SONY

Document for developers of NSP-1

GPI Handbook

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This handbook contains descriptions on prospective functions that have not yet been realized, and may be changed or deleted.

Monitor Department
Display Division
PSN Company
Sony Corporation

Revision History

Version (Doc)	Version (Soft)	Date	Description		In Charge
				Description	
V1.00	V2.20b	2005/06/21		First Edition	mori
V1.01	V2.11	2005/08/31	#1	Correction of page.14. Setup range: ”10” to ”2000”.	mori
V1.02	V2.11	2005/09/21	#2	Correction of 5.2 GPI Html Setup Page.	mori

Contents

1. Overview

1.1. Overview of the GPI Control

The NSP-1 supports the GPI control of five inputs and five output ports. The GPI output is controlled by the control codes that are embedded in the sequence. Refer to the NSP-1 Procedure Manual for the control sequence. The GPI input control corresponds to the NSP-1 commands. Correspondence between the control commands and the input pins is registered in the NSP-1 internal database. This control can be customized by modifying the database. The method to set the database is described in Chapter 5.

2. Setup

2.1. GPI Setup

The connector for GPI interface is the dedicated connector. The output port can be operated regardless of the setups. However, the input port cannot be operated until the setup is made valid. For details of the setting, refer to Chapter 5.

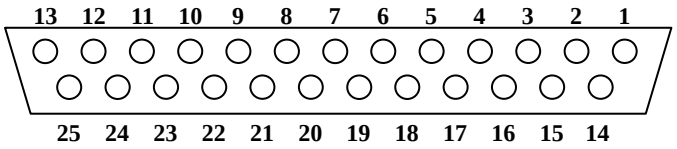
3. Hardware

The hardware configuration of the GPI interface is shown below.

3.1. Connector

D-Sub 25-pin (Male)

D-SUB connector pin layout (when viewed from the rear NSP-1



3.2. Pin Assignments

Pin assignments for the D-Sub 25-pin connector (Table 3.2)

Pin No.	Name	Function
1	-	No Connection
2	GPI Output 1	Output 1
3	GPI Output 2	Output 2
4	GPI Output 3	Output 3
5	GPI Output 4	Output 4
6	GPI Output 5	Output 5
7 to 9	-	No Connection
10	GPI Input 1	Input 1
11	GPI Input 2	Input 2
12	GPI Input 3	Input 3
13	GPI Input 4	Input 4
14	-	No Connection
15	GPI Input 5	Input 5
16 and 17	-	No Connection
18 to 25	GND	GND

Table 3.2 Pin assignments

3.3. Input/Output Specifications

3.3.1. Electrical Characteristics

Electrical characteristics are shown in Table 3.3.1.

V_{IL}	Input Low Voltage	-0.5	0.8	V	
V_{IH}	Input High Voltage	2.0	Vcc+0.5	V	
V_{OL}	Output Low Voltage	-	0.45	V	I_{OL}=4.0mA
V_{OH}	Output High Voltage	2.4	-	V	I_{OH}=-1.0mA
I_{IL}	Input Leakage Current	-	±10	uA	0<V_{IN}<V_{CC}
I_{OZ}	Tristate Leakage Current	-	±20	uA	0.45<V_{OUT}<Vcc

Table 3.3.1 DC electrical characteristics

Note 1: The above specifications indicate the data at the pins of the LSI. When the cable is extended, the specifications are not supported at the end of the extension cable

Note 2: All pins are pulled up to 5V via 4.7 kΩ.

Circuit example is shown in Table 3.3.2.

