13.56MHz (NFC) Wireless Charger Modules

BP3621/BP3622 Application Note

This document describes the charging and communication functions, which are the main functions of the BP3621/BP3622 wireless charger modules capable of powering up to 200 mW for NFC communication.

Contents

1. Product overview

The BP3621 (power transmitter module) and BP3622 (power receiver module) are small, board-integrated modules ideal for building wireless power supply systems using a high frequency band of 13.56 MHz. It is easy to install in small equipment, and the back side full flat structure contributes to housing design. In addition, the power transmitter module and the power receiver module have built-in software related to wireless charging and NFC Tag communication and are optimized for efficient charging. By using these in pairs, it is possible to reduce development man-hours such as prototyping, adjustment, evaluation, etc. necessary for optimization of power supply efficiency.

2. Pin function

The BP3621/BP3622 each have a 0.5mm pitch, 8-pin FPC connector as host interface, which can be connected to the user's board via a cable.
The pin functions of BP3621 are as follows.

- SHUTDOWN
  - High: Active when BP3622 detects full charge
  - Low: No Active
  - When SHUTDOWN is active, BP3621 stop power transmission. To restart power transmission, turn on VDD again or input a reset signal.
- RESET
  - High: No Active
  - Low: Active
  - Since RESET is internally connected to a pull-up resistor, there is no need to connect an external pull-up resistor.
- ERROR
  - Hi-Z: No Active
  - Low: Active when an error (Internal Temperature, TX current is abnormal) is detected
  - When ERROR is active, BP3621 stop power transmission. To restart power transmission, turn on VDD again or input a reset signal.
  - When using ERROR, connect an external pull-up resistor.
- INT_S
  - High: No Active
  - Low: Active when an interrupt occurs
  - INT_S is used for the communication function. See 4. Communication function for detailed INT_S specifications.

Table 1 BP3621 pin list

	Pin		I/O	Function	Connections for unused pins
BP3621	1	VDD	I	Power supply (5.0V Input)	-
	2	SHUTDOWN	O	Shutdown request output	Open
	3	RESET	I	Hardware reset input	Open
	4	ERROR	O	Error information output	Open
	5	SDA_S	I/O	I2C serial data access	Open
	6	SCL_S	I	I2C clock	Open
	7	INT_S	O	I2C interrupt information	Open
	8	GND	-	Ground	-

The pin functions of BP3622 are as follows.

- ISO_V
  - ISO_V outputs a reference voltage of the logic pins while BP3622 is receiving power.
  - Note that carrying current from ISO_V will cause BAT output to become unstable.
- RFDET
  - Hi-Z: No Active
  - Low: Active after Power on and finish the initial setting
  - When using RFDET, connect an external pull-up resistor.
  - I2C command control is available after RFDET becomes active.
- P12
  - P12 is internally connected to a pull-up resistor.
  - When “Low” voltage is input to P12, power is output from BAT.
  - When “High” voltage is input to P12 (or P12 is Open), BP3622 sends the shutdown request to BP3621.
- INT_S
  - High: No Active
  - Low: Active when an interrupt occurs
  - INT_S is used for the communication function. See 4. Communication function for detailed INT_S specifications.

Table 2 BP3622 pin list

	Pin		I/O	Function	Connections for unused pins
BP3622	1	ISO_V	-	Logic IO voltage	Open
	2	RFDET	O	RF signal detection output	Open
	3	P12	I	Charger IC status input	GND
	4	SDA_S	I/O	I2C serial data access	Open
	5	SCL_S	I	I2C clock	Open
	6	BAT	O	Power output	-
	7	INT_S	O	I2C interrupt information	Open
	8	GND	-	Ground	-

3. Charging function

Energize the BP3621, face the BP3622, and start charging at 10 mm distance. During power supply, charging is stopped about once every minute, and the status is checked between power transmitter and power receiver.

3.1. Examples of connection circuits

The BP3621 can be operated simply by connecting VDD and GND. When the opposing BP3622 is powered, it outputs a voltage from the BAT pin. The connection with the BP3622 connects BAT, GND and P12, which is the status signal for charge control. P12 continues to output from the BAT pin for "L" and notifies BP3621 to stop powering when it reaches "H".

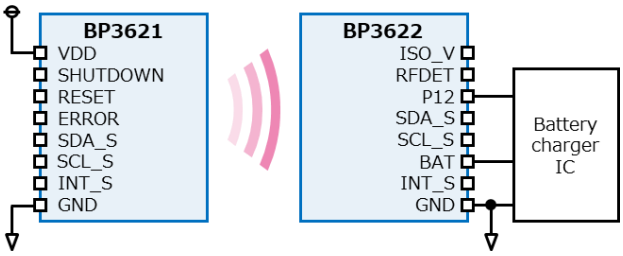


Figure 1 Example of connection circuit (only power supply function)

3.2. Power supply range

This product is adjusted so that power supply is most efficiently when the antenna center is aligned and the distance between the antennas is 10 mm. Please refer to the data sheet for the range that can be supplied with this product. Because the range of power can be supplied varies depending on the load, it is important to carefully evaluate the positional relationship between the required amount of power supply.

3.3. Behavior when the operating range is exceeded (power supply adjustment)

The BP3622 defines the operating range with a load resistance value. If the load current is large (the load resistance is small), the output voltage may be less than the specified value. At that time, adjust the power transmission from BP3622 to BP3621. This behavior is called power supply adjustment, and it may be repeated multiple times until the output voltage stabilizes. In addition, if the output voltage is not stable even after multiple power supply adjustments are performed, the BP3621 stops power transmission and makes an error. In that case, the load current should be adjusted because it is not in a stable output state.

