Matrix 604 Quick Installation Guide

Overview

Matrix 604 is a WinCE ready, ARM9-based embedded computer. Its lower power and robust design concept makes it an ideal industrial computer platform for harsh environment. The WinCE 6.0 OS is pre-installed in the on-board Flash memory and the SDK for Microsoft Visual Studio 2005 coming with Matrix 604 CD is ready for your application development.

Features

1. ARM926EJ-S ARM Thumb Processor 400MHz w/MMU
2. 32-KByte Data Cache and 32-KByte Instruction Cache
3. 64MB SDRAM, 128MB NAND Flash on board
4. One 10/100 Mbps Ethernet
5. Two USB 2.0 full speed (12 Mbps) Host Ports
6. One software configurable RS-232/422/485 port and three RS-232/485 ports
7. One serial console port
8. 5 programmable GPIO
9. 9 to 48VDC power input
10. Pre-installed WinCE 6.0 and file system
11. SDK available in Artila CD
12. Supporting WinCE Remote Display Control
13. Optional DIN RAIL mounting adaptor

Packing List

Matrix 604 is shipped with following items
1. Matrix 604
2. Artila CD includes SDK, Installation guide and Remote Display Control software and example programs

Optional Accessory

1. CB-RJ45F9-150: RJ45 to DB9 Female Cable
2. CB-RJ2CON-100: Serial Console Cable
3. DK-35A: DIN RAIL Mounting Kit
4. PWR-12V-1A: 110~240VAC to 12VDC 1A Power Adaptor

Matrix 604 Layout

10/100Mbps Ethernet
USB2.0 Host x2
9-48VDC Power
Reset
Serial Console & GPIO

Power LED
System Ready LED
Ethernet LED

Serial Port LED

P1/P2/P3/P4 Serial Ports

USB Port

The USB port is an USB2.0 full speed host port. It can be used to expand the storage of Matrix 604. USB client can work with ActiveSync to exchange file and data between PC and Matrix 604.

Reset Button

Press the "Reset" button to activate the hardware reset. Please always use "*reboot*" command to reset Matrix 604. You should only use this function if the software reboot does not function properly.

Power LED

The Power LED will show solid green if power is properly applied

Ready LED

After Power ON, Matrix 604 starts booting. Once system is boot up, the Ready LED will show solid green.

Link/Act LED

When Ethernet port are connected to the network, Link/Act will show solid green and if there is traffic in the Ethernet, this LED will flash

Serial Port LED

These four dual color LEDs indicate the data traffic at the serial ports. When RXD line is high then Green light is ON and when TXD line is high, Yellow light is ON.

Serial Port

The four serial ports can be configured as RS-232, RS-422 or RS-485 by software. They use RJ45 connector and the pin assignment are shown as following table.

Pin	RS-232	RS-422	RS-485
1	DSR	---	---
2	RTS	TXD+	Data+
3	GND	GND	GND
4	TXD	TXD-	Data-
5	RXD	RXD+	---
6	DCD	RXD-	---
7	CTS	---	---
8	DTR	---	---
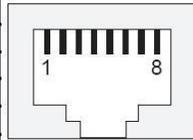
Port 1: RS-232/422/485
    RS-232: RXD,TXD,RTS,CTS,DSR,DTR,DCD,GND
    RS-422: TXD+, TXD-,RXD+,RXD-,GND
    RS-485: DATA+,DATA-,GND
Port 2/3/4:
    RS-232: RXD,TXD,RTS,CTS,GND
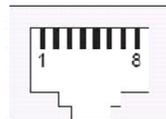   RS-485: DATA+, DATA-, GND

Serial Console & GPIO Port:

Serial console port is used for locally accessing Matrix 604 system using RS-232 port. The console port uses RJ45 connector and is next to Ethernet port. Therefore please be careful to plug in the right connector

Port 0: RS-232:RXD,TXD,GND

| Pin	Definition
1	PIO0
2	TXD
3	GND
4	PIO1
5	PIO2
6	PIO3
7	RXD
8	PIO4

Console

Therefore you need to prepare or purchase the serial console cable (CB-RJ2CON-100) in order to use the serial console port .
In addition to the serial console signal, the console RJ45 port also provides GPIO (programmable I/O signal) function. The GPIO port is CMOS I/O and can be programmed as digital input or output. Power up setting is digital input mode with 75K ohm pull up resistor.
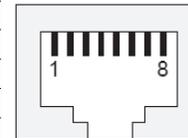
Power Connector

