Embest UNetICE for ARM

Manual

Version 1.0

Content

I. Overview

Embest UNetICE for ARM is the new-generation high-speed real time in-circuit emulator that Embest introduced in August 2004 after the release of Embest PowerICE for ARM and Embest Emulator for ARM.

Compared with Embest PowerICE for ARM and Embest Emulator for ARM, this new emulator has following added features:

◆ Supports both 10/100M Ethernet and USB port communication, user can choose one of the two connection ways or shift between them;

◆ Supports Embest IDE for ARM, ARM/SDT and ARM/ADS integrated development environment;

◆ Downloading and debugging speed up to 800KB/S;

◆ Supports Internet sharing among development team and remote debugging;

◆ With powerful emulator management software UNetICE Manager to support the settings of online IP address, subnet address, Mac address; fast software upgrade within 30s; it has an information window to provide auxiliary debugging information;
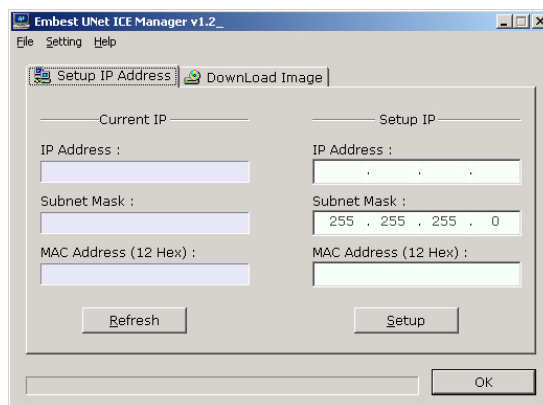
Main features:

1. Supports ARM series kernel chips;

2. Driver program supports Windows98/NT /2000 /XP;

3. Supports standard 20-pin JTAG port;

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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

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#85 Taining Road,
Shenzhen, Guangdong, China(518020)
http://www.embedinfo.com

4. Supports assembler level debugging, support ARM. THUMB and instruction set across debugging;

5. Supports standard C language program debugging;

6. Non-plug-in debugging, consume no resources of board;

7. Supports high-speed online Flash programming;

8. Supports maximum two hardware breakpoints, two data breakpoints and unlimited software breakpoints.

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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

Room 509, Luohu Science&Technology Building,   4
#85 Taining Road,
Shenzhen, Guangdong, China(518020)
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II. UNetICE Connections

2.1 UNetICE Hardware

Embest UNetICE emulator includes:

- JTAG port for connecting target board;

- USB and Ethernet ports for connecting host

- RESET and UPDATER buttons

- External power supply socket and power switch

- Red, green, yellow emulator state indicator

See details in diagram below:
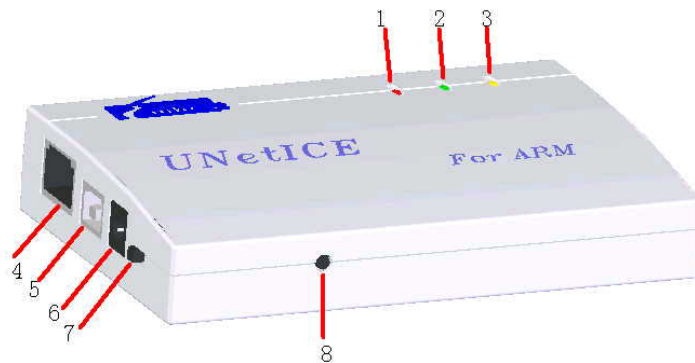
Figure 2-1 Frontal view of UNetICE

Figure 2-2 Rear view of UNetICE

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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

Room 509, Luohu Science&Technology Building, 5
#85 Taining Road,
Shenzhen, Guangdong, China(518020)
http://www.embedinfo.com

No.	Item	Functions
1	Power indicator (PWR)	Indicate the state of power supply
2	State indicator (RUN)	Indicate running state of emulator
3	Alarm indicator (ALARM)	Indicate error alarm
4	Ethernet port	The communication port connected to host in Ethernet way.
5	USB port	The communication port connected to host in USB way.
6	External power supply socket	Use external power supply
7	Power switch	Switch power supply modes (USB power supply / external power supply)
8	RESET	Reset emulator
9	JTAG port	20-pin IDC plug port
10	UPDATER (FUNC)	Press the button when resetting the emulator to enter updater mode

2.2 Connections of emulator

In the host-target machine cross development model, through debugging device the host is connected with target machine, and conducts download and debugging. UNetICE is a JTAG emulator, connected to JTAG port of target board via a 20-pin IDC straight-through cable (1-1, 2-2, … 20-20), connected to host through USB or Ethernet port. User can select an appropriate connecting way according to their requirement.

USB connection type

USB (Universal Serial Bus) is a new port technology in PC application, it provides power supply and high-speed telecom channels for peripheral equipment, bringing users a lot of convenience.

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Fax: +86-755-25616057
Email: market@embedinfo.com

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The host can be connected to UNetICE emulator through a special USB cable. See figure below, the A-type male port in the left is connected with the A-type female port of host, the B-type male port in the right is connected with the B-type female port of target board. If you need to use USB as power supply device, you can adjust the power switch.
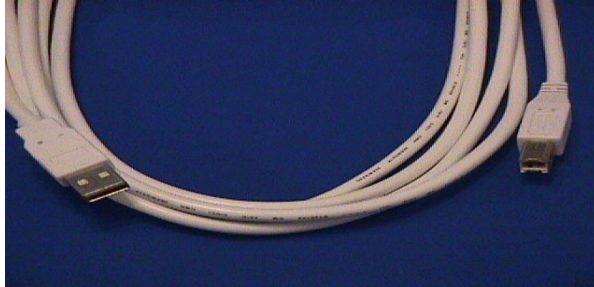

Figure 2-3 USB cable

Ethernet connection type

There are two ways of Ethernet connection, one is standard Ethernet connection, use two parallel network cable (see figure below) to connect host, target board and HUB to constitute a LAN. The other way is using one cross cable to connect the host and target machine directly.