3.4. Timing chart

The timing chart is described for basic power supply operation. The power supply operation begins with the VDD input, and outputs from BAT. The behavior of each terminal from the P12 opening at full charge to the charging stop and SHUTDOWN notification is as follows.

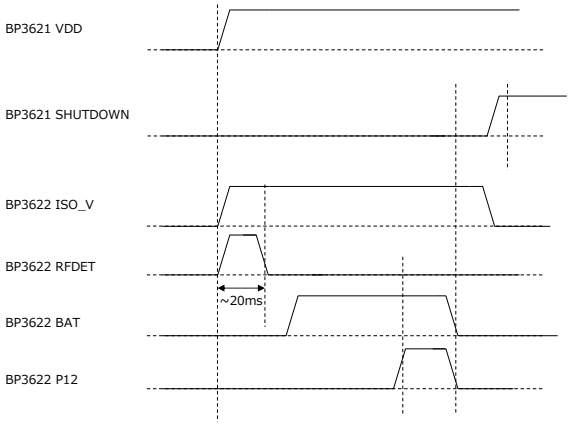


Figure 2 Timing chart (power supply operation)

The behavior when an error occurs during charging is as follows.

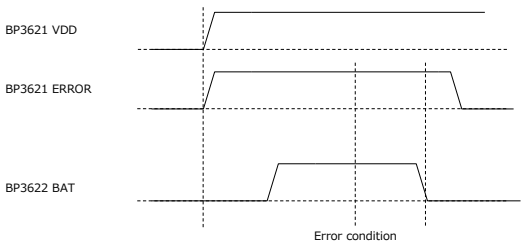


Figure 3 Timing chart (error occurs)

4. Communication function

The BP3621 and BP3622 are equipped with an I2C slave function, and data can be exchanged between the BP3621 and BP3622 by issuing a command from the I2C master. The wireless communication speed of the modules is 212 kbps, and it is possible to transmit up to 256 bytes with one transmission. In addition, since BP3622 supports NFC Type3 tag communication, tag information can be read from NFC readers such as smartphones.

The interface specification is as follows.

・Connection

I2C Slave + Interrupt signal. It is also possible to control without using the Interrupt signal.

・Interrupt signal

Interrupt signal is INT_S of BP3621/BP3622. Interrupt signal is negative logic level output. Clear the interrupt signal by reading INTREQ0 from the host processor

・SCLK

Max 400KHz

・Slave address

BP3621/BP3622 are only 0x17(0b0010111x)

4.1. Reference circuit

A host MCU is required for each of BP3621 and BP3622. The MCU connects SDA_S, SCL_S and INT_S. Also, since the BP3622 operates at 5V, it is necessary to insert a level shifter if the MCU is not operating at 5V.

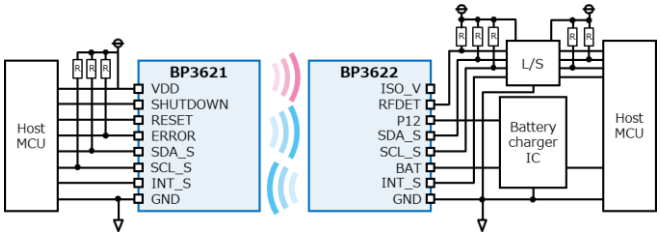


Figure 4 reference circuit (communication)

4.2. Control registers

The register used by the host processor for host command control is as follows. Register specifications are common to BP3621/BP3622.

Table 3 List of registers

Address	Register Name	Symbol	Read/ Write
0x00	Configuration register	CFG	Write
0x02	Interrupt Mask register0	INTMSK0	Write
0x10	FIFO register (Write)	PAYLOAD	Write
0x20	Parameter register09	PRM9	Write
:	:	:	Write
0x29	Parameter register00	PRM0	Write
0x2A	Entry register	ENT	Write
0x89	Status register	STATUS	Read
0x8A	Error Code register0	ERROR0	Read
0x8B	Error Code register1	ERROR1	Read
0x8C	Interrupt Request register0	INTREQ0	Read
0x90	FIFO register (Read)	PAYLOAD	Read
0xC0	Result register 00	RSLT00	Read
:	:	:	Read
0xCF	Result Register 0F	RSLT0F	Read

4.2.1. CFG

Please set 0x04. The host connected to the BP3622 needs to know whether the BP3622 receives RF field from the BP3621. Therefore, RF field detection signal (RFDET of BP3622) is required. It is necessary to set it every time it detects the RF field detection signal.

4.2.2. INTMASK0

To generate an interrupt signal (INT_S), set the corresponding bit to 0. The meaning of the bit is the same as INTREQ0. It is necessary to set it every time it detects the RF field detection signal.

Table4 List of interrupt source

INTMASK0	Meaning	Note
0b00000001	Host Command	Occur when host Command processing is completed
0b00000010	General-purpose communication notification (BP3622 only)	Occurs when a send or receive command is executed.
0b00000100	Charge control state	Tag search → Low Current Low Current → Tag Search Tag search → Charging Charging → Tag search Charging → Full charge Charging → Low Current Full charge → Charging Occurred due to the above state transition. It can be confirmed by reading the status register.
0b00001000	Reserve	Reserve
0b00010000	General-purpose communication pre-setting	After "General-purpose communication send" is executed, it occurs when PRM and PAYLOAD are released.
0b00100000	Reserve	Reserve
0b01000000	Reserve	Reserve
0b10000000	Reserve	Reserve

4.2.3. STATUS

The internal state of the firmware is set. The internal state is shown below. This is read only register.