Connect the 9 to 48VDC power line to Matrix 604. If the power is properly supply, the power LED will show a solid green color.
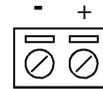
Ethernet Port

The Ethernet Port use RJ45 connector

Pin	Signal
1	ETx+
2	ETx-
3	ERx+
6	ERx-

Power on and System boot up

Once Matrix-604 is correctly power on, you can see the message prompt from the serial console port. The system starts from the initial table and a batch file,*autoexec.bat* which is located at \NandFlash will follow up. Therefore user can edit the *autoexec.bat* file or init table for your auto run program. To skip the autoexec.bat, please repeatedly key $ (shift+4) right after system boot up.

```
USB:OhcdPdd_Init
++InitializeOHCI
--InitializeOHCI
ATMEL_usbfn!C_USB_DEVICE::ThreadRun: : Attach Detected
 Pocket CMD v 6.00
\> Pocket CMD v 6.00
\> REM Execute the following commands when system startup
\>
\> REM Initialize all GPIOs as input mode
\> gpio.exe
\>
\> REM Network Setting
\> REM ifconfig -n NET1 -i 192.168.2.127 -g 192.168.2.1 -m 255.255.255.0
\>
\> REM Set UART interface
\> REM setuart -p 3 -t 232
\>
\> REM set GPIO pin
\> REM gpioctl -i 1 -m 1 -s 0
\>
\>
```

Initial Table:

WinCE uses initial table to decide the order of program/service to start after power on. You can use *init* command to configure the initial table as follow:
Number 70 is Artila Manager and Number 71 is WinCE remote display control.

```
\> init -h
Ver. 1.00
Usage: init [-a|-r|-l| -d| -n| -h]
     -a <application name>   : Add application to init table
     -r <70...99>            : Remove application from init table
     -n <70...99>            : Specify application number
     -d "number number ..."  : Depended application
     -l                      : List init table
     -h                      : Display this usage
70  amgrd.exe
71  cerdisp.exe
```

Network Settings

To configure the network setting by serial console, you can use command *ifconfig* as followed.   To check current network configuration, you can use command *ipconfig*

```
Windows IP configuration

Ethernet adapter [NET1]:
        IP Address ........ : 169.254.107.225
        Subnet Mask ....... : 255.255.0.0

        DNS Servers........ : 192.168.1.1

\> ifconfig -h
Ver. 1.00
Usage: ifconfig [-n|-i|-m| -g| -d| -h]
      -n <adapter name>        : Ethernet adapter name
      -i <IP address or DHCP>  : Static IP or DHCP
      -m <Netmask address>     : Subnet Mask
      -g <Gateway address>     : Default gateway
      -d <DNS address>         : Domain Name Server
      -h                       : Display this usage
\>
```

User Account Manager

To create user group and account, you can use command *usrmgr.* After user's account and password are created, user can add authentication in telnet and ftp function by using *telnetdcfg* and *ftpdcfg*.

```
Usage: usrmgr [-a|-d|-l] [<user name> [<password>]]
      -a <user name> <password> : Add or update a user
      -d <user name>            : Remove a user
      -l                        : List all users
      -gn                       : Create a new group
      -gd                       : Delete a group
      -gl                       : List all groups
      -gm                       : List members in a group
      -gat                      : Add a user to a group
      -grf                      : Remove a user from a group
\>
```

Telnet Configuration

Telnet is enabled without authentication as factory default. To disable or add authentication, please use command *telnetdcfg* as follow:

```
telnetdcfg [IsEnabled] [UseAuthentication]
1:enabled, 0:disabled
```

FTP Configuration

FTP is enabled without authentication as factory default. To disable or add authentication, please use command *ftpdcfg* as follow:

```
ftpdcfg [IsEnabled] [UseAuthentication] [AllowAnonymous]
1:enabled, 0:disabled
\> _
```

File System

User programs and files should be saved at NandFlash. The other folders are saved as RAMDisk therefore do not save your data to them. Under NandFlash, you will find *www* folder and *autoexec.bat* file. Www is for web page and *autoexec.bat* is for auto run program. If you have a USB disk plugged in Matrix-604, you will find a new folder *Hard Disk* available.

```
\> dir
    Directory of \

01/01/98  05:00a  <DIR>           NandFlash
07/13/10  05:35p  <DIR>           Application Data
07/13/10  09:35a            23    Control Panel.lnk
07/13/10  09:35a  <DIR>           My Documents
07/13/10  09:35a  <DIR>           Program Files
07/13/10  09:35a  <DIR>           Temp
07/13/10  09:35a  <DIR>           Windows

    Found 7 file(s). Total size 23 bytes.
    1 Dir(s) 24530944 bytes free
```

```
\NandFlash> dir
    Directory of \NandFlash

07/13/10  07:47p  <DIR>              Documents and Settings
07/08/10  11:36p            303     autoexec.bat
07/14/10  12:53p  <DIR>             www

    Found 3 file(s). Total size 303 bytes.
    1 Dir(s) 100098048 bytes free
```

