

# NAD-4000 PROTOCOL

## Revision history...

2019. 03. 04 PC <-> NAD-4000 Communication Protocol Design Among Boards

2020. 05. 27 DETECTION RECORD RELATED PACKET ADDITION (Refer to text in Brown Color)

# 1. PC-NAD4000 COMMUNICATION PROTOCOL N560간

## 1.1 LOG-IN SPECIFICAITON

- . COOMUNICATION LOG-IN: Ethernet (TCP/IP Socket COMMUNICATION)
  - N560: Server Socket
  - PC: Client Socket

## 1.2 COMMUNICATION PROCESS

### 1.2.1 Socket LOG-IN & WAVE DATA REQUEST

- 1) At Client(PC), SOCKET LOG-IN At Server(N560)
- 2) After logging-in, Request Wave Data (If necessary, version or product data might be requested)

### 1.2.2 Request Command Processing (PC -> NAD4000)

: HOW TO SEND REQUEST FROM PC TO NAD4000

- 1) PC sends request when setting up and reviewing at NAD4000
- 2) NAD4000 sends response signal upon receipt of request.
- 5) PC repeats the same process three times if not receiving response after sending request.

## 2. Frame Definition

### 2.1 Frame Format

1) Request/Response/Event Command

Field Name	STX	LENGTH	CMD	DATA	ETX	LRC
Length (Byte)	1	2	1	n	1	1

2) ACK / NAK

Field Name	STX	LENGTH	CMD	ACK or NAK	ETX	LRC
Length (Byte)	1	2	1	1	1	1

### 2.2 Define

1) STX: Frame Start Character, 0x02

2) LENGTH: Frame's Length, (STX ~ LRC) Count(Byte), -> ex) STATUS DATA REVIEW 0x02 0x00 0x06 0x33 0x03 0x34

3) CMD: Command Code

4) DATA: Parameter needed to fulfill Command

5) ETX: Frame End Character, 0x03

6) LRC: Check Code, STX ~ ETX의 값을 E-OR 연산한 값

7) ACK or NAK:

- . ACK: 0x53 ('S')

- . NAK: 0x46 ('F')

ORDER OF HOST BYTE: Big-Endian

Ex) 0x1234 -> in order of 0x12, 0x34

## 2.3 Command Summary

CMD	Item	Memo
Setting/Review Command (PC -> NAD4000)		
0x2A	VERSION DATA REVIEW	REVIEW ON FIRMWARE VERSION OF NAD4000
0x32	PRODUCT DATA REVIEW	REVIEW ON CURRENTLY PRODUCED ITEM
0x33	STATUS DATA REVIEW	WHEN REVIEW NAD4000 STATUS FROM PC, NAD4000 REPORTS IT TO PC BY ONE TIME IMMEDIATELY.
0x3A	DETECTION RECORD REVIEW	
Event Notification Command (MD -> PC)		
0x35	REPORT ON NAD4000 STATUS	RESPONSE TO REVIEW ON NAD4000 STATUS, AFTER STARTING MONITORING, PERIODICAL REPORT MESSAGE
0x3A	REPORT ON DETECTION RECORD	RESPONSE TO REVIEW ON DETECTION RECORD

### 3. Packet Definition

#### 3.1 Version Data Review

- 1) Request
  - CMD: 0x2A
  - DATA Field: N/A
- 2) Response
  - CMD: 0x2A
  - DATA Field: AP.001 Version content

#### 3.2 Product Data Review

- 1) Request
  - CMD: 0x32
  - DATA Field: N/A
- 2) Response
  - CMD: 0x32
  - DATA Field: AP.002 Pack content

#### 3.3 NAD4000 Status Review

- 1) Request
  - CMD: 0x33
  - DATA Field: N/A
- 2) Response
  - CMD: 0x35
  - DATA Field: AP.005 Report content (Type 1)

#### 3.5 NAD4000 Status Report

- 1) Request
  - CMD: 0x35
  - DATA Field: AP.005 Report content
- 2) Response
  - N/A

#### 3.6 Detection Report Review

- 1) Request
  - CMD: 0x3A
  - DATA Field: AP.010 Period content
- 2) Response
  - CMD: 0x34
  - DATA Field: ACK or NACK