Table 5 List of internal state

STATUS	Meaning	Note
Bit0-2	Charge control state	0b000: Tag search or charge control invalid (tag only in case of BP3622) 0b001: Charging 0b010: Full charge (BP3621 only) 0b011: Full charge, Low current state (BP3621 only) 0b100: Tag not found, Low current state (BP3621 only) 0b101: Abnormal stop 0b110: Misalignment stop (BP3621 only)
Bit3-6	Reserve	Reserve
Bit7	Processing of general-purpose communication request	Only BP3622 is used for internal processing. Occurs when a send or receive command is requested from the module. "General-purpose communication ACK/NACK Command" or "General-purpose communication reception data acquisition command" Cleared when it is executed.

Note: When the value is 0xFE, the system is initializing. At this value host command cannot be executed.

4.2.4. INTREQ0

Interrupt sources are set. The meaning of the bit is the same as INTMASK0.

- When emergency stop (INTREQ0=0×FF) is set, INTREQ0 is not cleared unless reset (RESET_N pin or power-on reset) is performed.
- The value is 'or' operation
- An interrupt signal is generated only at the bit cleared by the interrupt mask register (INTMASK0). Even when masked, the value of ITNREQ0 is updated.

4.2.5. EEROR0, ERROR1

Error code of host command execution result. ERROR0 is 0-7 bits, and ERROR1 is 8-15 bits. This is read only register.

Table 6 List of error code

Error code	Meaning	Note
0x0000	No error	-
0x0001	Command execute error	-
0x0002	Invalid parameter	-
0x0003	Command not found	-
0x0004	Tag not found	-

4.2.6. PAYLOAD

This is a 256-byte FIFO that stores the execution result and the Parameter. Read and write can be performed only when the Host Command is not running.

The RP in the figure below is the position of the data to be extracted when reading. WP is the position of the data to be written when writing.
If 1byte is read, RP is incremented by 1byte. If continuous reading is done, RP will be incremented by the number of accessed bytes. Similarly, for WP, 1byte write increments WP by 1byte, and if WP is written continuously, WP will be incremented by the number of written bytes. Both return to 0x00 after 0xFF. Also, when Execute the command, WP and RP will return to 0x00. It cannot be accessed during command execution.

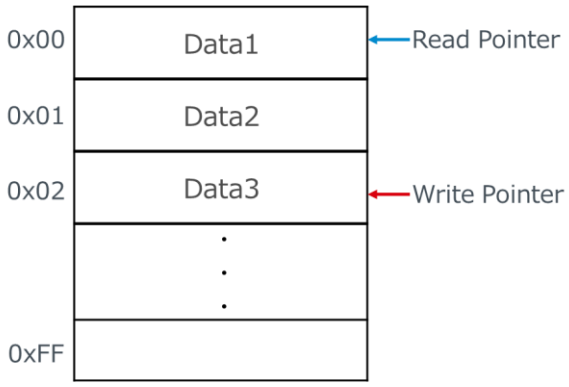


Figure 5 Read pointer, Write pointer

4.2.7. PRM0 to PRM9

Parameter to send to BP3621/BP3622. Writing is prohibited while the command is being executed. Completion of command execution reads INTREQ0. Indicates the end of command processing when the 0th bit becomes 1.

4.2.8. ENT

Set 0x01, the BP3621/BP3622 executes the command. It returns to 0x00 when Command execution is completed.

4.2.9. RSLT00 to RSLT0F

The execution result of Host Command is stored. This is read only register.

4.3. Command control sequence

The control sequence is shown below.

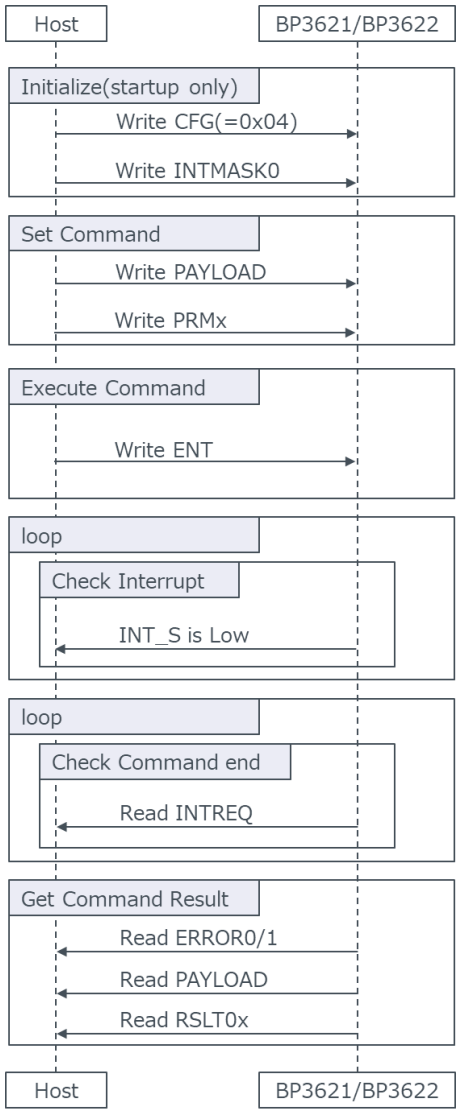


Figure 6 control sequence

The description of each group in the sequence is below.