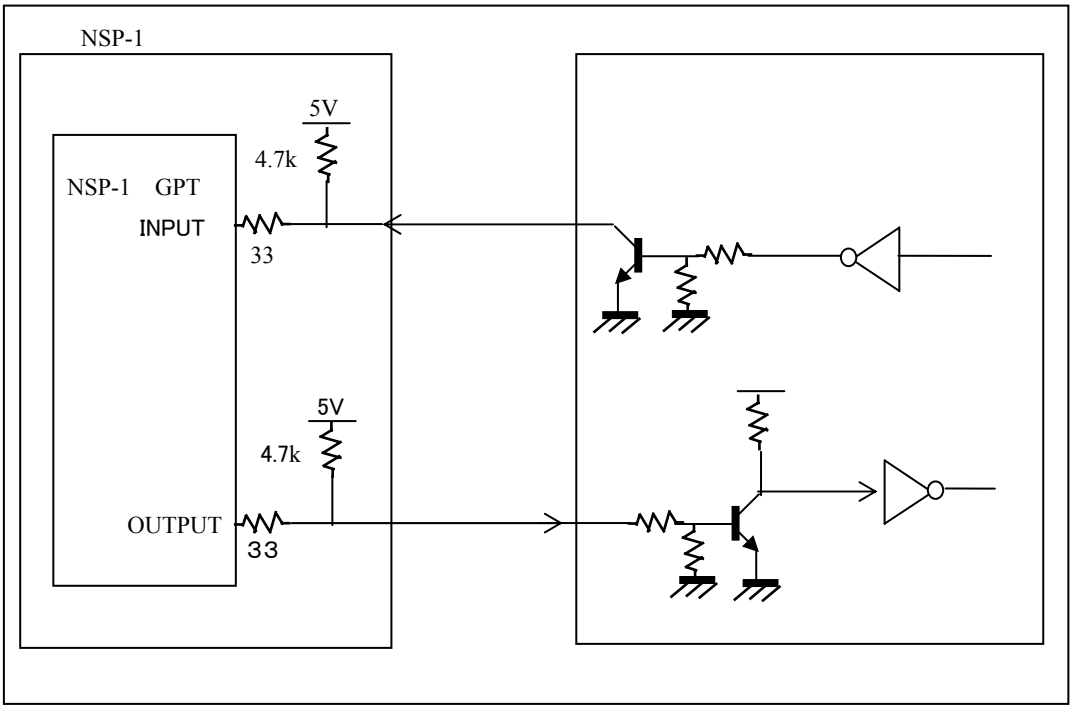


Table 3.3.2 Circuit example

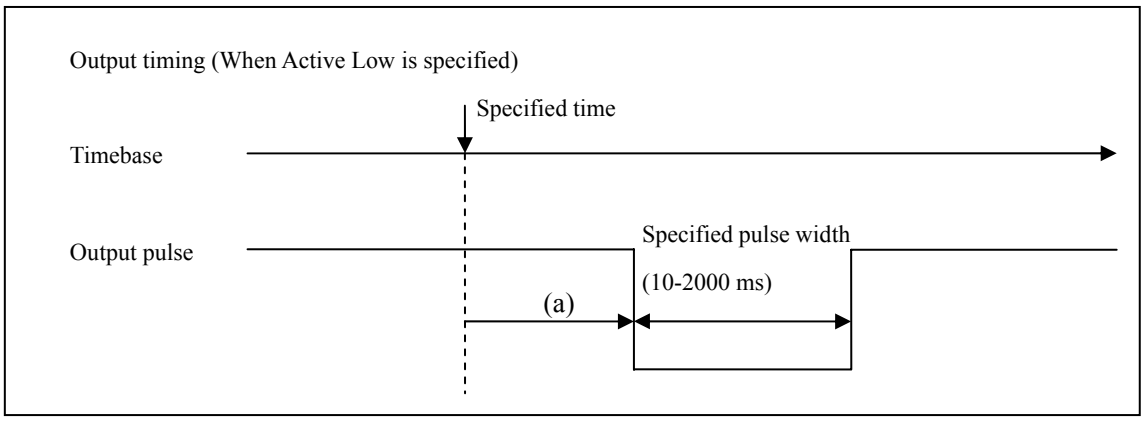
4. Timing

4.1. Output

Because the data output is controlled by the timings that are fixed by sequence, the data are output in accordance with the timebase within the sequence. The output data format is the pulse output only

As the output pulse width, only the fixed values of the system can be specified. The output pulse width can be specified by the GPI Output Property. The output pulse width can be specified in units of 10 ms (The values in between the units are truncated.)

As the active level, only the fixed values of the system can be specified. Please note that the output data remains low while the NSP-1 has started up. When “Active Low” is specified after startup, the output level goes High. In the same way, the output level goes Low when “Active High” is specified.



The output pulse width is [Specified pulse width] ±10 mseconds.

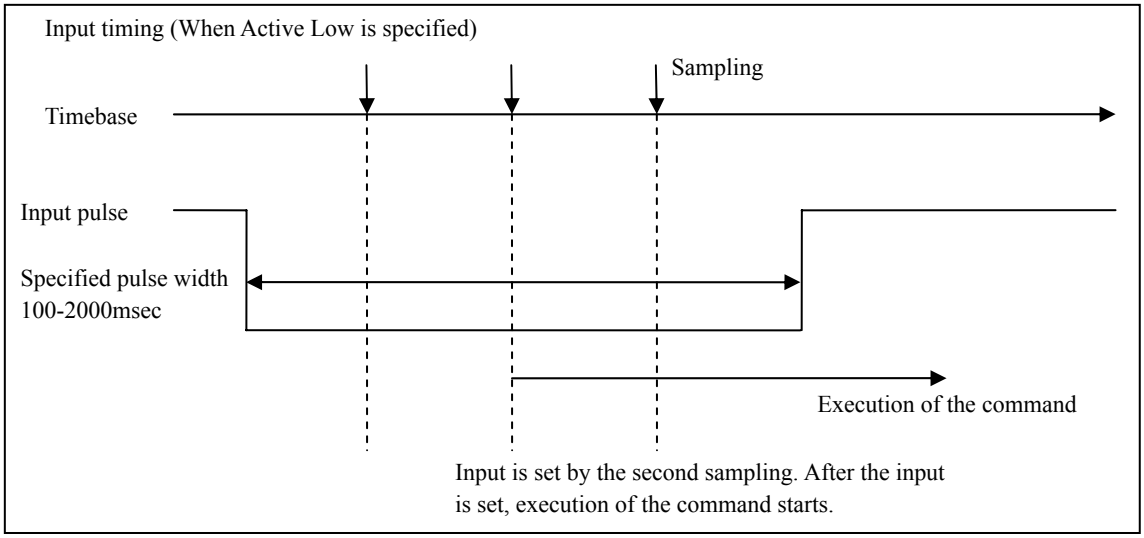
The output timing (a) is [Specified time] ±500 mseconds.