### 3.7 Detection Record Report

#### 1) Request

- CMD: 0x3A
- DATA Field 1: AP.021 Report content1 (Period Output Basic Data)
- DATA Field 2: AP.022 Report content2 (DATE)
- DATA Field 3: AP.023 Report content3 (Record for each specific data)

#### 2) Response

- N/A

## 4. Data Field Definition

### AP.001 Version Info Field

Byte Number	Define	REMARK
20	DISPLAY Board Version	예) "NMD560DSP 190217a"
20	SENSOR Board Version	예) "NMD560CPU 190217a"
20	IO Board Version	예) "NMD560RJT 190217a"

### AP.002 Pack content

Byte Number	Define	REMARK
1	PRODUCT NUMBER	1 ~ 100
20	PRODUCT NAME	MAX WITHIN 20 CHARACTERS IN ENGLISH & 10 CHARACTERS IN KOREAN
1	CH1 Gain	
1	CH2 Gain	
2	Max DETECTION LEVEL	
2	Min DETECTION LEVEL	
2	DOUBLE ENTRY PERCEPTION TIME	
1	PRODUCT PASSING TYPE	0 ~ 2 (SINGLE/BULK/REVERSE)
2	PASSING TIME	
2	DELAY TIME	
2	OPERATING TIME	

### AP.005 Report content

Byte Number	Define	REMARK
1	PRODUDCT NUMBER	1 ~ 50
1	MACHINE STATUS	AP.100 Status Type
2	Ch1 Peak	Data on CH1 at Graph
2	Ch2 Peak	Data on Ch2 at Graph
2	Max DETECTION LEVEL	
2	Min DETECTION LEVEL	
4	PRODUCTION Q'TY	Ex) integer: 123456 (=0x1E240) → In order of 0x00,0x01,0xE2,0x40
2	DETECTION Q'TY	Ex) integer: 1234 (=0x4D2) → In order of 0x04,0xD2

#### AP.010 Period content

Byte count	Define	Memo
3	Start date	Ex) 2020/1/1 (0x14, 0x1, 0x1)
3	End date	Ex) 2020/1/10 (0x14, 0x1, 0xA)

#### AP.021 Report content1

Byte count	Define	Memo
1	Sub command	0x1 (Fixed)
1	Output method	0x3 (Fixed)
6	Checking Period□	AP.010 Period content
6	Output date and time	Ex) 2020/1/15 5:20:30 (0x14,0x1,0xF,0x5,0x14,0x1E)
4	Production Quantity	Ex) Integer: 123456 (=0x1E240) → 0x00,0x01,0xE2,0x40
4	Detection Quantity	Ex) Integer: 123456 (=0x1E240) → 0x00,0x01,0xE2,0x40
16	SN	Ex) "20010001M0", Fill the rest with NULL (0x0)
20	Display Board Version	Ex) "NMD560DSP V.160217a"
20	Main Board Version	Ex) "NMD560CPU V.160217a"
20	Reject Board Version	Ex) "NMD560RJT V.160217a"

#### AP.022 Report content2

Byte count	Define	Memo
1	Sub command	0x2 (Fixed)
3	Date	Ex) 2020/1/15 (0x14, 0x1, 0xF)
4	Detection quantity	Ex) Integer: 123456 (=0x1E240) → 0x00,0x01,0xE2,0x40

#### AP.023 Report content3

Byte count	Define	Memo
1	Sub command	0x3 (Fixed)
1	LOG TYPE	0x0: detect, 0x1: Reverse, 0x2: Power on
1	PRODUCT NUMBER	0x1 ~ 0x64 (Integer: 1 ~ 100)
6	DETECTING TIME	Ex) 2020/1/15 5:20:30 (0x14,0x1,0xF,0x5,0x14,0x1E)
2	DETECTING COUNT	Ex) Integer: 1234 (=0x4D2) → 0x04,0xD2
3	PRODUCT COUNT	Ex) Integer: 123456 (=0x1E240) → 0x01,0xE2,0x40
3	NULL	0x0,0x0,0x0



**AP.100** Status Type

Explanation	Range		Meaning
bit	0x01	NG SIGNAL	Whether or not metal is detected
	0x02	Ch1 enable	Ch1 Activation
	0x04	Ch2 enable	Ch2 Activation
	0x08	Test mode	Whether or not Test Mode is on
	0x10		
	0x20		