Table 7 Sequence description

group	説明
Initialize	Initialize the configuration register (INTMSK0) and the interrupt mask register (CFG). This process can be omitted after the first time.
Set Command	Set the payload (PAYLOAD) and Parameter register (PRM).
Execute Command	Execute Command written with Set Command.
Check Interrupt	It is optional. When interrupt is enabled INT_S goes low when Command is completed.
Check Command End	Read the INTREQ0. When the 0bit becomes 1, It indicates the end of Command processing. The INTREQ0 is a read clear register. If you read the value other than 0x00 and read it again, the value will be 0x00. The maximum execution time of Command is 1 second.
Get Command Result	Get the result of Command. The result is stored in the payload register (PAYLOAD), Result register (RSLT), Error code register (ERROR).

4.4. Command list

The commands supported by BP3621 / BP3622 are as follows. If the information required for each command is stored in the parameter register (PRM0-9) and FIFO register (PAYLOAD) and then executed, the contents corresponding to the command will be executed. The executed result is stored in the error code register (ERROR0/1), result register (RSLT00-0F), and FIFO register (PAYLOAD).

Table 8 List of command

Command code (PRM0)	Meaning	Corresponding module
0x03	Setup	BP3621
0x06	T3T data Read	BP3621
0x07	T3T data Write	BP3621
0x08	T3T Polling	BP3621
0x09	Reset	BP3621
0x10	General-purpose communication send	BP3621
0x11	General-purpose communication get data	BP3622
0x12	General-purpose communication set ACK/NACK	BP3622
0x13	General-purpose communication receive	BP3621
0x14	General-purpose communication receive data setting	BP3622

4.4.1. Setup

- Explanation

  Reset the BP3621/BP3622 and re-execute charge control.

- Command (PRM0)

  0x03

- Parameter

  ✓ PRM1
  0x00: Stop charging control
  0x01: Reset the BP3621/BP3622
  0x02: None
  0x03: Redo the charge control
  0x04: Reset the BP3622 and stop the charge control

- Error (ERROR0 | (ERROR1 << 8))

  None

- Result

  None

4.4.2. T3T data Read

- Explanation

  Read Type3 Tag. Only one block can be read.

- Command (PRM0)

  0x06

- Parameter

  - ✓ PRM1
    Block number (0 to 30)
  - ✓ PRM2
    Reserved (setting is ignored)
  - ✓ PRM3
    0: Send Polling Command and keep IDM internally
    1: Do not send Polling Command, use IDM obtained last

- Error (ERROR0 | (ERROR1 << 8))

  0x0001: Read failed
  0x0004: Tag not found

- Result

  - ✓ Success
    PAYLOAD[0] to PAYLOAD[15]: Block data
  - ✓ Error (0x0001: Read failed)
    PAYLOAD[0]: Status Flag1
    PAYLOAD[1]: Status Flag2

4.4.3. T3T data Write

- Explanation

  Write Type3 Tag. Only one block can be written.

- Command (PRM0)

  0x07

- Parameter

  - ✓ PRM1
    Block number (0 to 30)
  - ✓ PRM2
    Reserved (setting is ignored)
  - ✓ PRM3
    0: Send Polling Command and keep IDM internally
    1: Do not send Polling Command, use IDM obtained last
  - ✓ Write block data
    PAYLOAD[0] to PAYLOAD[15]

- Error (ERROR0 | (ERROR1 << 8))

  0x0001: Write failed
  0x0004: Tag not found

- Result

  - ✓ Error (0x0001: Write failed)
    PAYLOAD[0]: Status Flag1
    PAYLOAD[1]: Status Flag2

4.4.4. T3T Polling

- Explanation

  Send Polling Command

- Command (PRM0)

  0x08

- Parameter

  ✓ PRM1
  Send count (1 to 255)

- Error (ERROR0 | (ERROR1 << 8))

  None

- Result

  PAYLOAD[0]: Number of successes
  PAYLOAD[1]: Maximum of Time Slot Number
  PAYLOAD[2] to [9]: Last IDM acquired

4.4.5. Reset

- Explanation

  Reset BP3621 and BP3622

- Command (PRM0)

  0x09

- Parameter

  ✓ PRM1
  0x00: Reset the BP3622 by turning off the RF field for 100ms
  0x01: Reset the BP3621. Since the RF field also turns off, the BP3622 is also reset
  0x02 to 0xFF: None

- Error (ERROR0 |(ERROR1 << 8))

  None

- Result

  None

4.4.6. General-purpose communication send

- Explanation

  Packet data is transmitted from the host connected to the BP3621 to the host connected to the BP3622. In this Command, the interrupt cause "general-purpose communication pre-setting" occurs. Thereafter, PRM0 to PRM9, PAYLOAD can be set even during command processing.

  When transmission of packet data is completed, the BP3622 notifies the host connected to the BP3622 by interrupt. Wait for this host to transmit "general communication ACK / NACK" or "general communication reception data setting" command. This command completes upon receipt of these commands.