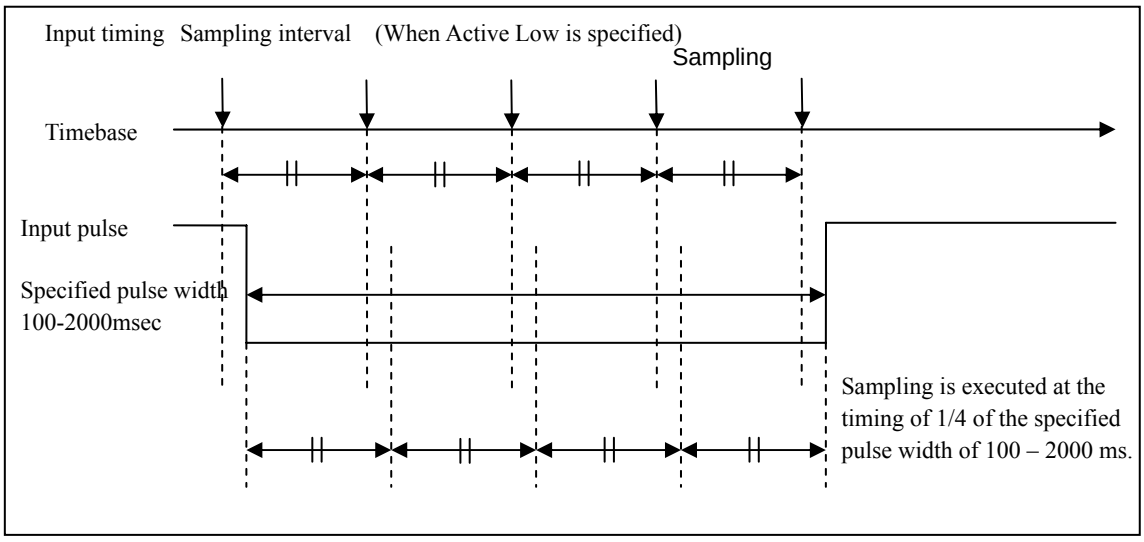
The output is available at five ports with synchronous output. The five ports with asynchronous output are not supported.

The output level supports Pulse only and does not support Level.

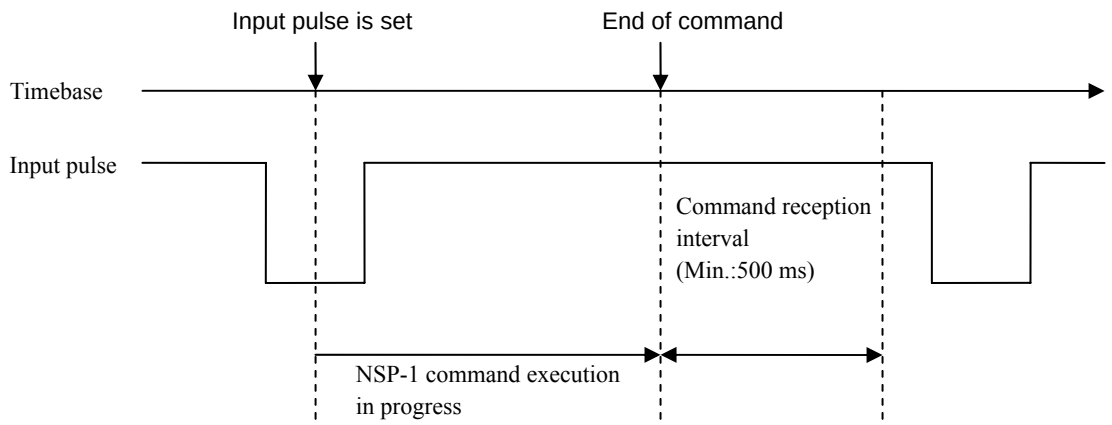
4.2. Input

The sampling timing of input event changes depending on the setup. Sampling interval can be set at 1/4 of the specified input pulse width. For example, when the input pulse width is set to 100 ms, the sampling interval can be specified in units of approximately 25 ms. When the same input level is detected two times, the input data level is set. This method is used in order to prevent the input level detection from malfunction.