Serial Ports Configuration

The serial port of Matrix-604 is mapped as followed
Serial 1=> USB Console (ActiveSync)
Serial 2=> Hardware Console Port (RS-232)
Serial 3=> Matrix-604 Port 1 (RS-232/422/485)
Serial 4=> Matrix-604 Port 2 (RS-232/485)
Serial 5=> Matrix-604 Port 3 (RS-232/485)
Serial 6=> Matrix-604 Port 4 (RS-232/485)
To configure serial port settings, please use command *setuart* as follow:

```
\> setuart -h
Ver. 1.00
Usage: setuart [-p|-t|-b|-h]
      -p <0,1,2...     >    : Specify port number
      -t <232,485,422>      : Set port type
      -b <9600...>          : Set port baud rate
      -h                    : Display this usage
\> _
```

Serial Console Configuration

The serial console port of Matrix-604 can be disabled or redirect to other serial port by command *setconsole* as follow:

```
\> setconsole -h
Ver. 1.00
Usage: setconsole [-p|-h]
      -p < port number >
   8:hardware console port, -1:output only
      -h                  : Display this usage
\>
```

GPIO Control

Matrix-604 comes with five GPIO which share the serial console port connector. Use *gpioctl* command to control the GPIO port. The I/O number starts from #1 to #5 and can be configured as input or output independently.

```
\> gpioctl -h
Ver. 1.00
Usage: gpioctl [-i|-s|-m| -a| -h]
      -i <1,2...     >      : Specify IO number
      -s <0, 1>            : Set IO state, 0:low, 1:high
      -m <0, 1>            : Set IO mode, 0:input, 1:output
      -a                   : List all IO state/mode
      -h                   : Display this usage
\>
```

Beep

Beep command will beep the buzzer as follow.

```
\> beep -h
Ver. 1.00
Usage: beep [-f|-d|-h]
      -f < Hz >               : Set frequency
      -d < msec >             : Set duration
      -h                      : Display this usage
\>
```

update

update command is used to update the kernel and loader of WinCE 6.0. Current version of WinCE is available in Artila CD.

```
\> update -h
Ver. 1.00
Usage: update [-k|-l|-v |-h]
      -k "filename"          : kernel image
      -l "filename"          : loader image
      -h                     : display this usage
\>
```

Web Page Directory

The web pages are placed at */NandFlash/www* and the home page name should be *index.htm*

Reboot

Reboot command is used to reboot the system.

Remote Display Control

Matrix 604 comes with WinCE remote display control software. You can find this software in Artila CD at \tool\cerhost.exe. Choose *connect* to find and connect Matrix-604 and ok to connect it. You can also enter the IP address of Matrix-604 to connect it.
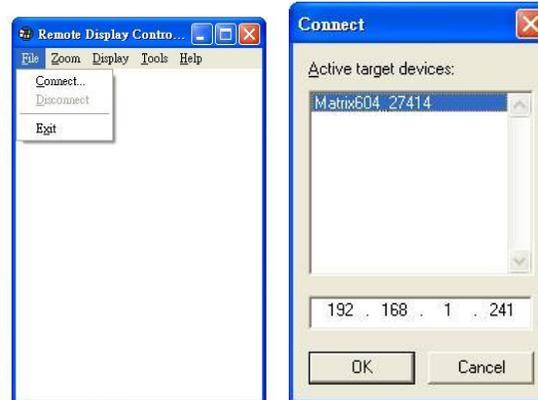
ActiveSync

Matrix-604 supports Microsoft ActiveSync via USB client. You can download ActiveSync from Microsoft web server. ActiveSync provides an easy way to transfer files between PC and Matrix-604.

Install Matrix604 SDK

Matrix-604 WinCE 6.0 SDK is located at Artila CD\SDK folder. You need to install Microsoft Studio 2005 before installing Matrix604 SDK.
Choose Matrix604_CE_SDK for the smart device application and click the device option.