- Command (PRM0)

  0x10

- Parameter

  ✓ PRM1
  Payload size to send. Set the actual size minus 1 (0 to 255)
  ✓ PRM2 to 9
  Header information
  ✓ PAYLOAD[0] to PAYLOAD[255]
  Payload

- Error (ERROR0 | (ERROR1 << 8))

  0x0001: Send failed
  0x0004: Send timeout

- Result

  ✓ Error (0x0001: Send failed)
  RSLT00: Status Flag1
  RSLT01: Status Flag2

4.4.7. General-purpose communication get data

- Explanation

  Acquires packet data transmitted by “General-purpose communication send” from BP3622

- Command (PRM0)

  0x11

- Parameter

  None

- Error (ERROR0 | (ERROR1 << 8))

  None

- Result

  ✓ RSLT00
  0x00:
  Receive general-purpose communication send request from BP3621
  0x01:
  Receive general-purpose communication receive quest from BP3621
  ✓ RSLT01
  Reserved. PRM1 value of data reception command is stored
  ✓ RSLT02 to RSLT09
  Header information
  ✓ PAYLOAD[0] to PAYLOAD[255]
  The send data is stored only when a “general-purpose communication send” request is received from the BP3621

4.4.8. General-purpose communication set ACK/NACK

- Explanation

  BP3622 send ACK/NACK to BP3621

- Command (PRM0)

  0x12

- Parameter

  ✓ PRM1
  0x00: ACK
  0x01: NACK. If NACK is set, transmission fails when BP3621 is transmitting. Receipt fails at reception. 0x01 is set for both Status Flag 1 and Status Flag 2.

- Error (ERROR0 | (ERROR1 << 8))

  None

- Result

  None

4.4.9. General-purpose communication receive

- Explanation

  Request and receive packet data reception from the host connected to the BP3621 to the host connected to the BP3622.

  When transmission of packet request, the BP3622 notifies the host connected to the BP3622 by interrupt. Wait for this host to transmit "general communication ACK / NACK" or "general communication reception data setting" command. This command completes upon receipt of these commands.

- Command (PRM0)

  0x13

- Parameter

  ✓ PRM1
  Reserved
  ✓ PRM2 to PRM9
  Header information

- Error (ERROR0 | (ERROR1 << 8))

  0x0001: Receive failed
  0x0004: Timeout

- Result

  Successes
  ✓ PAYLOAD[0] to PAYLOAD[255]: Payload data
  ✓ RSLT00: Payload size. Set the actual size minus 1 (0 to 255)
  ✓ RSLT01 to RSLT08: Header information

  Error (0x0001: Read failed)
  ✓ RSLT00: Status Flag1
  ✓ RSLT01: Status Flag2

4.4.10. General-purpose communication receive data setting

- Explanation

  Set packet data to send to BP3621 from BP3622

- Command (PRM0)

  0x14

- Parameter

  ✓ PRM1
  Payload size. Set the actual size minus 1 (0 to 255)
  ✓ PRM2 to PRM9
  Header information
  ✓ PAYLOAD[0] to [255]
  Payload data

- Error (ERROR0 | (ERROR1 << 8))

  None

- Result

  None

4.5. About Status Flag

Status Flag indicates Error when Fag1 is other than 0x00. The meaning of Error is shown below.

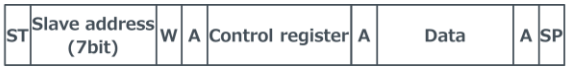
Table 9 Status Flag List

Flag1	Flag2	Meaning
0x01	0x01	Incorrect block list
0x01	0x02	Incorrect number of blocks
0x01	0x03	Block data write failure Note: This error is returned even when writing to the locked area is performed. However, if the same data as the written data is written, judge it to be normal.
0x01	0x04	Block data write CRC Error
0x01	0x05	Block data write voltage low
0x01	0x00	Other errors

4.6. Data structure of I2C communication

4.6.1. I2C data write

When writing, put “0” which is Write, in the least significant bit of the slave address and issue the command.



ST: Start Condition
W: Write
A: Ack
SP: Stop Condition

Figure 7 Data structure at write time

It also supports continuous writing, and the control register is automatically incremented to the next address value except for FIFO. The FIFO register (PAYLOAD) writes data in the FIFO register when writing continuously.

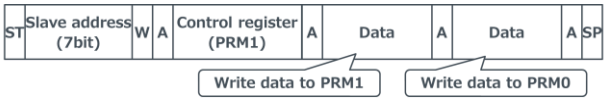


Figure 8 Data structure for continuous writing (Data writing to PRM1,0)

4.6.2. I2C data read

When reading, write to the control register and then issue a restart condition to read. When reading, put "1" which is Read, in the least significant bit of the slave address and issue the command.

ST: Start Condition
W: Write
R: Read
RS: Re-start Condition
A: Ack
NA: Nack
SP: Stop Condition

Figure 9 Data structure at read time

It also supports continuous reads, and the control register is automatically incremented to the next address value except for FIFO. When the FIFO register (PAYLOAD) is continuously read, the data is read in the FIFO register.

Figure 10 Data structure for continuous reading (Reading data from RSLT00,01)

4.7. General-purpose communication control

General-purpose communication is a function to perform synchronous / asynchronous communication of half duplex communication with BP3621 as a master by NFC Type 3 Tag communication. There are two methods for communication: normal communication and high-speed communication. The sending / receiving unit is one packet (8 bytes header, maximum payload of 256 bytes).

4.7.1. Normal communication

Normal communication controls host commands as follows.