Figure 2-4 Ethernet cable

Power supply

User can choose 5V power supply through USB port by operating power switch; or alternatively choose 6~9V external power supply. In external power supply socket, the inside is positive, the outside is negative, see the figure below:
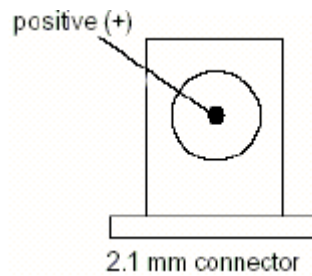
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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

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Figure 2-5 power supply socket

2.3 Indicators

Functions of indicators: PWR: indicate the state of power supply; RUN: indicate running state of emulator; ALARM: indicate error alarm. See details in the table below:

Names of indicators	Description of indicator state
PWR	Power indicator "on": indicate normal power supply.
RUN	When the emulator is powered on, it enters normal mode, the indicator is on. In normal mode, when the debugging software is connected to emulator, the indicator blinks; When the emulator is powered on, while in updater mode, the indicator is on (ALARM indicator is also on) In updater mode, during the process of downloading, the indicator blinks;
ALARM	The indicator is on, the system enters updater mode; The indicator turns on, then turns off in 1 second, indicating an alarm message created; The indicator blinks for 5 seconds, turns on then turns off in 1 second, indicating an error message created.

2.4 Port signal

- **JTAG**

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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

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#85 Taining Road,
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The definition of JTAG port is shown in the figure below (the RES pin can be used for future upgraded versions, please refer to relevant specification)
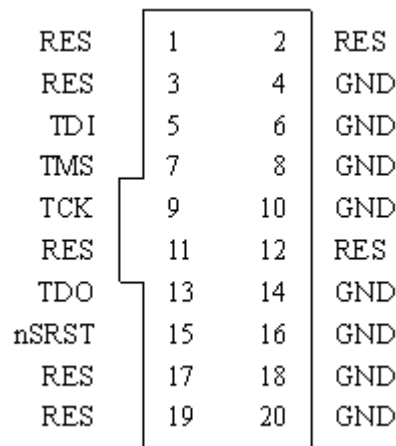
RES	1	2	RES
RES	3	4	GND
TDI	5	6	GND
TMS	7	8	GND
TCK	9	10	GND
RES	11	12	RES
TDO	13	14	GND
nSRST	15	16	GND
RES	17	18	GND
RES	19	20	GND

Figure 2-6 Definition of 20-pin JTAG port cable

Description of pin signal

Signal	I/O	Description
GND	—	Power Ground.
TDI	Output	The testing data input signal from Embest Emulator to JTAG port of target board, It is recommended to add a pull-up or pull-down resistance.
TMS	Output	The testing mode signal from Embest Emulator to JTAG port of target board, the signal should be pulled up in target board, to avoid possible negative impact caused by change in TCK pin before connecting.
TCK	Output	The testing clock signal from Embest Emulator to JTAG port of target board, It is recommended to add a pull-up or pull-down resistance.
TDO	Input	The testing data output signal from JTAG port of target board to Embest Emulator.
nSRST	Output	The system reset signal from open collector of

Embest Emulator to target board. the signal should be pulled up in target board, to avoid possible unexpected reset before connecting.

RES　　—　　Reserved.

● **USB**

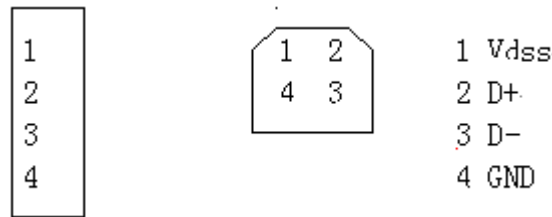The definition of USB port is shown in the figure below:

Figure 2-7 definition of USB port

Description of pin signal:

Signal	Specification
VDss	USB port can be used to supply power to peripheral equipment, voltage range of USB port: 4.4-5.25V
D+	Communication channel
D-	Communication channel
GND	Grounding

● **ETH**

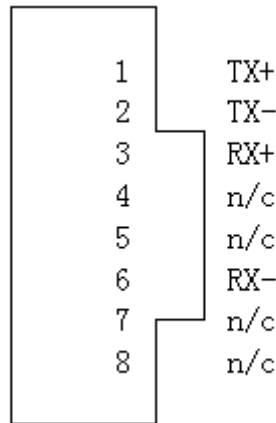The definition of Ethernet port is shown in the figure below:

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Figure 2-8 Definition of Ethernet port

Description of pin signal:

Signal	Specification
TX+	Tranceive Data+
TX-	Tranceive Data-
RX+	Receive Data+
RX-	Receive Data-
n/c	Not connected

2.5 USB driver installation

If connecting UNetICE emulator in USB way, you need to install USB driver program following the procedures below, the USB driver program is saved in the folder UNetICE USB Driver under root directory of driver CD.

1. Connect PC and UNetICE emulator through USB cable, when the emulator is powered on, PC finds the new USB device and pops up a dialog box "Found New Hardware Wizard" , click "NEXT";

2. Select "search for a suitable driver for my device" in the dialog box "Install hardware driver program", click "NEXT";

3. Select "Specify a location" in the dialog box "Found driver program files", click "next", choose USB driver folder in the source of manufacturer file, e.g. F:\UNetICE USB Driver.

4. When the installation is completed, the system displays "Completing the Found New Hardware Wizard", indicating you have successfully installed Embest UNetICE device.

III. Configuration of emulator

Embest UNetICE Manager is the special management software of UNetICE emulator, it is used to Setup IP address, MAC address, subnet address of emulator, load and upgrade modules, output debugging information.

To ensure normal connection, debugging and downloading, user need to use Embest UNetICE Manager to properly configure the emulator before using it.

3.1 Embest UNetICE Manager

● **Introduction**

Embest UNetICE Manager is the software kit of Embest UNetICE emulator, it is used to setup IP address, MAC address of UNetICE, update and upgrade UNetICE firmware, in addition, when UNetICE supports SDT2.51/ADS1.2 environment to conduct development and debugging, UNetICE Manager provides information window to display output information of UNetICE.

Embest UNETICE has two working modes: normal and updater. The settings of IP address, MAC address and firmware update, upgrade proceed in updater mode, emulator monitoring information in normal debugging mode.

