N-Wire Checker

User's Manual

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1. OVERVIEW

The N-Wire Checker is an application designed to facilitate operational testing of the N-Wire emulator and target CPU connected to the PC.

Test description

N-Wire emulator test

This test is performed to check the N-Wire emulator connection, initialization, and the read/write operations of the target CPU registers. The test results can be output to a log viewer and log file.

DCK waveform test

This test involves outputting set data from the N-Wire emulator as a DDI signal in order to check the waveform of the DCK signal on the board using an oscilloscope.
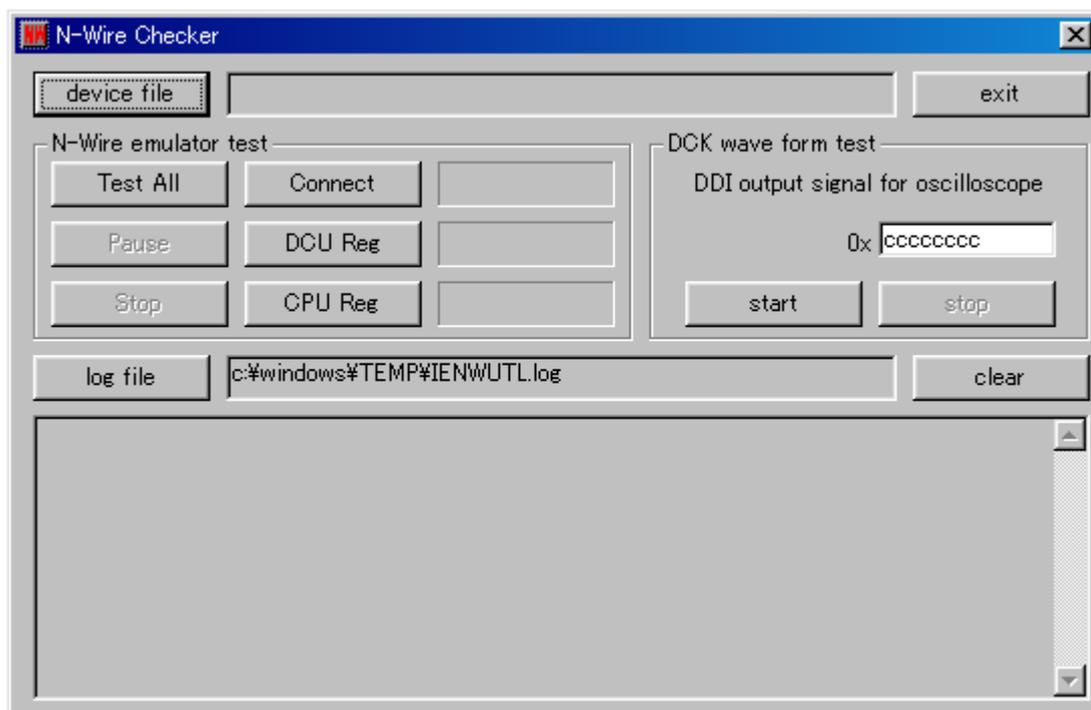
2. OPERATION

It is assumed that the ID850NW is already installed in the folder "NEC Tools32".

1. Apply power to the N-Wire emulator and target board, in that order.
2. Click the Start button on Windows and point to [Program] and [NEC Tools32], in that order.
    Then click [N-Wire Checker] to start up the N-Wire Checker. If the ID850NW is already
    running at this time, close it.

N-Wire emulator test

1. Click [Test All].
    The [Connect], [DCU Reg], and [CPU Reg] buttons can also be clicked independently.
2. When the test has finished, check that all the test items indicate OK.
    * If NG is displayed, refer to 4. HANDLING IN CASE OF NG.

