0000-0xFFFF	Power delivered to load= 2.5mW * value
Calib.	2 byte	0x0000-0xFFFF	Calibration register
Mask Enable	2 byte	0x0000-0xFFFF	Alert configuration

For more details of these parameters refer to INA226 datasheets.

PWR_STATUS_REQ:

Message used to check if the DUT caused an over current. If return value is failure, the power supply for the DUT was automatically stopped.

Message ID: <0x53>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

PWR_STATUS_CONFIRM:

Message ID: <0x73>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
DUT Power Status	unsigned integer / 1 byte	0x00-0xFF	0x00- DUT Powered On 0x01- Over Current by DUT

PWRC_REQ:

Message used to clear the over current protection and switch the DUT off.

Message ID: <0x54>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

Note: It is not possible to switch on a DUT, when the error bit is set. It's recommended to clear the bit, before switch on the DUT.

PWRC_CONFIRM:

Message ID: <0x74>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

XPRO_FIRMWARE_VERSION_REQ:

Message used to get the firmware version of the ATmega256RFR2 Xplained PRO Firmware.

Message ID: <0x55>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

XPRO_FIRMWARE_VERSION_CONFIRM

Message ID: <0x75>

Message payload description:

Field	Type/size	Values	Description
FW Version	unsigned integer / 1 byte	0x00-0xFF	Firmware version

PWR_REQ

Message used to enable the power to the DUT.

Message ID: <0x56>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

PWR_CONFIRM:

Message ID: <0x76>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

ZBDUT_REQ:

Message used to indicate the type of DUT to the Xplained PRO.

Message ID: <0x57>

Message payload description:

Field	Type/size	Values	Description
Type of DUT	unsigned integer / 1 byte	0x00-0xFF	0x01: SOC DUT 0x02: 2.4 GHz Transceiver 0x03: Sub GHz Transceiver

ZBDUT_CONFIRM:

Message ID: <0x77>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

GPIOTEST_REQ:

Message used to run the GPIO Test involving Pin Short Test and Continuity test on required pins. The command is implemented only in case of DUT containing MCU+ Transceivers or SoC.

Message ID: <0x58>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

GPIOTEST_CONFIRM:

Message ID: <0x78>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
String	unsigned char	ASCII Characters	Gives the pins shorted. First byte gives the number of char in the string

HWTEST_REQ:

Message used to run the UART, TWI, and 32kHz tests in case of DUTs containing MCU+Transceiver or SoC.

Message ID: <0x59>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

HWTEST_CONFIRM:

Message ID: <0x79>

Message payload description:

Field	Type/size	Values	Description
Test ID	unsigned integer / 1 byte	0x00-0xFF	0x00: SUCCESS 0x01: UART Test failed 0x02: TWI Test failed 0x04: 32kHz Crystal Test failed

XTALCALIB_REQ:

Message used to run the Crystal Calibration using ATmega1284P and DUT. The DUT should generate a 4MHz clock output to the ATmega1284P.

Message ID: <0x5A>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

XTALCALIB_CONFIRM:

Message ID: <0x7A>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
XTAL_TRIM_VALUE	unsigned integer / 1 byte	0x00-0x0F	XTAL_TRIM value after calibration
FREQUENCY	Unsigned integer/4 bytes	0x00000000 – 0xFFFFFFFF	Actual frequency = value * Calibration Trim Factor measured. By default Trim Factor = 1.000065

RF_PARAM_REQ:

Message used to set the transmit power level and the operating channel of the transceiver for RF Tests.

Message ID: <0x5B>

Message payload description:

Field	Type/size	Values	Description
POWER	unsigned integer / 1 byte	0x00-0xFF	Set the Transmit Power level
CHANNEL	unsigned integer / 1 byte	0x00-0xFF	Set the Transceiver Channel

RF_PARAM_CONFIRM:

Message ID: <0x7B>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

RFTEST_REQ:

Message used to start the RF Transmission Test.