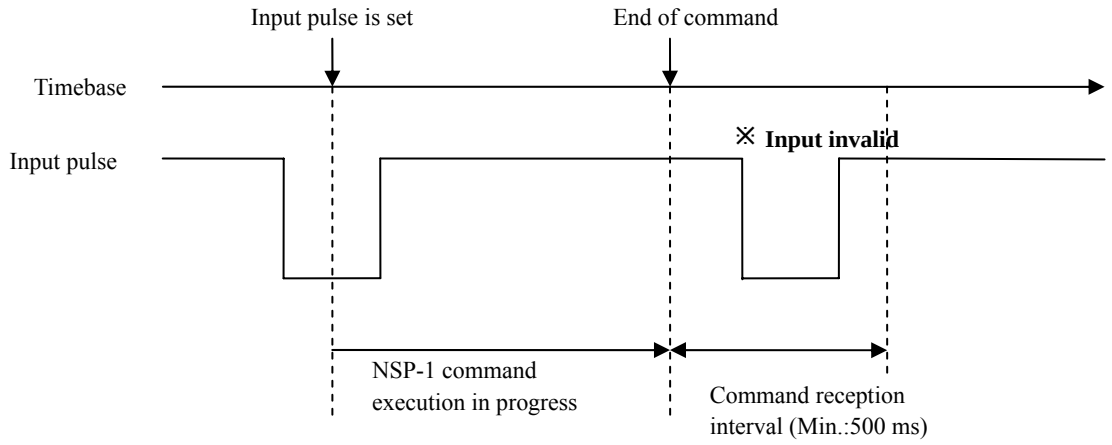




Input timing Command reception interval (When Active Low is specified)



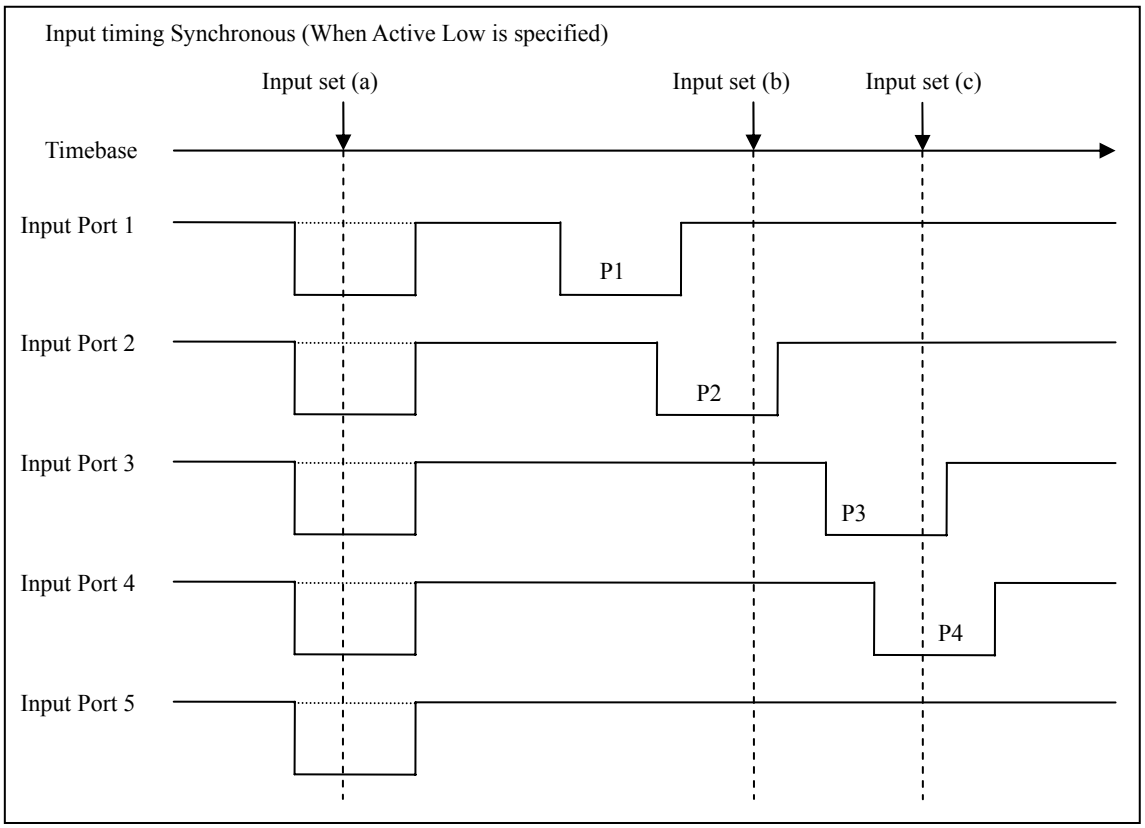
Input timing Command invalid period (When Active Low is specified)