        [Connect] OK
        [DCU reg] OK
        [CPU reg] OK

DCK waveform test

1. Connect the DCK signal on the target board to the oscilloscope probe.
   * Ensure that the power supply to the N-Wire emulator and target board is off before making the connection.
2. Input 4-byte data (default value: 0xcccccccc) under DDI output signal for oscilloscope and click the start button.
3. Observe the waveform using the oscilloscope.
4. Check that the waveform noise (reflection) is within the standard range shown below.
   * If the noise is not within this range, refer to 4. HANDLING IN CASE OF NG.
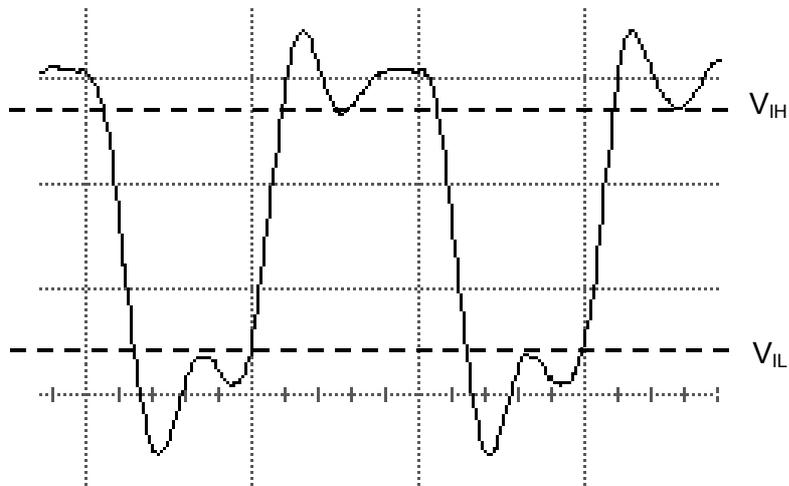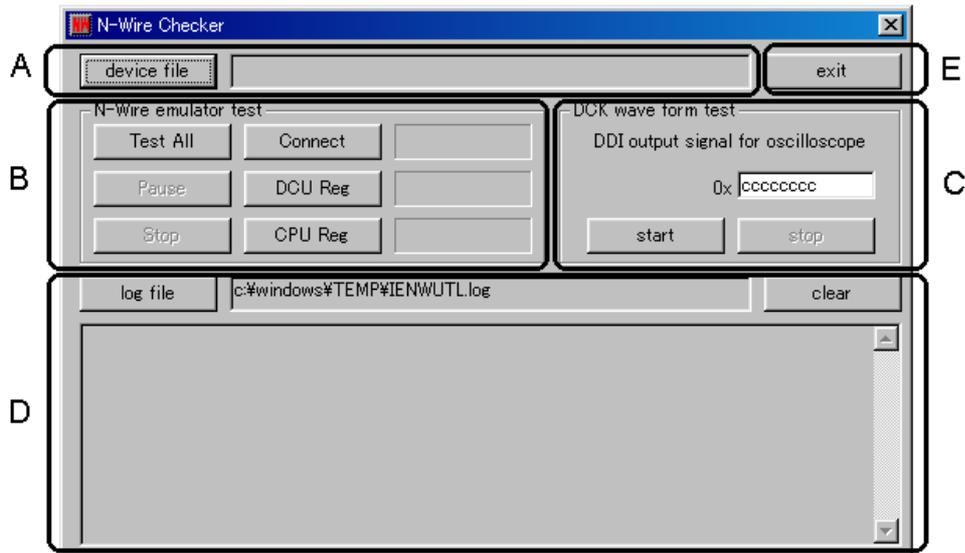

V_{IH}: Min. 2.4 V
V_{IL}: Max 0.6 V

Caution) Data is output starting from the LSB.

If data from the target board changes due to data shifting, the changed data will be output following the shift.

3. DESCRIPTION OF AREAS AND BUTTONS

A. Operational environment area

Object	Function
device file button	Displays a dialog box for specifying the name of the target CPU device file.
Text area	Displays the name of the target CPU device file and its path. Specify this when starting up the tool.

B. N-Wire emulator test area

Object	Function
Test All button	Tests Connect, DCR Reg, and CPU Reg, in that order.
Pause button	Pauses the test (click the Pause button again to resume testing).
Stop button	Stops the test.
Connect button	Executes a test in which communication with the target is initiated and initialization is performed.
DCU Reg button	Executes a test in which the DCU register is read/written.
CPU Reg button	Executes a test in which the CPU register is read/written.

C. DCK waveform test area

Object	Function
DDI output signal for oscilloscope area	Set the DDI signal data to be output from the N-Wire emulator. If a value of 0xffffffff or higher is set, an error will occur when the start button is clicked.
start button	Outputs the value (0 to 0xffffffff) specified in the text area under DDI output signal for oscilloscope.
stop button	Stops the signal for testing the value specified in the text area under DDI output signal for oscilloscope.