● **Installation**

Embest UNetICE Manager runs in PC, supporting Windows98 / Windows2000 / WindowsXp. To install it, run setup.exe under folder /UNetICE Manager, the default installation directory is {EmbestIDE}\Tools\UNetICE Manager, user can select an installation directory from the browse window, and can create a shortcut if necessary. Restart PC when the installation is finished.
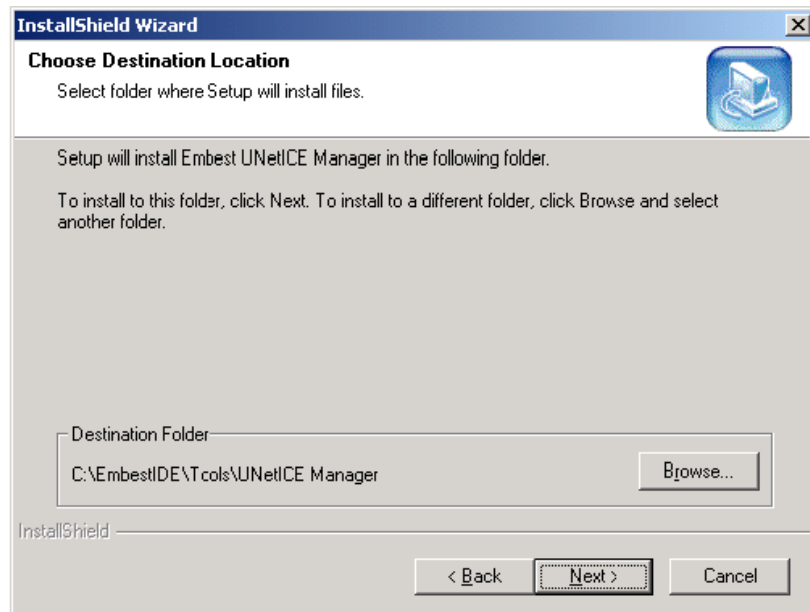
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Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

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#85 Taining Road,
Shenzhen, Guangdong, China(518020)
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Figure 3-1 Installation interface

3.2 Setup IP address

To Setup IP address, the emulator must work in Updater mode. The IP address can follow the steps below:

(1) Start-up emulator and enter Updater mode

Continuously press Updater button of Embest UNetICE emulator, press RESET button to restart UNetICE emulator, let the emulator enter Updater mode, UNetICE's RUN and ALARM indicators are on after start-up, indicating Updater is ready to operate.

(2) Run Embest UNetICE Manager

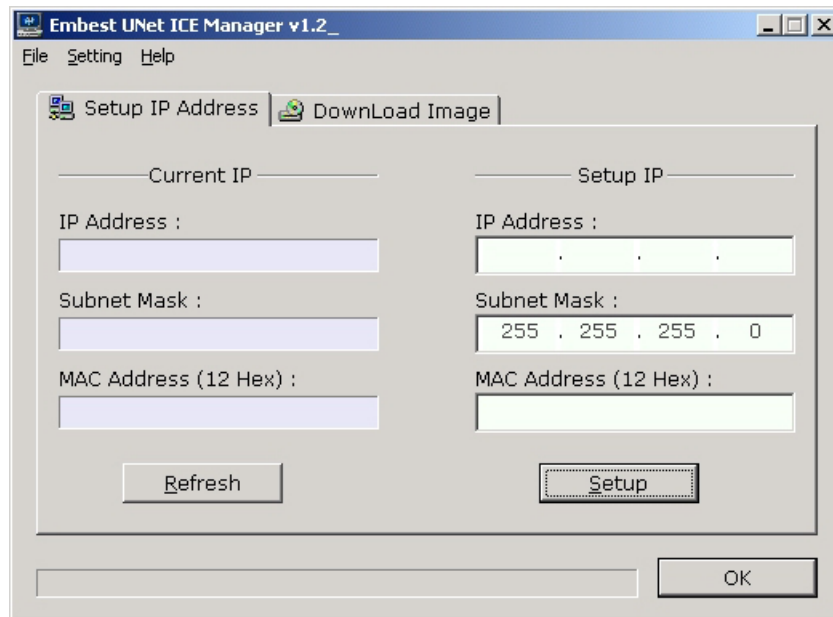Run Embest UNetICE Manager in PC, select the property page [Setup IP Address].

Figure 3-2 UNetICE IP address setting interface

(3) Configure options of telecom

Select the option [Setting]→[Configure…], configuration dialog box pops up.

In the column Remote Device, select UNetICE.

In the column Debug Speed, select Full Speed.

In the column Select Communication Type, select USB or TCPIP according to the communication type between UNetICE and the host, if you choose TCPIP enter UNetICE's current IP address in IP Address column.
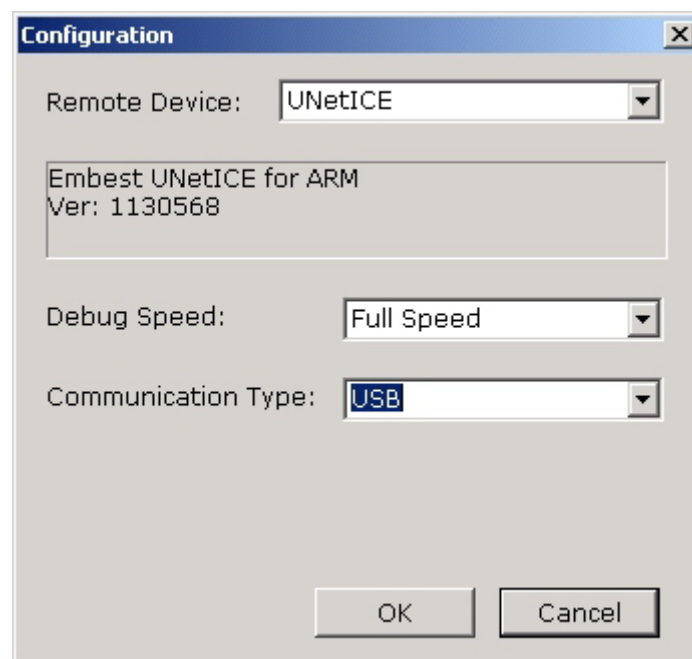
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Fax: +86-755-25616057
Email: market@embedinfo.com

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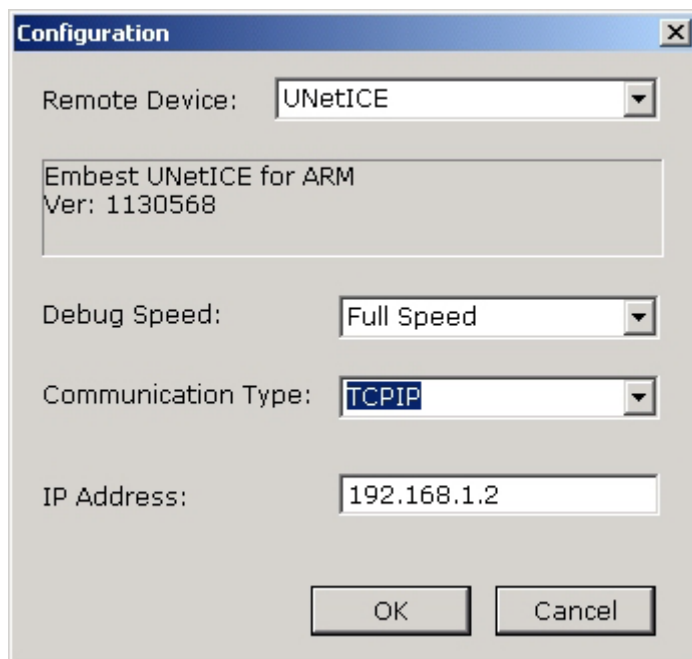
Figure 3-3 configure USB communication type

Figure 3-4 Configure TCP/IP communication type

Notice: if you don't know UNetICE's IP address, you can choose USB communication type to set it.