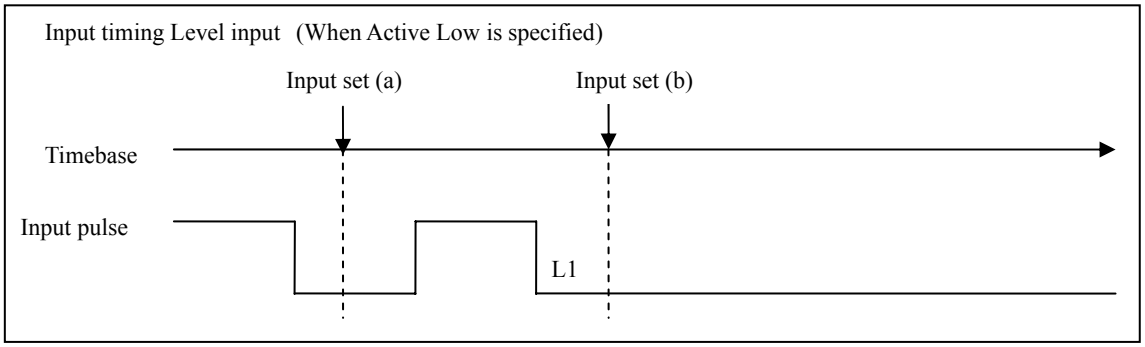
※ During the period of the command reception interval, the input pulse is not detected. (Command is not set.)
The input pulse is not detected also while the command execution is in progress.

Specification for the input pulse width is [Specified pulse width] + 10 ms.
The input data of maximum five ports can be scanned at the same time and are accepted as the synchronous inputs. Because the input data are the synchronous inputs, the change at the port within the input setting (confirmation) cycle cannot be recognized normally.

The level input is available at the input. (It monitors the status change of input.)



The five input ports detect the input signals at the same time as shown above so that the "Input set (a)" is established.
If the asynchronous inputs are supplied that are shown as Input pulses P1 and P2, P1 cannot be set but P2 alone can be set because P2 is input before P1 is set. (Input set (b)).
When P3 and P4 are input asynchronously that are shown as Input pulses P3 and P4, they can be detected at the setting timing of P4. (Input set (c)).



In the case of the level input L1, the input pulse cannot be detected until a level change is detected after the Input set (b) as shown by the above timing chart.

5. Setup File

The GPI interface can be set by using the Database, or by using the XML file or by using the HTML page.
All of the above three setup methods require rebooting of the NSP-1 in order to reflect the setup data to the NSP-1. (NSP-1 reads the GPI setup during booting.)

5.1. Database

The NSP-1 GPI setups are controlled by the Database (SQL).
The NSP-1 contains the GPI Database named ”NSP1_GPI”.

5.1.1. GPI Input Setup

The GPI Input setup is registered in the “GPI_INPUT_CONFIG_TBL” table in the NSP1_GPI Database.

Table 5.1.1 shows elements of the GPI_INPUT_CONFIG_TBL.

Data	Type	Default	Description
index	integer	0	Uniquely given number. 0 is the reserved number.
enable	smallint	0	GPI Input enable/disable. “0”: Disable, ”1”: Enable
active	character varing (1)	L	GPI Input active level. “L”: Active Low, ”H”: Active High
width	smallint	0	GPI Input pulse width (msec) It specifies the input pulse width. Default value is 0. However, if 0 is set, the NSP-1 sets GPI input pulse width to the default value: 100 ms. Setup range: ”100” to ”2000” Setup interval is in units of 10 ms.
extend	smallint	0	It specifies the command acceptance interval. (msec). Default value is 0. However, if 0 is set, the NSP-1 sets GPI input command acceptance interval to the default value: 500 ms. Setup range: ”100” to ”2000” Setup interval is in units of 10 ms.

Table 5.1.1 GPI_INPUT_CONFIG_TBL

The index ”1” only can be recognized. Multiple setups can be registered.

5.1.2. GPI Input Data Setup

The GPI input data setup is registered in the ”GPI_INPUT_DATA_TBL” table of the NSP1_GPI Database.

Table 5.1.2 shows elements of GPI_INPUT_DATA_TBL.

Data	Type	Default	Description
index	integer	0	Uniquely given number. 0 is the reserved number.
bitptn	character varing (2)	00	It sets the input data pattern. Setup range: ”00” to ”1F” Hex characters are specified.
command	character varing (256)	-	It specifies the command for the input data. When any GPI input is detected, the command that is specified here is executed. For the commands, refer to the NSP-1 Procedure Manual. Maximum characters are 256 that can be used in the XML tag only.
starttime	Time(0) without time zone	-	Starting time of input valid acceptance. “hh: mm: ss” format. Setup range: “00:00:00” to “23:59:59”. No default value. When the specified ”bitptn” is received after this time, the” command” is executed.
endttime	Time(0) without time zone	-	Ending time of input valid acceptance. “hh: mm: ss” format. Setup range: “00:00:00” to “23:59:59”. No default value. When the specified ”bitptn” is received before this time, the “command” is executed.
startdate	date	-	Starting date of input valid acceptance. “yyyy-MM-dd” format. Setup range: “2004-01-01” to “9999-12-31”. No default value. When the specified ”bitptn” is received before this date, the “command” is executed.
enddate	date	-	Ending date of input valid acceptance. “yyyy-MM-dd” format. Setup range: “2004-01-01” to “9999-12-31”. No default value. When the specified ”bitptn” is received before this date, the “command” is executed.