Message ID: <0x5C>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

RFTEST_CONFIRM:

Message ID: <0x7C>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
TX_RSSI_VALUE	unsigned integer / 1 byte	0x00-0x54	PHY_ED_LEVEL register value from ZigBit USB indicating TX level
RX_RSSI_VALUE	unsigned integer / 1 byte	0x00-0x54	PHY_ED_LEVEL register value from DUT indicating reception

REGISTER_WRITE_REQ:

Message used to write the given Transceiver Register Address with the given Parameter value.

Message ID: <0x5D>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value to be written

REGISTER_WRITE_CONFIRM:

Message ID: <0x7D>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back from DUT

REGISTER_READ_REQ:

Message used to read the given Transceiver Register Address.

Message ID: <0x5E>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned long / 2 byte	0x0000-0xFFFF	Register Address to be read

REGISTER_READ_CONFIRM:

Message ID: <0x7E>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned long / 2 byte	0x0000-0xFFFF	Register Address read
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back from DUT

CRYSTAL_FREQ_READ_REQ:

Message used to measure the frequency of the signal given as input to CLKO pin of the Production XPRO board.

Message ID: <0x5F>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

CRYSTAL_FREQ_READ_REQ:

Message ID: <0x7F>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
Crystal frequency	unsigned integer / 4 byte	0x00000000- 0xFFFFFFFF	Actual frequency = Calibration Trim Factor * value. Default calibration trim factor = 1.000065

3.2 Messages for Communication between Test PC (pdt_runner) and ZigBit USB

ZIGBITUSB_RF_PARAM_REQ:

Message used to set the Transmit Power level and the channel of operation in the ZigBit USB used for RF Test.

Message ID: <0x5B>

Message payload description:

Field	Type/size	Values	Description
POWER	unsigned integer / 1 byte	0x00-0xFF	Set the Transmit Power level
CHANNEL	unsigned integer / 1 byte	0x00-0xFF	Set the Transceiver Channel

ZIGBITUSB_RF_PARAM_CONFIRM:

Message ID: <0x7B>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

ZIGBITUSB_RFTEST_REQ:

Message used to put ZigBit USB to receive mode in a particular channel.

Message ID: <0x5C>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

ZIGBITUSB_RFTEST_CONFIRM:

Message ID: <0x7C>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

ZIGBITUSB_REGISTER_WRITE_REQ:

Message used to write to the ZigBit Transceiver Register with the given value.

Message ID: <0x5D>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value to be written

ZIGBITUSB_REGISTER_WRITE_CONFIRM:

Message ID: <0x7D>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back

ZIGBITUSB_REGISTER_READ_REQ:

Read the transceiver register value.

Message ID: <0x5E>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be read

ZIGBITUSB_REGISTER_READ_CONFIRM:

Message ID: <0x7E>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be read
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back

ZIGBITUSB_INFO_REQ:

Message used to check whether the ZigBit USB is of correct part number.

Message ID: <0x5F>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

ZIGBITUSB_INFO_CONFIRM:

Message ID: <0x7F>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
DUT_PART_NUM BER	unsigned integer / 1 byte	0x00-0xFF	PART_NUM register value from Transceiver

3.3 Messages for Communication between ATmega256RFR2 Xplained PRO and DUT Containing MCU+Transceiver or SoC

RUN_LOOPTEST_REQ:

Message used to run the GPIO Test involving Pin Short Test and Continuity test on required pins.

Message ID: <0x01>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

RUN_LOOPTEST_CONFIRM:

Message ID: <0x11>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
Pin Combination	Unsigned char[N]	ASCII Characters	String giving the pin shorted. First byte gives the number of char in the string

START_PERF_TEST_REQ:

Message used to start the RF Transmission Test.

Message ID: <0x02>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

START_PERF_TEST_CONFIRM:

Message ID: <0x12>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
TX_RSSI_VALUE	unsigned integer / 1 byte	0x00-0x54	PHY_ED_LEVEL register value from ZigBit USB indicating TX RSSI
RX_RSSI_VALUE	unsigned integer / 1 byte	0x00-0x54	PHY_ED_LEVEL register value from DUT indicating RX RSSI

RUN_HWTEST_REQ:

Message used to run the UART, TWI, and 32kHz tests in case of DUTs containing MCU+Transceiver or SoC.