(4) Get displayed IP address setting information

Click [Refresh] button, if the communication type is properly set, UNetICE's current IP address information will be displayed in the column Current IP.
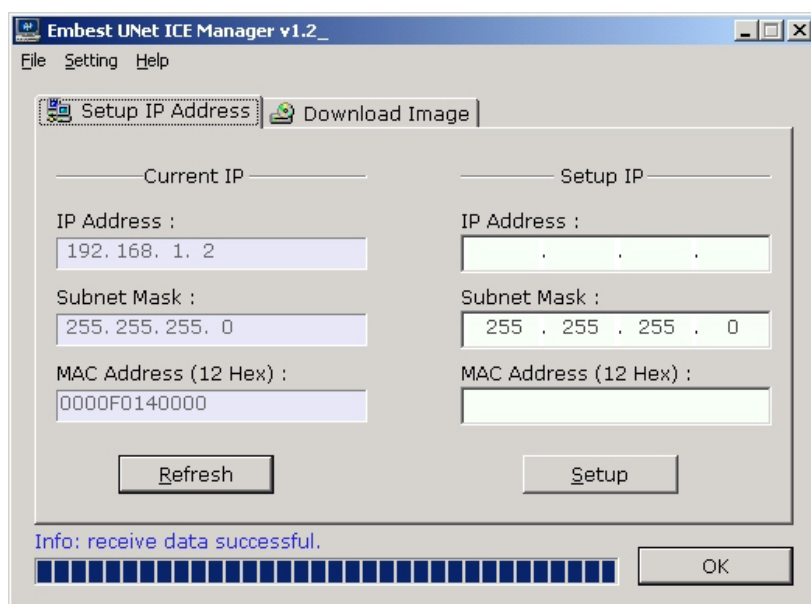
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Email: market@embedinfo.com

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Figure 3-5 The original IP address

(5) Setup IP address

In the column Setup IP, enter the IP address, Subnet Mask code to be setup. If you need setup UNetICE's MAC address, enter 12-digit hexadecimal MAC address in the column MAC.
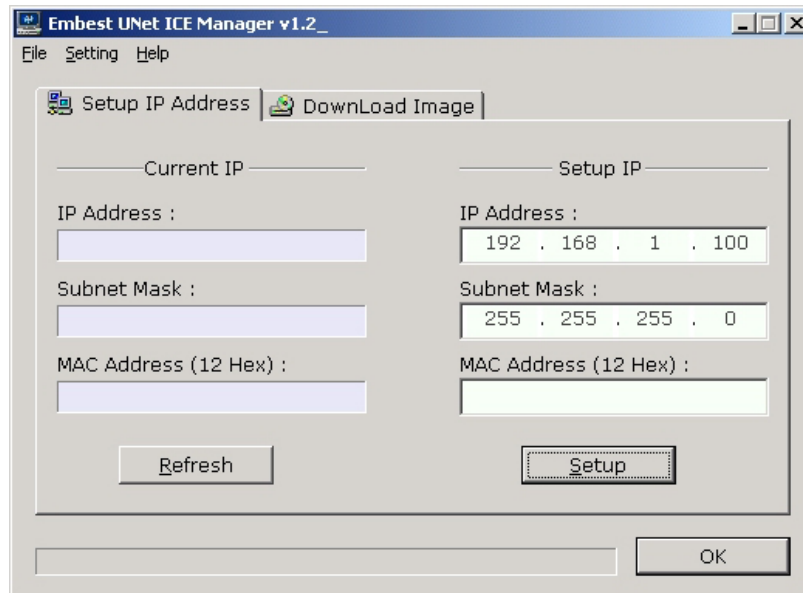

Figure 3-6 Setup UNetICE IP address

Notice: make sure the IP address, MAC address to be setup do not conflict with other machines, subnet mask code compliant to subnet. If you have modified UNetICE MAC, you need to restart the host directly connected with UNetICE.

(6) Write setup parameters and return

When you have confirmed IP address, click [Setup] address to setup UNetICE's address. When the setup is finished, click [Refresh], the IP address already set will be displayed in the left column Current IP.
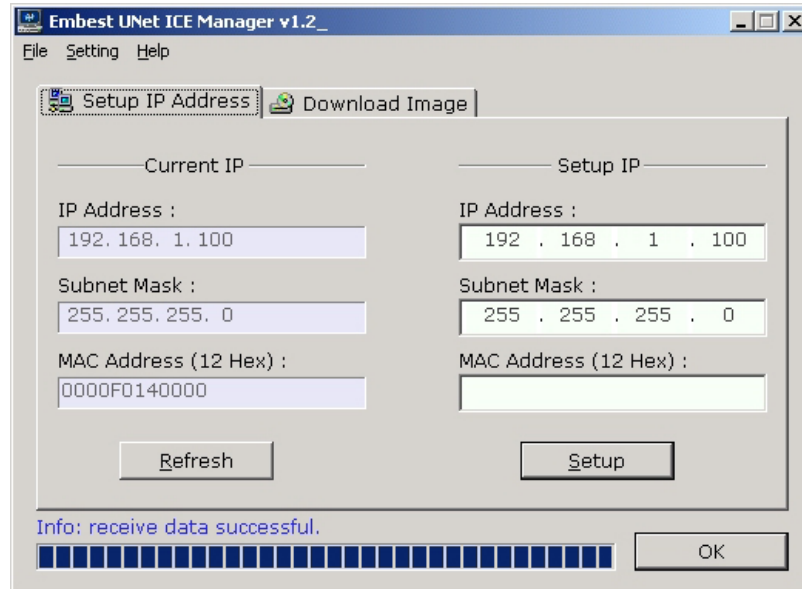
Figure 3-7　New IP address after setup

(7) Restart UNETICE

When IP address setup is finished, restart UNetICE, UNetICE will run the software at the new IP address (on condition that the new address does not conflict with other host IP addresses).