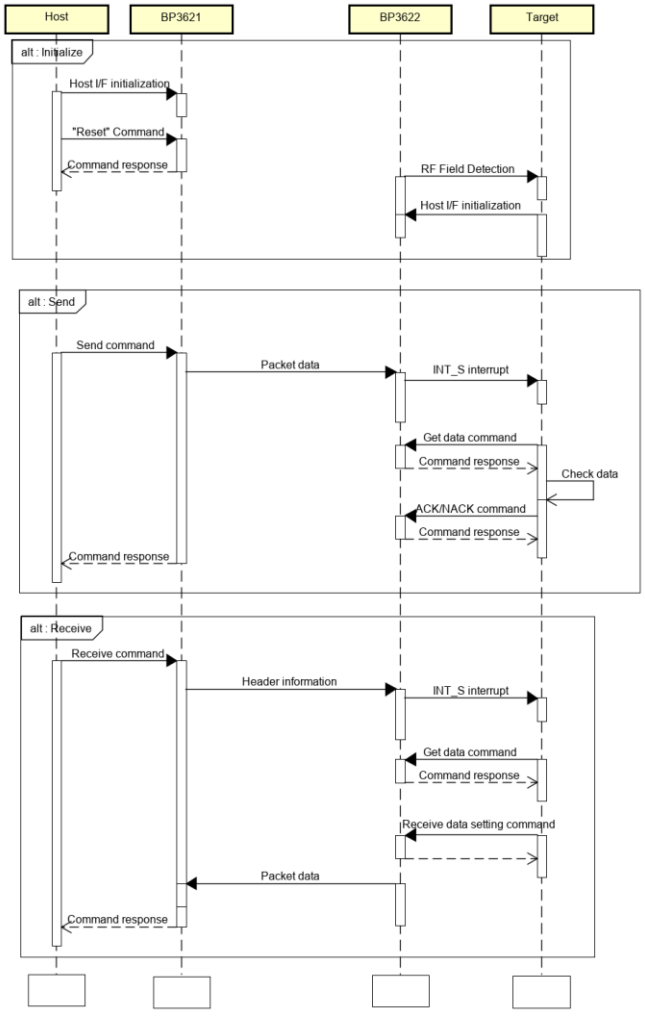


Figure 11 Normal communication sequence

Note: "Command" indicates that Host has set ENT = 1. "Command response" indicates that the BP362x has set ENT = 0 or the interrupt signal (INT_S) = Low.

4.7.2. High speed communication

High-speed communication controls host commands as follows. The send command notifies the host of the pre-set interrupt. The host can set PAYLOAD and PRM of the next transmission command after the pre-set interrupt. As a result, host communication can be parallelized with BP3621 communication. Although host control becomes complicated, high-speed communication is possible compared with normal communication.

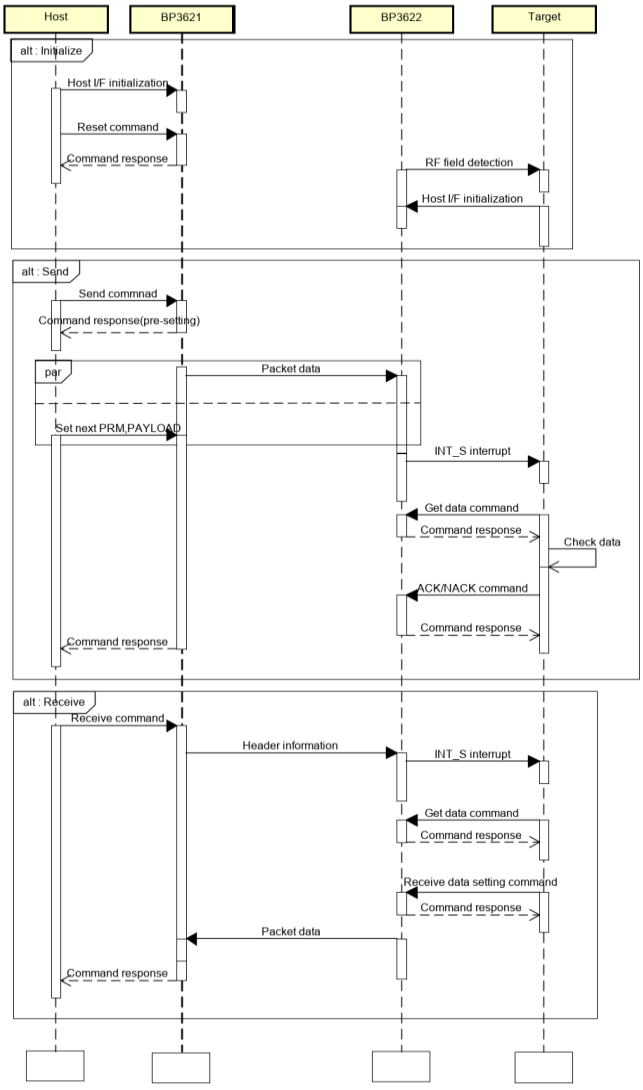


Figure 12 High speed communication sequence

Note: "Command" indicates that Host has set ENT = 1. "Command response" indicates that the BP362x has set ENT = 0 or the interrupt signal (INT_S) = Low.

5. How to use, and Installation

This chapter describes the basic use of this product.

5.1. Installation of this product

1. Align the antenna centerline of the power transmitter module BP3621 with the antenna centerline of the power receiver module BP3622, and install them horizontally and at a distance between the antennas during power supply and communication at 10 mm. Also, do not place metal or magnetic materials around the antenna.