Message ID: <0x03>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

RUN_HWTEST_CONFIRM:

Message ID: <0x13>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00: SUCCESS 0x01: FAILURE

SET_RFPARAM_REQ:

Message used to set the transmit power level and the operating channel of the transceiver for RF Tests.

Message ID: <0x04>

Message payload description:

Field	Type/size	Values	Description
POWER	unsigned integer / 1 byte	0x00-0xFF	Set the Transmit Power level
CHANNEL	unsigned integer / 1 byte	0x00-0xFF	Set the Transceiver Channel

SET_RFPARAM_CONFIRM:

Message ID: <0x14>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

CRYSTAL_CALIB_REQ:

Message used to set the XTAL TRIM value of DUT.

Message ID: <0x05>

Message payload description:

Field	Type/size	Values	Description
XTAL Trim	unsigned integer / 1 byte	0x00-0xFF	XTAL TRIM to be assigned; Allowed values depends on DUT. Usually from 0x00-0x0F

CRYSTAL_CALIB_CONFIRM:

Message ID: <0x15>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

REG_WRITE_REQ:

Message used to write the given Transceiver Register Address with the given Parameter value.

Message ID: <0x06>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value to be written

REG_WRITE_CONFIRM:

Message ID: <0x16>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address written
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back from DUT

REG_READ_REQ:

Message used to read the given Transceiver Register Address.

Message ID: <0x07>

Message payload description:

Field	Type/size	Values	Description
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address to be read

REGISTER_READ_CONFIRM:

Message ID: <0x17>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
REG_ADDR	unsigned integer / 2 byte	0x0000-0xFFFF	Register Address read
REG_VALUE	unsigned integer / 1 byte	0x00-0xFF	Parameter Value read back from DUT

3.4 Messages for Communication between ATmega256RFR2 Xplained PRO and ATmega1284P of Production XPRO

CURRENT_CONSUMPTION_REQ:

Message used to read the registers of current sensor, INA226 from ATmega1284P.

Message ID: <0x08>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

CURRENT_CONSUMPTION_CONFIRM:

Message ID: <0x18>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x0000-0xFFFF	0x00- SUCCESS 0x01-FAILURE
Bus Voltage	2 byte	0x0000-0xFFFF	Bus voltage measurement data. Actual bus Voltage = 1.25mV * value
Shunt Voltage	2 byte	0x0000-0xFFFF	Shunt voltage measurement data. Actual Shunt Voltage = 2.5 μ V * value
Current Measured	2 byte	0x0000-0xFFFF	Current measured value with MSB first, Actual Current = (value * 100) μ A
Power	2 byte	0x0000-0xFFFF	Power delivered to load= 2.5mW * value
Calib.	2 byte	0x0000-0xFFFF	Calibration register
Mask Enable	2 byte	0x0000-0xFFFF	Alert configuration

ENABLE_DUTPWR_REQ:

Message ID: <0x09>

Message payload description:

Message used to enable the DUT Power from ATmega1284P:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

ENABLE_DUTPWR_CONFIRM:

Message ID: <0x19>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

RUN_CRYSTAL_CALIB_REQ:

Xplained PRO commands the ATmega1284P to run the crystal calibration routine. ATmega1284P runs the calibration routine, chooses an appropriate XTAL TRIM value and responds back. This XTAL TRIM value is then used to change the XOSC_CTRL in DUT.

Message ID: <0x0A>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

RUN_CRYSTAL_CALIB_CONFIRM:

Message ID: <0x1A>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
XTAL_TRIM	unsigned integer / 1 byte	0x00-0xFF	XTAL Trim value to be assigned to DUT next

START_CRYSTAL_CALIB_REQ:

Message used to command ATmega1284P to initialize for calibration.

Message ID: <0x0B>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

START_CRYSTAL_CALIB_CONFIRM:

Message ID: <0x1B>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

READ_CRYSTAL_FREQ_REQ:

Message used to read the frequency of the clock signal given to CLK0 pin of Production XPRO.

