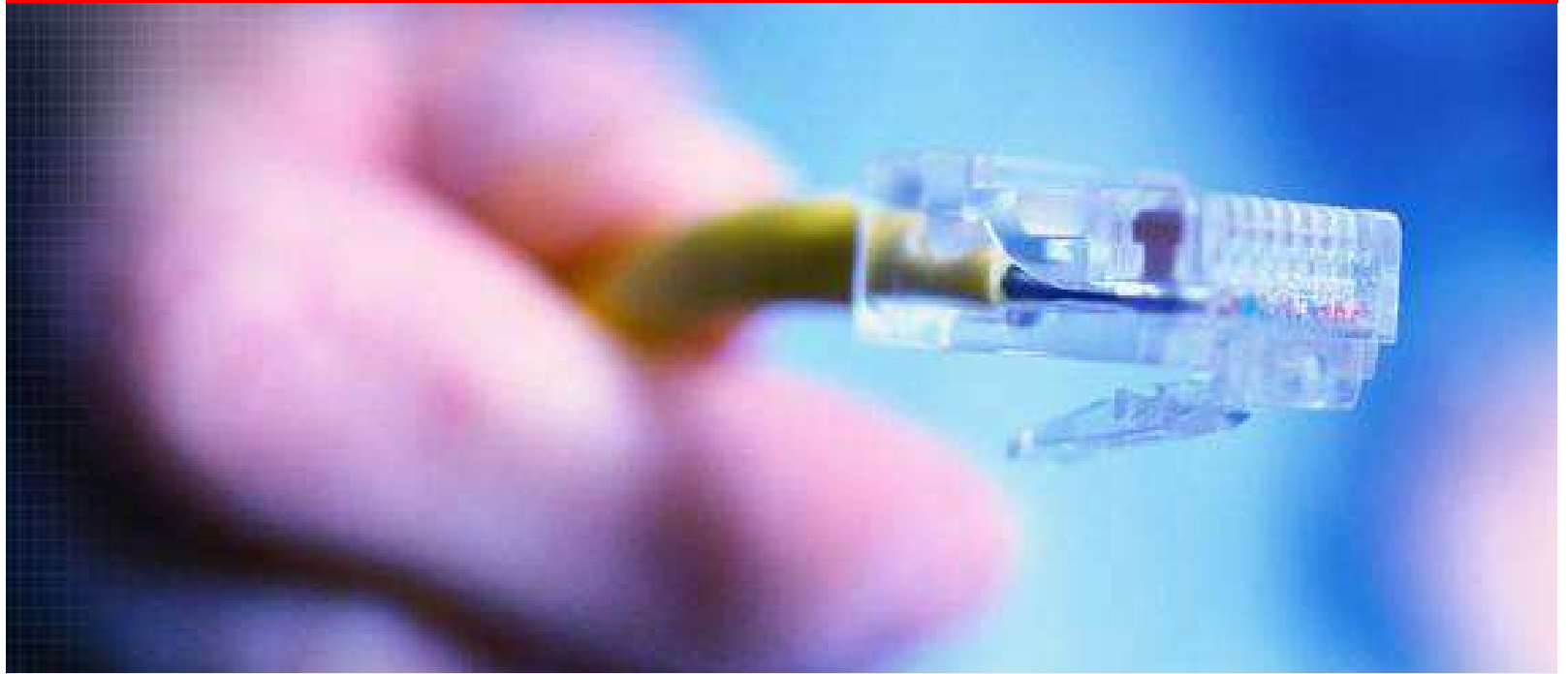
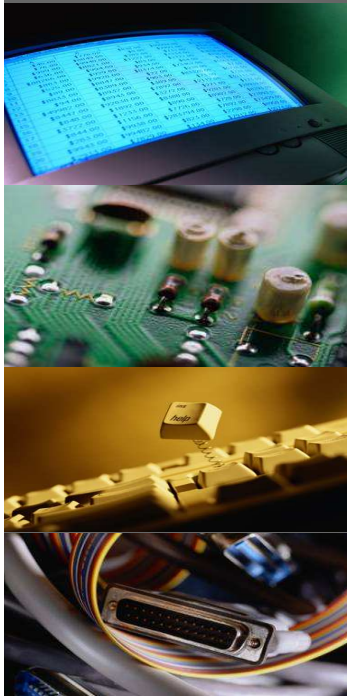