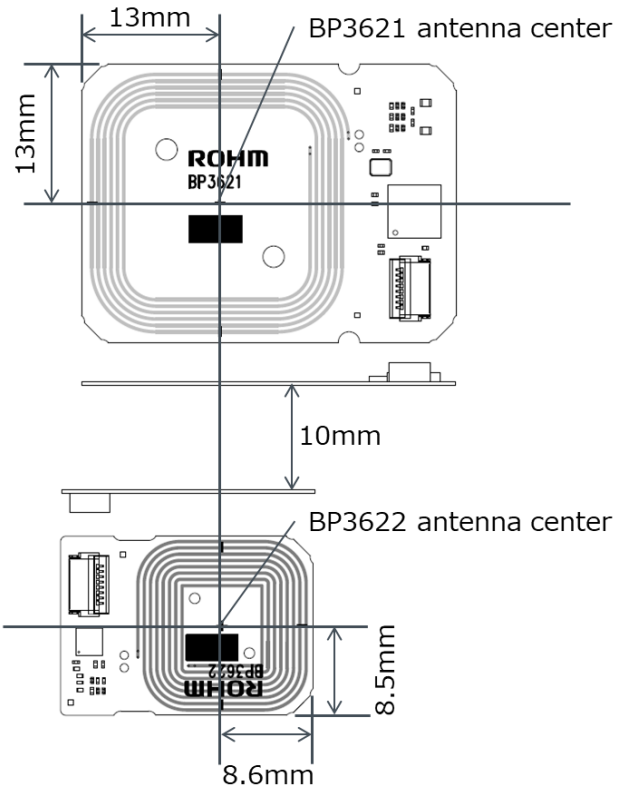


Figure 13 BP3621 and BP3622 positions

2. To prevent the product from moving in the customer's product, please fix it on the customer's product with double-sided tape or screws. Be careful not to hold down the mounting parts of this product from above when fixing. When using screws, use a resin screw and be careful not to damage the substrate by tightening too strongly.

5.2. About flex cable connection

The BP3621/BP3622 interface uses HIROSE FH34SRJ-8S-0.5SH (50). FH34SRJ-8S-0.5SH (50) has a pitch of 0.5mm, 1.0mm high, both upper and lower contacts backflip type FPC (Flexible printed circuit) / FFC (Flexible Flat Cable) connector.

How to insert FPC and FFC

1. Note that the flip (actuator) of the connector has increased before inserting the FPC /FFC (hereinafter referred to as the flex cable). If the flip is down, raise the flip before inserting the flex cable. If you try to insert the flex cable while the flip is lowered, the connector or cable may be damaged.

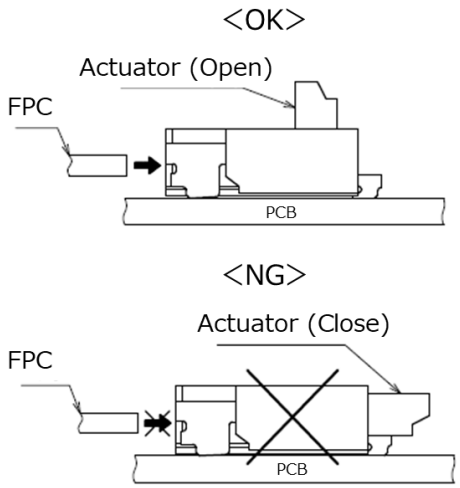


Figure 14 Flex cable insertion and actuators

2. When inserting flex cable into the connector, insert the cable vertically toward the connector insertion port instead of diagonally. Insert horizontally against the board surface. Also, please insert it to the back surely.

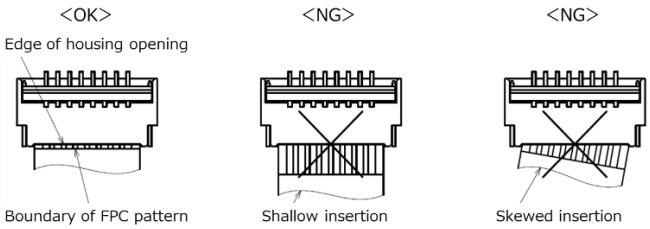


Figure 15 Example of flex cable insertion

3. When the flex cable is inserted all the way into the connector, press down to rotate the flip. Make sure the flip is going down. Also, be careful not to touch other mounting parts when rotating the flip.
   The flip is lowered, which electrically connects and locks gripping the cable.