3.3 Software upgrade

Embest UNetICE Manager supports the online upgrade of the emulator. The upgrade files include master program files and debugging module files that support various processors. The function and version of files can be displayed in UNetICE Manager interface, users can download the latest version of files from Embest's website. The software can be upgraded following the procedures below:

(1) Start-up emulator and enter Updater mode.

Continuously press the Updater button of Embest UNetICE emulator, press RESET button to restart UNetICE emulator, let the emulator enter Updater mode, UNetICE's RUN and ALARM indicators are on after start-up, indicating Updater is ready to operate.

(2) Run Embest UNetICE Manager

Run Embest UNetICE Manager in PC, select the property page [Download Image].
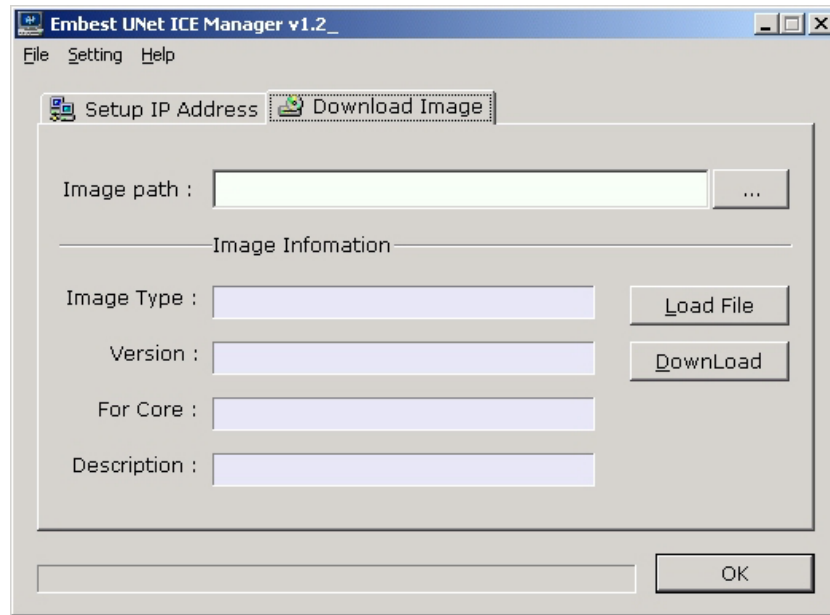
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Fax: +86-755-25616057
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Figure 3-8 UNetICE software upgrade interface

(3) Configure options of telecom

Select the option [Setting]→[Configure…], Configuration dialog box pops up.

In the column Remote Device, select UNetICE.

In the column Debug Speed, select Full Speed.

In the column Select Communication Type, select USB or TCPIP according to the communication type between UNetICE and the host, if you choose TCPIP enter UNetICE's current IP address in IP Address column.
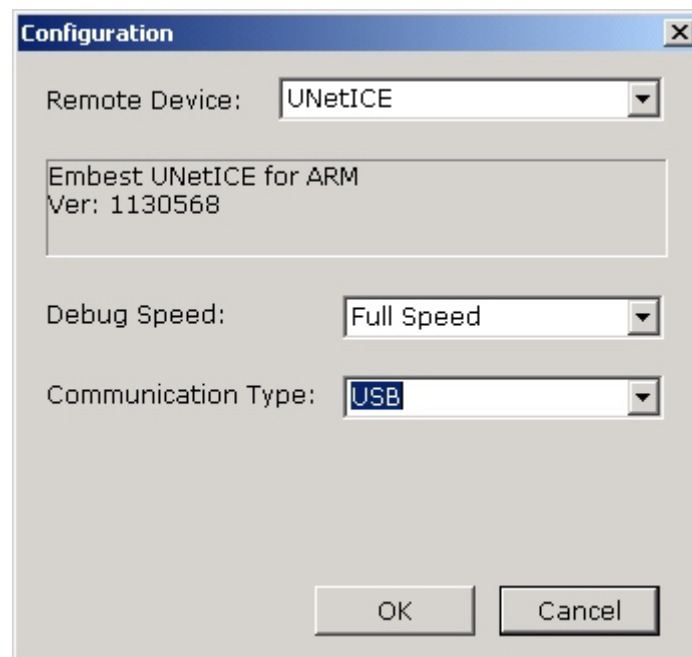
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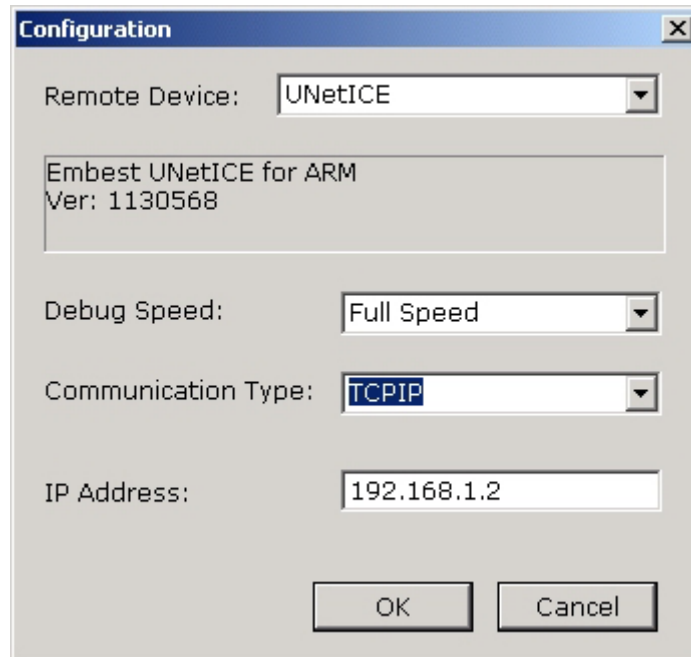http://www.embedinfo.com

Figure 3-9 Configure USB communication type

Figure 3-10 Configure TCP/IP communication type

Notice: if you don't know UNetICE's IP address, you can choose USB communication type to set it.