# Guide Book for L7P (Communication Protocol)

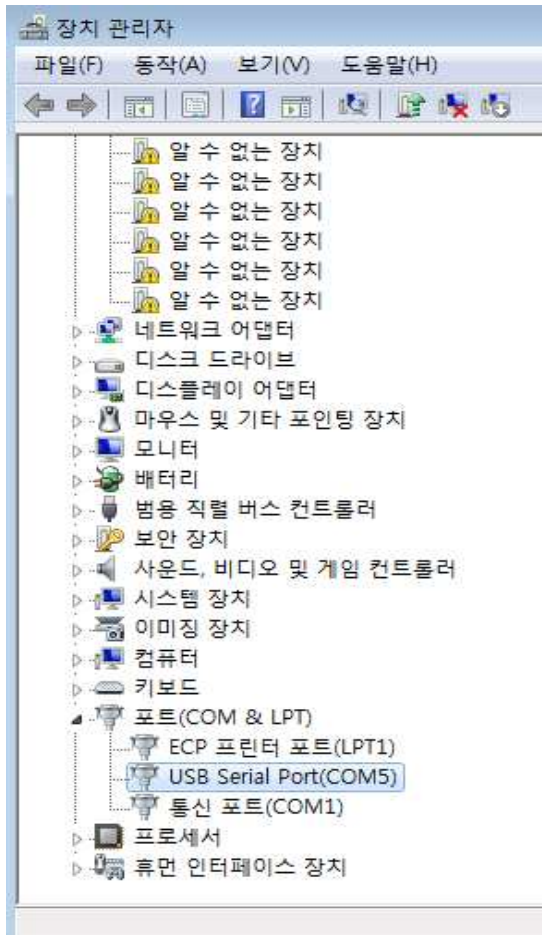


24.July,2015  
LS Mecapion

- ▶ L7P Servo drive uses RS-422 serial communication by connecting it to a PC or an upper controller. Need communication converter to use PC.
- ▶ You can also operate or handle communication of up to 32 axes by connecting multiple L7P servo drives via a multi-drop method.



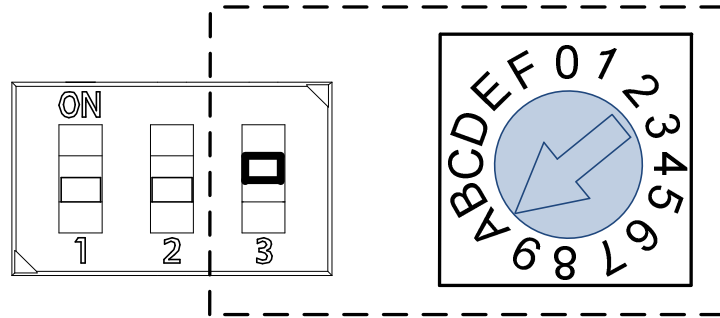
- ▶ In the case of using PC for upper controller, After checking Serial port at device manager, the Baud Rate (0x3002) & (Node ID, Using Node switch) in Drive. Set it in communication program



- ▶ In the case of abnormal communication access,
  - 1) Check Serial Port
  - 2) Baud rate(0x3002) of Drive
  - 3) Node ID (Node switch)

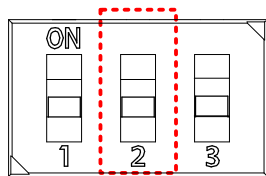
## Communication protocol overview

## Communication protocol



Node address could be set up to 31 using one dip switch and one rotary switch.

Node address is 26  
= 16(Dip switch 3 is ON) + 10(Rotary switch is A)



Termination resistor S/W  
(OFF: Not use, ON: Use)

L7P drive provide built-in 120 ohm termination resistor for RS-422 communication. Last drive of the communication line need a termination.

## Communication protocol overview

## Communication protocol

- 0x05 Write Single Coil
  - Set a SV\_ON(enable drive) bit of address 1 drive

Request : Master → Slave

|     | Slave Addr. | Function Code | Output Address |     | Output Value |     | CRC |    |
|-----|-------------|---------------|----------------|-----|--------------|-----|-----|----|
|     |             |               | High           | Low | High         | Low |     |    |
| Hex | 1           | 05            | 00             | 0C  | FF           | 00  | Lo  | Hi |

Response : Master ← Slave

|     | Slave Addr. | Function Code | Output Address |     | Output Value |     | CRC |    |
|-----|-------------|---------------|----------------|-----|--------------|-----|-----|----|
|     |             |               | High           | Low | High         | Low |     |    |
| Hex | 1           | 05            | 00             | 00  | FF           | 00  | Lo  | Hi |

## Communication protocol overview

## Communication protocol

- 0x01 Read Coils
  - Read a ALARM(servo alarm) bit of address 1 drive

Request : Master → Slave

|     | Slave Addr. | Function Code | Register Address |     | Quantity of Outputs |     | CRC |    |
|-----|-------------|---------------|------------------|-----|---------------------|-----|-----|----|
|     |             |               | High             | Low | High                | Low |     |    |
| Hex | 1           | 01            | 00               | 21  | 00                  | 01  | Lo  | Hi |