Table 5.1.2 GPI_INPUT_DATA_TBL

If all of the “starttime”, “endttime”, “startdate” and “enddate” are not specified, the ”bitptn” input is accepted all time. (Time will have no relation.)

5.1.3. GPI Output Setup

GPI output setup is registered in the “GPI_OUTPUT_CONFIG_TBL” table of the NSP1_GPI Database..

Table 5.1.3 shows elements of the GPI_OUTPUT_CONFIG_TBL.

Data	Type	Default	Description
index	integer	0	Uniquely given number. 0 is the reserved number.
enable	smallint	0	GPI output enable/disable. “0”: Disable. ”1”: Enable The NSP-1 becomes Enable regardless of this setup.
active	character varing (1)	L	GPI output active level. “L”: Active Low, ”H”: Active High
width	smallint	0	GPI output pulse width (msec) It specifies the output pulse width. Setup range: ”10” to ”2000”. #1 Setup interval is in units of 10 ms. Default value is 0. However, if 0 is set, the NSP-1 sets GPI output pulse width to the default value: 100 ms.

Table 5.1.3 GPI_OUTPUT_CONFIG_TBL

The index ”1” only can be recognized. Multiple setups can be registered.

The NSP-1 GPI output functions even when this table does not exist.
However, the setup of the default value will be used. (Default active=”0”, width=”100”)

5.1.4. GPI Output Data Setup

The GPI output data is registered in “EXTGPIO_TBL” of the ”NSP1” Database.
For the registration procedure, refer to the NSP-1 Procedure Manual.
For “EXTGPIO_TBL”, refer to the NSP-1 Procedure Manual Section 4 “Contents Property and Contents Data”.

Table 5.1.4 shows the NSP-1 Procedure Manual Section 4 “Contents Property and Contents Data” - 4.2. “Material Contents Property” – “Table 13 GPI Contents Property Database Structure”.

▪ **External Equipment Control (GPI) Unique Table Elements**

Registration to the element can be made from files by default.

Table name: EXTGPIO_TBL

Data	Type	Default	Description
pattern	**varchar 2**	**00**	Output: 5-bit data. **Setup range: “00” to “1F”**
width	smallint	0	Pulse width (msec). ”10” to ”2000”ms. 10 ms step. Entry smaller than 10 ms is truncated.

Table 1 GPI Contents Property Database Structure

Table 5.1.4 NSP-1 Procedure Manual “Table 13 GPI Contents Property Database Structure”

Contents of the table are shown in Table 5.1.4. (Changed to support GPI)
Contents are different from those of Ver2.10 and before.
In ”width”, the first digit is truncated.
In the case of “width”=”0”, the NSP-1 GPI output pulse width becomes the default value of 100 ms.

5.2. XML File

The NSP-1 GPI setup can be reflected to the Database by reading the XML file.
Use the text file of the XML format.
When the NSP-1 reads the XML file, and if the Database does not exist, the Database is created automatically.
The filename should be ”nsp1_gpi_setup.xml”. The XML file should be the separate file from the setup file of the NSP-1 itself.
The destination directory of transfer should be ”/usr/htdocs/GPI/ “.

Table 5.2.1 shows the elements of the setup file.

Setup tag	Setup contents (elements)	Parameter	Destination of the Database reflection
<setup>	Entire elements of setup	-	-
<gpii-setup>	GPI input setup	-	GPI_INPUT_CONFIG_TBL (table)
<gpii-enable>	GPI Input enable/disable.	“yes”: Enable “no”: Disable.	enable (GPI_INPUT_CONFIG_TBL column)
<gpii-active>	GPI input active level	“low”: Active Low “high”: Active high	active (GPI_INPUT_CONFIG_TBL column)
<gpii-width>	GPI input pulse width	“100” to ”2000” in units of 10 ms.	width (GPI_INPUT_CONFIG_TBL column)
<gpii-extend>	GPI input command acceptance interval	“500 to 2000” in units of 10 ms.	Extend (GPI_INPUT_CONFIG_TBL column)
<gpii-inputdata>	GPI input data setup	-	GPI_INPUT_DATA_TBL (table)
<gpii-data index=xx>	GPI input data index (“xx” is the index number.)	“1 to ” “0” is reserved and should not be used.	Index (GPI_INPUT_DATA_TBL column)
<gpii-data-bitptn>	GPI input data pattern	“00 to 1F” (Hex)	Bitptn (GPI_INPUT_DATA_TBL column)
<gpii-data-command>	Command for the GPI input data For commands, refer to the NSP-1 Procedure Manual.	Character strings are not inspected up to the 256 character strings.	command (GPI_INPUT_DATA_TBL column)