Message ID: <0x0C>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

READ_CRYSTAL_FREQ_CONFIRM:

Message ID: <0x1C>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
Crystal frequency	unsigned integer / 4 byte	0x00000000- 0xFFFFFFFF	Actual frequency = Calibration Trim Factor * value. Default calibration trim factor = 1.000065

READ_FREQ_CALIB_REQ:

Message used to read the crystal calibration results from ATmega1284P of Production XPRO.

Message ID: <0x0D>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

READ_FREQ_CALIB_CONFIRM:

Message ID: <0x1D>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
XTAL_TRIM_VALUE	unsigned integer / 1 byte	0x00-0x0F	XTAL_TRIM register value after calibration
FREQUENCY	Unsigned integer/4 bytes	0x00000000 – 0xFFFFFFFF	Actual frequency = value * Calibration Trim Factor measured. Default Trim factor = 1.000065

CLEAR_POWER_ERROR_FLAG_REQ:

Message used to clear the error flag due to over current of DUT in ATmega1284P. It also switches the DUT to OFF state.

Message ID: <0x0E>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

CLEAR_POWER_ERROR_FLAG_CONFIRM:

Message ID: <0x1E>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE

GET_JIG_STATUS_REQ:

Message used to get the status of the fixture lid from the ATmega1284P.

Message ID: <0x0F>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

GET_JIG_STATUS_CONFIRM:

Message ID: <0x1F>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0x01	0x00- SUCCESS 0x01-FAILURE
Fixture Status	unsigned integer / 1 byte	0x00-0x01	0x00- FIXTURE OPEN 0x01- FIXTURE CLOSE

GET_POWER_ERROR_FLAG_REQ:

Message used to get DUT power status from ATmega1284P.

Message ID: <0x10>

Message payload description:

Field	Type/size	Values	Description
Start up parameter	unsigned integer / 1 byte	0x00-0xFF	Start up parameter to identify the request. Default value is 0xAA

GET_POWER_ERROR_FLAG_CONFIRM:

Message ID: <0x20>

Message payload description:

Field	Type/size	Values	Description
Status	unsigned integer / 1 byte	0x00-0xFF	0x00- SUCCESS 0x01-FAILURE
DUT Power Status	unsigned integer / 1 byte	0x00-0xFF	0x00- DUT Powered On 0x01- Over Current by DUT

4. Error Codes

Error code	Value	Description
SUCCESS	0x00	Requested Operation has completed successfully
FAILURE	0x01	Requested Operation has failed
INVALID_CMD	0x02	Invalid Message ID
INVALID_ARGUMENT	0x03	Arguments in the request command are wrong
VALUE_OUT_OF_RANGE	0x04	Parameter value is out of range
TRANSMISSION_FAILURE	0x05	Transmission to ZigBit USB has failed
ERR_BAD_DATA	0xFC	Data integrity check failed
ERR_BUSY	0xF6	Power error flag is set

5. Example Test Sequence

SI no.	Test name	Request to be executed	Comments
1	Set DUT Type	ZBDUT_REQ	DUT type needs to be set before conducting any test
2	Enable DUT Power	PWR_REQ	Power to the DUT should be enabled before conducting the tests
3	Measure the current consumed	PWRM_REQ	Verify the current consumed by DUT
4	GPIO Test	GPIOTEST_REQ	Run pin short and continuity tests on the pins configured in DUT firmware
5	HW Test	HWTEST_REQ	Check UART, SPI, TWI, 32kHz crystal. Not implemented in DUTs containing only RF transceivers
6	Crystal calibration	XTALCALIB_REQ	Run the 16MHz crystal calibration. DUT should generate a 4MHz CLKO to Production XPRO
7	RF Test	ZIGBITUSB_INFO_REQ ZIGBITUSB_RF_PARAM_REQ ZIGBITUSB_RFTEST_REQ RFTEST_REQ RF_PARAM_REQ	Check the ZigBit USB. Configure channel and power in ZigBit USB and DUT. Conduct RF Test. Select the DUT based on the Tx and Rx RSSI values

6. Reference

- WPTR User Guide
- INA226 Current/Power Monitor: <http://www.ti.com/lit/ds/sbos547/sbos547.pdf>

7. Revision History

Doc. Rev.	Date	Comments
42265A	03/2014	Initial document release



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