Response : Master ← Slave

|     | Slave Addr. | Function Code | Register Address |     | Quantity of Outputs |     | CRC |    |
|-----|-------------|---------------|------------------|-----|---------------------|-----|-----|----|
|     |             |               | High             | Low | High                | Low |     |    |
| Hex | 1           | 01            | 00               | 20  | 00                  | 01  | Lo  | Hi |

## Communication protocol overview

## Communication protocol

| LS메카피온 L7P INDEXER Series Servo Drive |             |         |       |         |       |       |
|---------------------------------------|-------------|---------|-------|---------|-------|-------|
| Monitoring                            | Axis1       | UNIT    | 출력신호  |         |       |       |
| Command Position                      | -1234567890 | [um]    | BRAKE | ALARM   | READY |       |
| Feedback Position                     | -1234567890 | [um]    | ZSPD  | INPOS1  | ORG   |       |
| Command Speed                         | -12345      | [rpm]   | EOS   |         |       |       |
| Feedback Speed                        | -12345      | [rpm]   | IOUT0 | IOUT1   | IOUT2 |       |
|                                       |             |         | IOUT3 | IOUT4   | IOUT5 |       |
| SVON                                  | I-START     | H-START | A-RST | J-START | J-DIR | PAUSE |
| ISEL0                                 | ISEL1       | ISEL2   | ISEL3 | ISEL4   | ISEL5 | REGT  |

### Communication address For Monitoring

- Command Position (Position demand value) : 24586, Size (32 bit)
- Feedback Position (Position Actual value) : 24590, Size (32 bit)
- Command Speed : 9729(Decimal), Size (16 bit)
- Feedback Speed : 9728(Decimal), Size (16 bit)

▶ Address setting in HMI : To set Address 'X', Set the address 'X+1' in HMI because recognizes address -1

EX) Servo address : 100, Set the address in HMI : 101

## ► Communication address For Input signals

| communication address |             | parameter name        | parameter No. | Variable Format | Default Value | Min | Max    | Unit | Accessibility |
|-----------------------|-------------|-----------------------|---------------|-----------------|---------------|-----|--------|------|---------------|
| decimal               | hexadecimal |                       |               |                 |               |     |        |      |               |
| 8481                  | 0x2121      | Drive Status Output 1 | 0x2121        | UINT            | 0             | 0   | 0xFFFF | -    | RO            |
| 8482                  | 0x2122      | Drive Status Output 2 | 0x2122        | UINT            | 0             | 0   | 0xFFFF | -    | RO            |

## ► Drive Control Input 1

| bit | Setting Details |
|-----|-----------------|
| 0   | POT             |
| 1   | NOT             |
| 2   | HOME            |
| 3   | STOP            |
| 4   | PCON            |
| 5   | GAIN2           |
| 6   | P_CL            |
| 7   | N_CL            |
| 8   | MODE            |
| 9   | Reserved        |
| 10  | EMG             |
| 11  | A_RST           |
| 12  | SV_ON           |
| 13  | SPD1 / LVSF1    |
| 14  | SPD2 / LVSF2    |
| 15  | SPD3            |

## ► Drive Control Input 2

| bit | Setting Details |
|-----|-----------------|
| 0   | START           |
| 1   | PAUSE           |
| 2   | REGT            |
| 3   | HSTART          |
| 4   | ISEL0           |
| 5   | ISEL1           |
| 6   | ISEL2           |
| 7   | ISEL3           |
| 8   | ISEL4           |
| 9   | ISEL5           |
| 10  | ABSRQ           |
| 11  | JSTART          |
| 12  | JDIR            |
| 13  | PCLEAR          |
| 14  | AOVR            |
| 15  | Reserved        |



## ► Communication address For Output signals

| communication address |             | parameter name        | parameter No. | Variable Format | Default Value | Min | Max    | Unit | Accessib ility |
|-----------------------|-------------|-----------------------|---------------|-----------------|---------------|-----|--------|------|----------------|
| decimal               | hexadecimal |                       |               |                 |               |     |        |      |                |
| 8481                  | 0x2121      | Drive Status Output 1 | 0x2121        | UINT            | 0             | 0   | 0xFFFF | -    | RO             |
| 8482                  | 0x2122      | Drive Status Output 2 | 0x2122        | UINT            | 0             | 0   | 0xFFFF | -    | RO             |

## ► Drive status output 1

| bit    | Setting Details |
|--------|-----------------|
| 0      | BRAKE           |
| 1      | ALARM           |
| 2      | READY           |
| 3      | ZSPD            |
| 4      | INPOS1          |
| 5      | TLMT            |
| 6      | VLMT            |
| 7      | INSPD           |
| 8      | WARN            |
| 9      | TGON            |
| 10     | INPOS2          |
| 15- 11 | Reserved        |