<gpii-data-starttime>	Starting time of the GPI input data valid acceptance.	“hh: mm: ss” format “00:00:00” to “23:59:59”	starttime (GPI_INPUT_DATA_TBL column)
<gpii-data-endtime>	Ending time the GPI input data valid acceptance	“hh: mm: ss” format “00:00:00” to “23:59:59”	endtime (GPI_INPUT_DATA_TBL column)
<gpii-data-startdate>	Starting date of the GPI input data valid acceptance	“yyyy-MM-dd” format Min. “2004-01-01” Max. “9999-12-31”	startdate (GPI_INPUT_DATA_TBL column)
<gpii-data-enddate>	Ending date of the GPI input data valid acceptance	“yyyy-MM-dd” format Min. “2004-01-01” Max. “9999-12-31”	enddate (GPI_INPUT_DATA_TBL column)
<gpio-setup>	GPI output setup	-	GPI_OUTPUT_CONFIG_TBL (table)
<gpio-enable>	GPI output enable/disable	“yes”: enable “no”: disable	enable (GPI_OUTPUT_CONFIG_TBL column)
<gpio-active>	GPI output active level	“low”: Active Low “high”: Active high	active (GPI_OUTPUT_CONFIG_TBL column)
<gpio-width>	GPI output pulse width	“10” to ”2000”	width (GPI_OUTPUT_CONFIG_TBL column)

Table 5.2.1 nsp1_gpi_setup.xml (GPI Setup XML file)

nsp1_gpi_setup.xml sample is shown in Table 5.2.2.