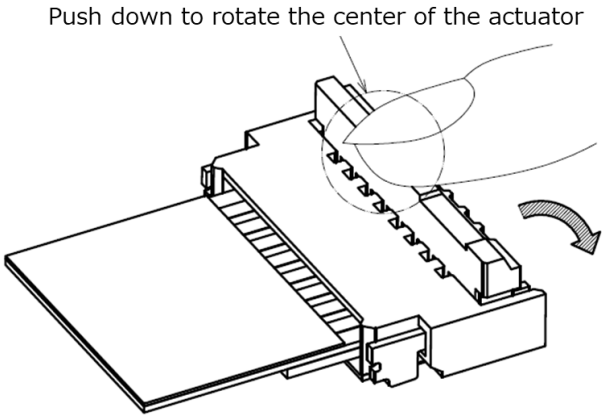


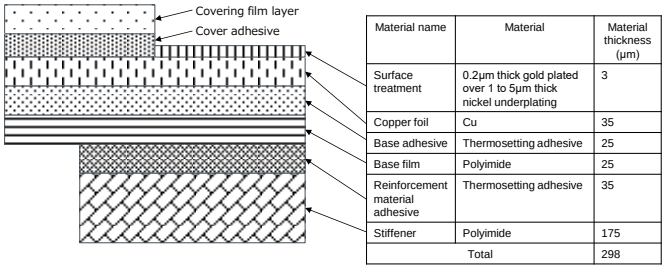
Figure 16 Locking flex cables

4. When pulling out the flex cable, use the opposite procedure from the insertion procedure, first jump up the flip and push it up slowly. After unlocking, pull out the flex cable straight. This connector is not expected to be inserted or removed multiple times. The number of insertions and removals should be less than 10 times.
   When pulling the flex cable around, be careful not to apply a load in the connector to the pull, insert, or laterally.

5.3. Flex cable specifications

The recommended specifications for flex cable are as follows.

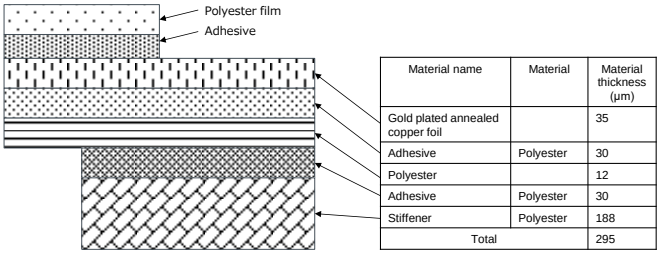
1. Single-sided FPC



Material name	Material	Material thickness (μm)
Surface treatment	0.2μm thick gold plated over 1 to 5μm thick nickel underplating	3
Copper foil	Cu	35
Base adhesive	Thermosetting adhesive	25
Base film	Polyimide	25
Reinforcement material adhesive	Thermosetting adhesive	35
Stiffener	Polyimide	175
Total		298

Figure 17 Recommended specifications for single-sided FPC

2. FFC



Material name	Material	Material thickness (μm)
Gold plated annealed copper foil		35
Adhesive	Polyester	30
Polyester		12
Adhesive	Polyester	30
Stiffener	Polyester	188
Total		295

Figure 18 FFC Recommended Specifications

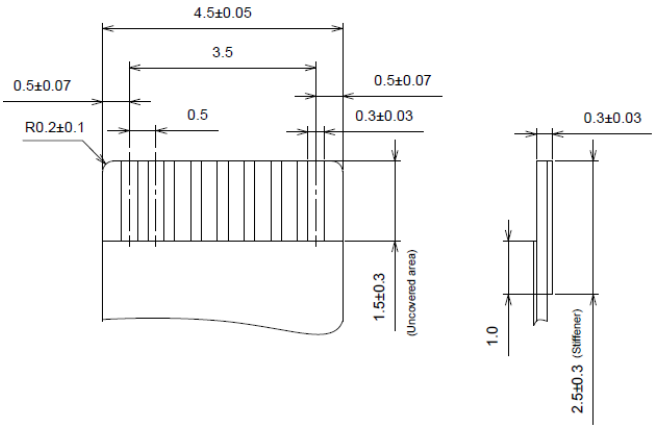


Figure 19 Flex cable dimension

6. Precautions for use

This chapter describes precautions for using this product.

- BP3621 and BP3622 must be located horizontally when charging. Please design your product. If the antenna is located diagonally, the original power supply performance may not be obtained.
- Do not apply stresses such as pulling to the flex cable inserted into the flex connector.
- Be sure to use the flaps on the flex connector with the flaps turned off. Electrical conduction is not obtained when the flaps are raised.
- Do not allow metal bodies such as Mg alloys, Fe, or Al to approach the antenna area. There is a case that power supply cannot be done.
- Keep magnets and other magnetic materials away from the antenna. There is a case that power supply cannot be done.
- Please use it after sufficient evaluation by vibration test etc. whether there is a problem with the fixing method of this product in the customer product.
- Do not remove this product once affixed with double-sided tape. If you try to peel it off from double-sided tape forcibly, it may cause damage.
- When fixing this product to the customer product using adhesives, etc., please use it after sufficient evaluation under the customer's responsibility.
- The BP3621 generates heat around IC during power supply, so design heat dissipation. When the IC surface temperature exceeds 100ºC, the output stops automatically.
- The BP3621/BP3622 have a board thickness of 0.4 mm, which is thinner than typical substrates. If excessive stress is applied to the substrate, it may cause damage to the board and damage to the mounting parts, so be careful when handling.
- This product is designed for one-to-one power supply. Please note that it does not support simultaneous power supply of multiple units.
- In Japan, this product is not covered by the Radio Law, but it may be applicable in other countries. If you are considering using it in other countries, please contact us in advance or contact the radio law certification agency.
- Please note that this product can be rewritten by I2C communication, but if it is arbitrarily rewritten from the config settings shipped by our company, it is not covered by the product warranty.

7. Revision history

Ver.	Date	Revised content
1.0.0 (Rev.001)	2021/10/27	Initial revision
1.0.1 (Rev.002)	2022/4/11	“4. Communication function” - Added “4.6. Data structure of I2C communication” - Updated overall errors and appearance “5. How to use, and Installation” - Added Figure: Flex cable dimension

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.

4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

6) The Products specified in this document are not designed to be radiation tolerant.

7) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

8) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

9) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.

10) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.

11) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.

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