## ► Drive status output 2

| bit   | Setting Details |
|-------|-----------------|
| 0     | ORG             |
| 1     | EOS             |
| 2     | IOU0            |
| 3     | IOU1            |
| 4     | IOU2            |
| 5     | IOU3            |
| 6     | IOU4            |
| 7     | IOU5            |
| 15~ 8 | Reserved        |

## ► Index Parameters

**LS** 메카피온 **L7P INDEXER Series Servo Drive**

| Parameter Name | Index00     | Index01     | Index02     | Index03     | Index04     | UNIT                 |
|----------------|-------------|-------------|-------------|-------------|-------------|----------------------|
| Index Type     | 12          | 12          | 12          | 12          | 12          | -                    |
| Distance       | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU]                 |
| Velocity       | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU/s]               |
| Acceleration   | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU/s <sup>2</sup> ] |
| Deceleration   | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU/s <sup>2</sup> ] |
| RegDistance    | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU]                 |
| RegVelocity    | -1234567890 | -1234567890 | -1234567890 | -1234567890 | -1234567890 | [UU/s <sup>2</sup> ] |
| RepeatCount    | 12345       | 12345       | 12345       | 12345       | 12345       | -                    |
| Dwell Time     | 12345       | 12345       | 12345       | 12345       | 12345       | [ms]                 |
| Next Index     | 12          | 12          | 12          | 12          | 12          | -                    |
| Action         | 1           | 1           | 1           | 1           | 1           | -                    |

## ► Internal variable of Idex00

| communication address |             | parameter name    | Variable Format | Min          | Max        | Unit              | Accessibility |
|-----------------------|-------------|-------------------|-----------------|--------------|------------|-------------------|---------------|
| decimal               | hexadecimal |                   |                 |              |            |                   |               |
| <b>Index</b>          | Index       | Number of entries | UINT16          | -            | -          | -                 | RW            |
| <b>Index+1</b>        | Index+0x01  | IndexType         | UINT16          | 0            | 10         | -                 | RW            |
| <b>Index+2</b>        | Index+0x02  | Distance          | INT32           | - 2147483648 | 2147483647 | UU                | RW            |
| <b>Index+4</b>        | Index+0x04  | Velocity          | INT32           | 1            | 2147483647 | UU/s              | RW            |
| <b>Index+6</b>        | Index+0x06  | Acceleration      | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| <b>Index+8</b>        | Index+0x08  | Deceleration      | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| <b>Index+10</b>       | Index+0x0A  | RegDistance       | INT32           | - 2147483648 | 2147483647 | UU                | RW            |
| <b>Index+12</b>       | Index+0x0C  | RegVelocity       | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| <b>Index+14</b>       | Index+0x0E  | RepeatCount       | UINT16          | 1            | 65535      | -                 | RW            |
| <b>Index+15</b>       | Index+0x0F  | DwellTime         | UINT16          | 0            | 65535      | ms                | RW            |
| <b>Index+16</b>       | Index+0x10  | Next Index        | UINT16          | 0            | 63         | -                 | RW            |
| <b>Index+17</b>       | Index+0x11  | Action            | UINT16          | 0            | 2          | -                 | RW            |

## ► Index00 ~Index63 Internal Variable Communication Address

| communication address |             | parameter name    | Variable Format | Min          | Max        | Unit              | Accessibility |
|-----------------------|-------------|-------------------|-----------------|--------------|------------|-------------------|---------------|
| decimal               | hexadecimal |                   |                 |              |            |                   |               |
| 12544                 | 0x3100      | Number of entries | UINT16          | -            | -          | -                 | RW            |
| 12545                 | 0x3101      | IndexType         | UINT16          | 0            | 10         | -                 | RW            |
| 12546                 | 0x3102      | Distance          | INT32           | - 2147483648 | 2147483647 | UU                | RW            |
| 12548                 | 0x3104      | Velocity          | INT32           | 1            | 2147483647 | UU/s              | RW            |
| 12550                 | 0x3106      | Acceleration      | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| 12552                 | 0x3108      | Deceleration      | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| 12554                 | 0x310A      | RegDistance       | INT32           | - 2147483648 | 2147483647 | UU                | RW            |
| 12556                 | 0x310C      | RegVelocity       | INT32           | 1            | 2147483647 | UU/s <sup>2</sup> | RW            |
| 12558                 | 0x310E      | RepeatCount       | UINT16          | 1            | 65535      | -                 | RW            |
| 12559                 | 0x310F      | DwellTime         | UINT16          | 0            | 65535      | ms                | RW            |
| 12560                 | 0x3110      | Next Index        | UINT16          | 0            | 63         | -                 | RW            |
| 12561                 | 0x3111      | Action            | UINT16          | 0            | 2          | -                 | RW            |

## ■ Revision history

| <b><i>Number</i></b> | <b><i>Date issued</i></b> | <b><i>Revised content</i></b> | <b><i>Version Number</i></b> | <b><i>Notes</i></b> |
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