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>
<setup>
        <gpii-setup>
                <gpii-enable>yes</gpii-enable>
                <gpii-active>low</gpii-active>
                <gpii-width>200</gpii-width>
                <gpii-extend>600</gpii-extend>
        </gpii-setup>
        <gpio-setup>
                <gpio-enable>yes</gpio-enable>        <!-- always yes -->
                <gpio-active>low</gpio-active>
                <gpio-width>200</gpio-width>
        </gpio-setup>
        <gpii-inputdata>
                <gpii-data index="1">
                        <gpii-data-bitptn>01</gpii-data-bitptn>
                        <gpii-data-command>cmd=plcl id=02
index=001000001</gpii-data-command>
                        <gpii-data-starttime>00:00:00</gpii-data-starttime>
                        <gpii-data-endtime>06:00:00</gpii-data-endtime>
                        <gpii-data-startdate>2005-06-07</gpii-data-startdate>
                        <gpii-data-enddate>2005-06-08</gpii-data-enddate>
                </gpii-data>
                <gpii-data index="3">
                        <gpii-data-bitptn>02</gpii-data-bitptn>
                        <gpii-data-command>spcl</gpii-data-command>
                </gpii-data>
        </gpii-inputdata>
</setup>
```

Table 5.2.2 nsp1_gpi_setup.xml sample

5.3. GPI HTML Setup Page

This page is the dedicated page for the NSP-1 GPI setup.

Make access to the http://(IP address of the NSP-1):4980/GPI/ using a browser (such as Microsoft Internet Explorer and others) that is installed in PC.

If the Database for GPI does not exist in the NSP-1 when access is made, the Database is created automatically.

Use the alphanumeric characters and symbols for entry.

5.3.1. ~~GPI~~ Input Setup #2

1) **[~~GPI~~ Input Function]** ▪ **Enable** ▪ **Disable**
When "Enable" is selected and the "Change" button is pressed, the GPI Input is enabled.
When "Disable" is selected and the "Change" button is pressed, the GPI Input is disabled.

2) **[~~GPI~~ Input Level]** ▪ **High** ▪ **Low**
When "High" is selected and the "Change" button is pressed, the GPI Input active level is set to Active High.
When "Low" is selected and the "Change" button is pressed, the GPI Input active level is set to Active Low.

3) **[~~GPI~~ Input Pulse Width]**
When a numeric data is entered in this box and the "Change" button is pressed, the GPI Input pulse width is set.
Setup range: "100" to "2000" ms (in units of 10 ms). The first digit is truncated even when entered.

4) **[~~GPI~~ Input Functional Interval]**
When a numeric data is entered in this box and the "Change" button is pressed, the GPI Input functional interval is set.
Setup range: "500" to "2000" ms (in units of 10 ms). The first digit is truncated even when entered.

5) **Others**
• When the "Restart" button is pressed, the NSP-1 restarts. Screen moves to the "Restart" confirmation page.
• When "To NSP-1 Maintenance Page" is pressed, the screen moves to the NSP-1 Maintenance page.

5.3.2. ~~GPI~~ Input Parameter #2

1) **[No.]** This is the Database index number. When a parameter is newly added, this number is automatically entered.

2) **[Input Value]** Enter the GPI Input data.
Setup range: “00” to “1F” (Hex)

Ex.1 #2
cmd=PLCL(space)id=02(space)index=001000001
Ex.2 #2
cmd=PLPL(space)table=playlist(space)index=001000001

3) **[Command]** Enter the NSP-1 command. For the commands, refer to the ”NSP-1 Procedure Manual”.

4) **[Starting Time]** Enter the starting time of command validity.
The input format is ”hh: mm: ss”
Setup range: “00: 00: 00“ to ”23: 59: 59”

5) **[Ending Time]** Enter the ending time of command validity.
The input format is ”hh: mm: ss”
Setup range: “00: 00: 00“ to ”23: 59: 59”

6) **[Starting Date]** Enter the starting date of command validity.
The input format is ”yyyy-MM-dd”
Setup range: “2004-01-01“ to ”9999-12-31”

7) **[Ending Date]** Enter the ending time of command validity.
The input format is ”yyyy-MM-dd”
Setup range: “2004-01-01“ to ”9999-12-31”

8) **[Delete]** It deletes the entered parameter. Click on the checkbox to be deleted.

9) **[New]** It is used when adding a new parameter.

10) **[Change]** When the “Change” button is pressed, all contents of the entered parameters are reflected.

11) **Others**
- When the “Restart” button is pressed, the NSP-1 restarts. Screen moves to the “Restart” confirmation page.
- When ”To NSP-1 Maintenance Page” is pressed, the screen moves to the NSP-1 Maintenance page.

5.3.3. ~~GPI~~ Output Setup #2

~~1) [GPI Output Function] ▪ Enable~~
~~"Enable" is selected all the time.~~

2) **[~~GPI~~ Output Level] ▪ High ▪ Low**
When "High" is selected and the "Change" button is pressed, the GPI Output active level is set to Active High.
When "Low" is selected and the "Change" button is pressed, the GPI Output active level is set to Active Low.

3) **[~~GPI~~ Output Pulse Width]**
When a numeric data is entered in this box and the "Change" button is pressed, the GPI Outut pulse width is set.
Setup range: "100" to "2000" ms (in units of 10 ms). The first digit is truncated even when entered.

4) **Others**
• When the "Restart" button is pressed, the NSP-1 restarts. Screen moves to the "Restart" confirmation page.
• When "To NSP-1 Maintenance Page" is pressed, the screen moves to the NSP-1 Maintenance page.

6. Operating Specifications

6.1. Restrictions

1) About XML file setu
   - ▪ The setup of the XML file is registered to the Database with top priority.
   - ▪ The XML file is read whenever the system starts up.
     When the HTML GPI page or the Database is changed after the NSP-1 has started up, and if the same index as that of the XML file exists, it is overwritten.
   - ▪ The GPI_INPUT_CONFIG_TBL and the GPI_OUTPUT_CONFIG_TBL are always reflected to index ”1”.
   - ▪ Only the tags that are described in the XML file are set. The tags that are not described are set to the default setup and the existing setup.
   - ▪ The items whose setups are not reflected, are not set by either not describing the tag or by commenting out (<!- - - - >).
   - ▪ If either one of the gpi-data-starttime or gpi-data-endtime or gpi-data-startdate or gpi-data-enddate is not described, the default value will be set to the items that are not described.
     (gpi-data-starttime=”00:00:00”, gpi-data-endtime=”23:59:59”)
     (gpi-data-startdate=”2004-01-01”, gpi-data-enddate=”9999-12-31”)
     If all of the above are not described, the null data are registered.
   - ▪ If gpi-data-starttime or gpi-data-endtime or gpi-data-startdate or gpi-data-enddate is null data, the input is accepted always.
   - ▪ When multiple numbers of search exist due to some conditions, the item that has the larger index will be executed.

2) About HTML setup
   - ▪ The HTML setups are not output to the XML file.
   - ▪ If either one of the Starting Time, Ending Time, Starting Date or Ending Date is left blank, the default value will be entered in the blank item.
     (Starting Time = ”00:00:00”, Ending Time = ”23:59:59”)
     (Starting Date = ”2004-01-01”, Ending Date = ”9999-12-31”)
     If all items are left blank, they remain blank.
   - ▪ If the Starting Time, Ending Time, Starting Date or Ending Date is left blank, the input is accepted always.

3) About GPI Input Data
   - ▪ If multiple data have the same bitptn, the data that has the larger index value will have priority.
   - ▪ If either one of the starttime, endtime, startdate or enddate is lacking, the NSP-1 sets the default value in the blank item.
     (starttime = ”00:00:00”, endtime = ”23:59:59”, startdate = ”2004-01-01”,

enddate = ”9999-12-31”)
If all of them are left blank, they remain blank.

- If either one of the starttime, endtime, startdate or enddate is left blank, the input is accepted always.
- When multiple numbers of search exist due to some conditions, the item that has the larger index will be executed.