(4) Load upgrade files

Enter the path of upgrade files in the column Image path, then click the button [Load File], UNetICE Manager will automatically identify the upgrade file modules, if the file is legal UNetICE software upgrade files, the software interface will automatically display the information of upgrade files.
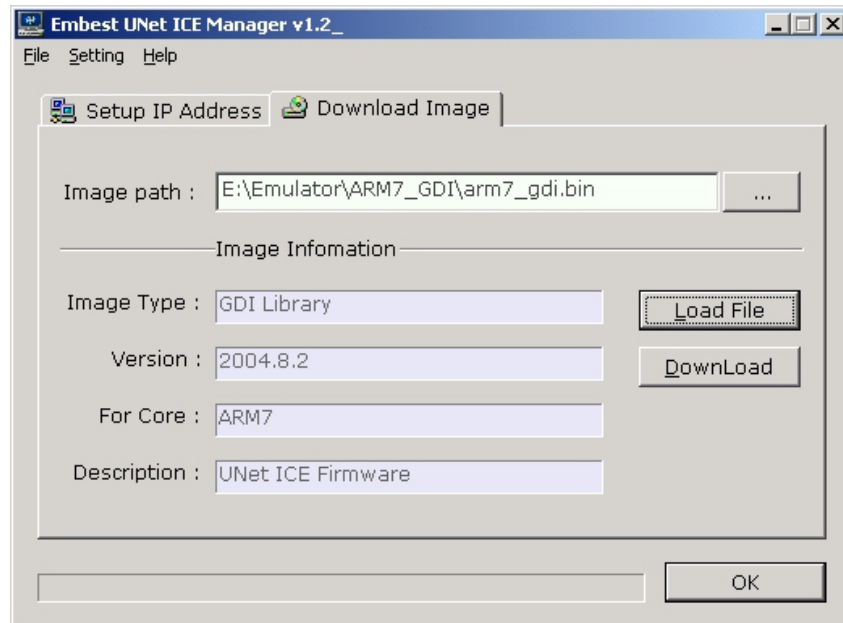
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Tel: +86 755 25635656
Fax: +86-755-25616057
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Figure 3-11 UNetICE Manager displays the information of upgraded files

(5) Download upgrade files to UNETICE

Click [Download] to download the files to UNetICE, UNetICE will automatically update corresponding software modules, in upgrading process, RUN indicator blinks. When check is completed, UNetICE software upgrade is finished.

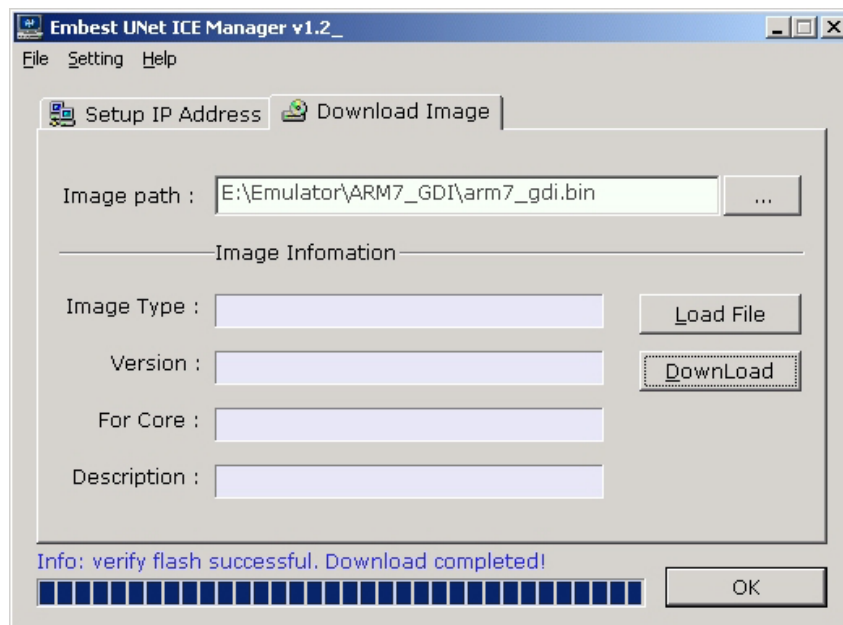Figure 3-12 the interface after UNetICE software upgrade

(6) Reset UNetICE

When the software upgrade is finished, reset UNetICE, UNetICE will run based on the upgraded software.

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Fax: +86-755-25616057
Email: market@embedinfo.com

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3.4 Emulator monitoring information

UNetICE emulator supports the debugging under ARM SDT 2.51 and ARM ADS 1.2 development environment. If UNetICE is used under SDT or ADS environment, UNetICE Manager will provide an information window to monitor output information of UNetICE.

(1) Start-up Embest UNetICE Manager configure communication options

Run Embest UNetICE Manager in PC

Select [Setting]→[Configure…], Configuration dialog box pops up.

In the column Remote Device, select UNetICE.

In the column Debug Speed, select Full Speed.

In the column Select Communication Type, select USB or TCPIP according to the communication type between UNetICE and the host, if you choose TCPIP, enter UNetICE's current IP address in IP Address column.

Figure 3-13 configure USB communication type
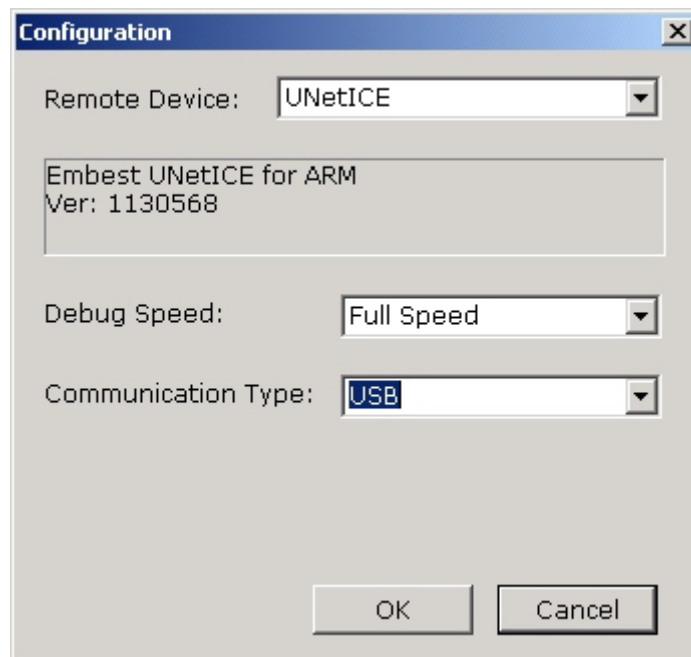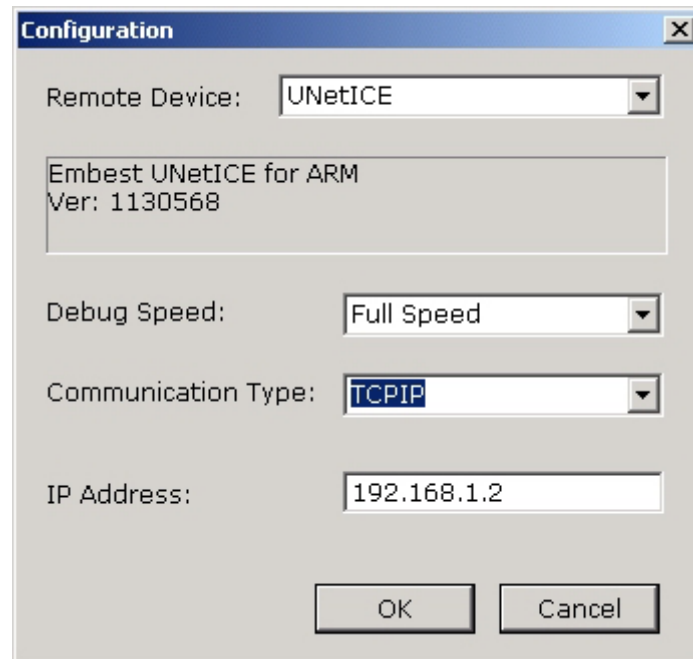
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Tel: +86 755 25635656
Fax: +86-755-25616057
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Figure 3-14 Configure TCP/IP communication type