D. Log viewer area

Object	Function
log file button	Displays a dialog box for specifying the name of the log file to which the test results are to be output. (The default name is Windows\TEMP\IENWULT.log.) The log file will be overwritten when the N-Wire Checker is started up. If the file path is not specified, the following will occur: • If there is no environment variable TEMP → A log file will be created under the environment variable TMP. • If there is no environment variable TMP either → A log file will be created in the current folder.
Text area	Displays the name of the log file and its path.
clear button	Clears display of the log viewer area. If a log file name is specified in the log file text area, the contents of the log file will not be cleared.
Log viewer area	Displays the test results as a log. (Up to about 21,000 characters) The same contents are also output to the log file specified in the log file text area.

E. Other

Object	Function
exit button	Terminates the N-Wire Checker.

4. HANDLING IN CASE OF NG

N-Wire Emulator test

If [Connect] is NG

Check the settings of the driver and CPU in accordance with the contents of the error message.

	Error No.	Error Message	Action
1.	0x0100	Driver cannot be opened.	The driver may not be installed correctly. Reinstall the driver.
2.	0x0105	Failed in reading device file(dxxxx.800)	Specify the correct device file.
3.	0x0c43	Connection of emulator cannot be performed.	Check the emulator's power supply. The PC-IF cable may not be connected correctly, so also check this connection.
4.	0x03a0	Power supply of target is OFF.	Check the target power supply and the cable between the emulator and the target. Also check the emulator's VDD signal.
5.	0x0c70	DCU cannot be accessed.	Check the power supply of the chip and the connection of the signal lines (DCK, DMS, DDI, DDO, DRSTZ). Also check the noise level using the DCK waveform test.
6.	0x0c71	Reset cannot be performed.	Check the clock signal. The clock may be stopped, or be low speed.
7.	0x0c24	It cannot shift to debug mode.	Check the clock signal. The clock may be stopped, or be low speed.
8.	0x0c72	Monitor memory cannot be accessed.	Check the noise level using the DCK waveform test. There may also be a problem inside the chip.
9.	0x0c73	Monitor execution cannot be performed.	Check the noise level using the DCK waveform test. There may also be a problem inside the chip.
10.	0x0c74	CPU register cannot be accessed.	Check the noise level using the DCK waveform test. There may also be a problem inside the chip.

If [DCU Reg] is NG

It appears that the DCU registers cannot be accessed normally.

Execute a DCK waveform test.

If the DCK waveform test indicates no abnormalities, the registers may be damaged, so try using a different target board.

If [CPU Reg] is NG

It appears that the CPU registers cannot be accessed normally.

Execute a DCK waveform test.

If the DCK waveform test indicates no abnormalities, the registers may be damaged, so try using a different target board.

DCK waveform test

Check that the target board has been designed in accordance with Chapter 2 Cautions on Design of Target Board Hardware in the IE-70000-MC-NW-A User's Manual.

- Is the N-Wire interface signal pattern 100 mm or less?
- Is the DCK signal shielded by a 4.7 kΩ pull-up resistor + GND?
- Are 4.7 kΩ pull-up resistors attached to the DMS and DDI signals?
- Is a 22 Ω dumping resistor attached to the DDO signal?
- Is a 50 kΩ pull-down resistor attached to the DRSTZ signal?

Also check the capacitance of the power supply on the target board.

- Is a power supply with sufficient capacitance being used?
- Have enough capacitors been placed on the target board?
- Is a bypass capacitor connected to each of the CPU power supply pins?
- Is there sufficient GND area on the target board?

5. RESTRICTIONS

No more than 21,000 characters can be displayed in the log viewer area. If there are insufficient resources in the Windows 9x system, even fewer than 21,000 characters may be displayed.

If the number of characters exceeds the displayable limit, the oldest data will be overwritten. In this case, refer to the log file as all the data is recorded there.
In cases when there is a severe shortage of system resources, output to the log viewer area will stop. In this case, even though screen output has stopped, data will continue to be recorded in the log file and can be referenced from there.
(The log file is overwritten when the N-Wire Checker is started up.)