Notice: if you don't know UNetICE's IP address, you can choose USB communication type to set it.

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(2) Open UNetICE information output channels

Select the menu [File]→[Message Window], an information window pops up, when information output monitoring window is opened, UNetICE information output window will be automatically opened.

Figure 3-15 Open monitoring information window
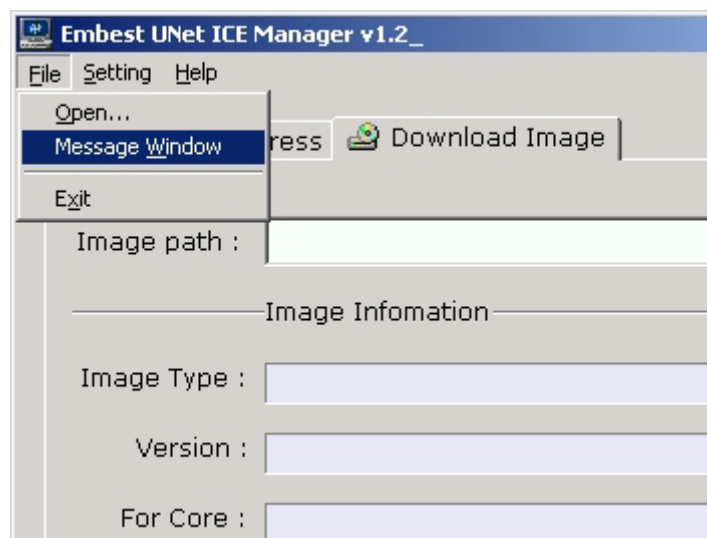

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Tel: +86 755 25635656
Fax: +86-755-25616057
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If you have opened several UNetICE windows, the most recent UNetICE information window is current window. The effective information window will prompt "Open remote output ok!"; if the opened information window fails to connect UNetICE, it will prompt "Cann't open remote output."
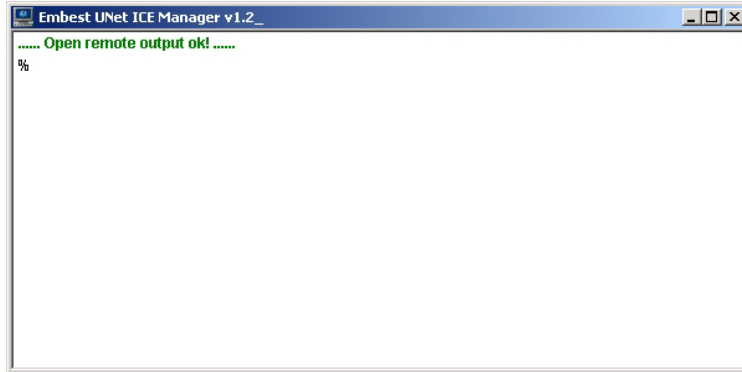

Figure 3-16 UNetICE information window open ok

Figure 3-17 UNetICE information window connect failed

(3) Close UNetICE information output

Close information output window, UNetICE information output channel will be closed.

(4) Clear message

Move the mouse to information output window, click the right button of mouse to pop up the menu, select [Clear Message] to clean the old message.
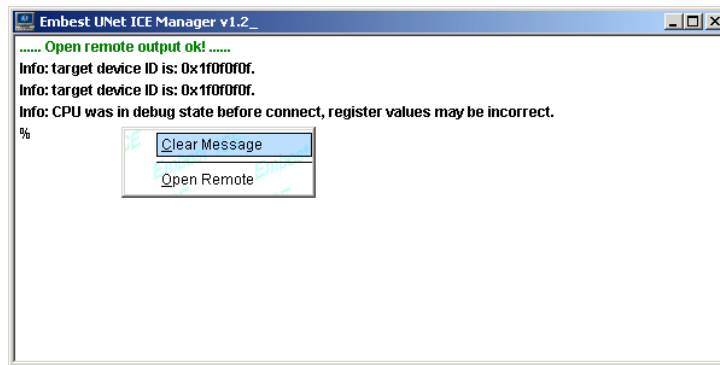
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Fax: +86-755-25616057
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Figure 3-18 Clear the old message

(5) Reconnect UNetICE

When the information opens, it automatically connect UNetICE, if connection fails, or UNetICE resets, reconnect UNetICE. Move the mouse to output window, click the right button of mouse to pop up the menu, select [Open Remote], reconnect UNetICE.

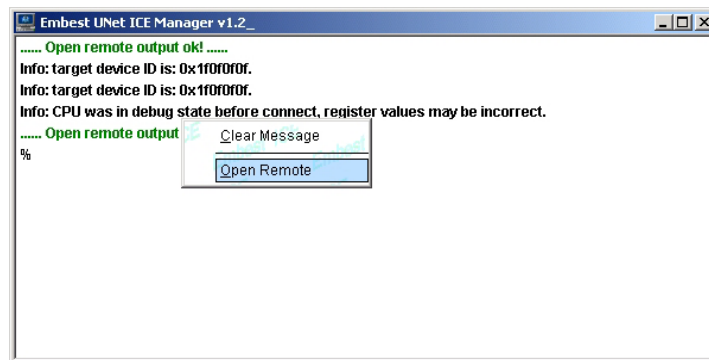Figure 3-19 Reconnect UNetICE

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IV. Software settings

4.1 Embest IDE settings

Run Embest IDE, select the option Project>Settings…, pop up the dialog box "project settings", select Remote option, see the figure below, user can configure the connection of emulator.
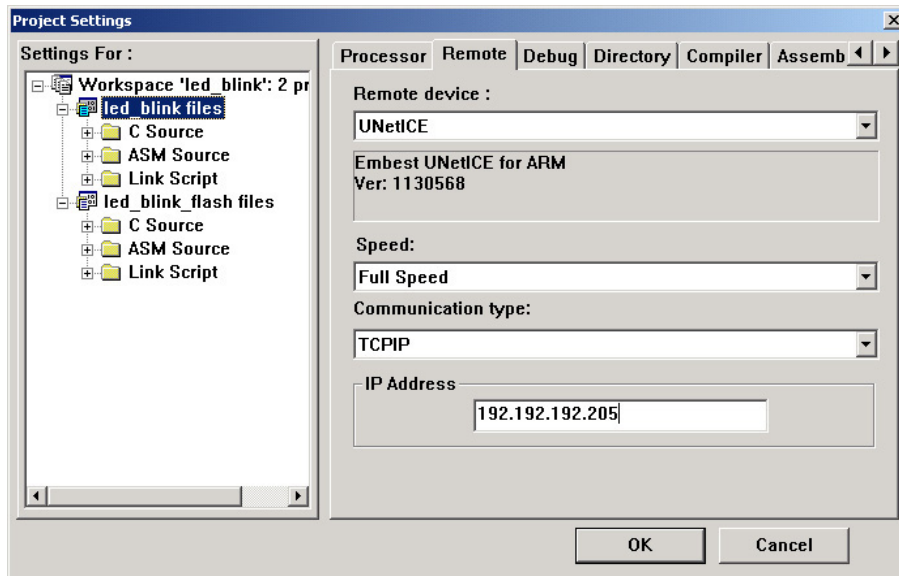

Figure 4-1 Ethernet connection configuration of UNetICE emulator

There are two setting items in the dialog box:

Remote device: it is to set the remote debugging device, if you use UNetICE, choose "UNetICE", see the above figure.

Speed: it is to set the download debugging speed, this setting is only available when the emulator supports debugging download speed.

Embest UNetICE	Full Speed, High Speed, Medium Speed, Low Speed.

Communication type: set the way of connection between the emulator and host.

Embest UNetICE	TCPIP Ethernet connection
	USB connection

IP Address: set IP address of UNetICE emulator, this address can be set online through UNetICE Manager software.

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Fax: +86-755-25616057
Email: market@embedinfo.com

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If you select USB communication type, no IP address setting page will be displayed.
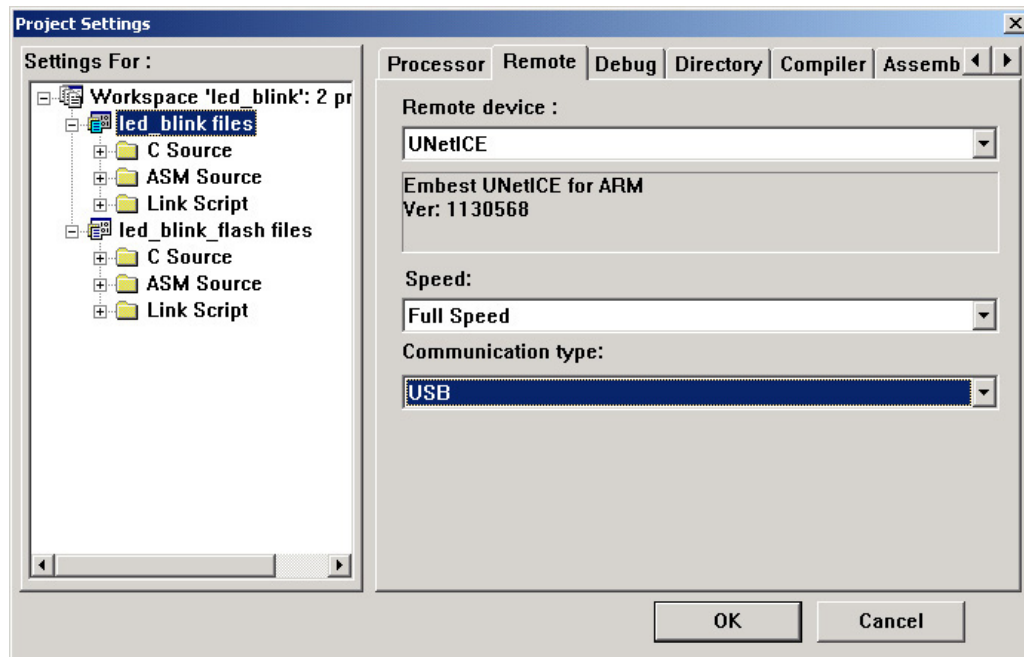

Figure 4-2 USB connection configuration of UNetICE emulator

References of error information

UNetICE emulator has added the following error information, other error information please refer to Embest IDE User's Manual

1001	**Usb or net initial failed.**	
	Brief description	**Usb or net initial failed.**
	Reasons and solution	Possible reasons:
		■ UNetICE emulator is not started-up, restart it.
		■ USB or network cable is improperly connected, check USB or network cable connection.
		■ USB is blocked, use IDE to reconnect UNetICE, or reset the emulator to reconnect UNetICE.
		■ USB driver load failed; disconnect IDE, reset the emulator then reconnect.
		■ IP or MAC address conflict with other hosts; use UNetICE Manager to

Embest Info&Tech Co.,LTD.
Tel: +86 755 25635656
Fax: +86-755-25616057
Email: market@embedinfo.com

Room 509, Luohu Science&Technology Building, 27
#85 Taining Road,
Shenzhen, Guangdong, China(518020)
http://www.embedinfo.com

		reconfigure the emulator's IP or MAC address. ■ IP address of UNetICE in IDE is incorrect, set correct IP address of emulator in IDE.
1002	**send command failed.**	
	Brief description	**send command failed**
	Reasons and solution	Possible reasons: ■ Send data failed in the communication with UNetICE emulator, disconnect IDE and UNetICE emulator, reconnect them.
1003	**receive response command time out.**	
	Brief description	**receive response command time out** .
	Reasons and solution	Possible reasons: ■ Receive response command time out in the communication with UNetICE emulator, disconnect IDE and UNetICE emulator, reconnect them.

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