HCS connected to Raspberry Pi demonstration scenario

\*NOTE : You should have basic knowledge on Raspberry Pi operation so that you can understand terms using in this document.

### **Demonstration idea**

The idea of the demonstration is to connect two HCS power supply to Raspberry Pi. A driver is installed into Raspberry Pi to connect USB device to Ethernet. The driver will map each USB port to TCP connect port. For example USB 1 is mapped to TCP port 4001. Then remote control software can connect to HCS power supply by using IP address of Raspberry Pi and port number for USB.

E.g. Raspberry Pi IP address : 192.168.1.100 USB port 1 map to TCP port 4001 The connection setup is 192.168.1.100:4001

A load, which can be LED or DC FAN, is used to connect to power supply output so that the voltage and current reading can be recorded. We can use programming feature in our application to program different voltage and current for the output. Then the application can record variation of voltage and current.

The demonstration will use application on iPad which can set HCS output, get reading from it, has 20 steps programed output and monitoring the output.

### **Demonstration setup**

Equipments list 1. HCS power supply x 2 2. Raspberry Pi B+ model 3. 12V DC Fan

4. 12 LED (around 5W)5. iPad with iOS 7 or above



Setup Raspberry Pi B+

Software required :

- i. Raspbian OS for Raspberry Pi
- ii. Manson driver for Raspberry Pi
- iii. Winscp File transfer tools to transfer driver to Raspberry Pi

1. It is recommended to buy SD card with pre-installed Raspbian directly from shop to simplify the installation.

2. Configure SSH server in Raspberry Pi for file transfer from Windows.

- Open terminal in Raspberry Pi.

- Run command "raspi-config" in raspberry pi console to get following interface.

Expand Filesystem     Change User Password     Change User Password     Senable Boot to Desktop/Scratch     Internationalisation Options     Enable Camera     Add to Rastrack     Overclock     Advanced Options     9 About raspi-config		Ensures that all of Change password for 1 ch Choose whether to boo Set up language and r Enable this Pi to wor Add this Pi to the or Configure overclockir Configure advanced se Information about thi	the SD card storage is available to the OS the default user (pi) ot into a desktop environment, Scratch, or the command-line regional settings to match your location * with the Raspberry Pi Camera lline Raspberry Pi Map (Rastrack) ng for your Pi strings is configuration tool

## - Select "Advanced Options" to configure SSH

Vanced Options A1 Overscan A2 Hostname A3 Memory Split A4 SSH A5 SPI A6 Audio A7 Update		You may need to configure overscan if black bars are present on display Set the visible name for this Pi on a network : Change the amount of memory made available to the GPU Enable/Disable remote command line access to your Pi using SSH Enable/Disable automatic loading of SPI kernel module (needed for e.g. PiFace Force audio out through HDMI or 3.5mm jack Update this tool to the latest version	
		<select></select>	<back></back>

# - Select "A4 SSH" to set SSH server

vanced Opti	A1 Overscan A2 Hostname A3 Memory Spli A4 SSH A5 SPI A6 Audio A7 Update	You may need to configure Set the visible name for t t change the amount of memor Enable/Disable remote comm Enable/Disable automatic l Force audio out through HD Update this tool to the la	overscan if black bars are present on display his Pi on a network y made available to the GPU and line access to your Pi using SSH Dading of SPI kernel module (needed for e.g. PiFace) Hi or 3.5mm jack test version	

- Select "Enable" to enable SSH server

Would you like the SSH server enabled or disabled?	
< <u>Enable&gt;</u> <disable></disable>	

- Press enter to exit the SSH server enabled message screen

		<b></b>
SSH server enabled		
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- Click "Finish" to exit this configuration menu

Setup Options Raspl	berry Pi Software Configuration Tool (raspi-config)
1 Expand Filesystem 2 Change User Password 3 Enable Boot to Desktop/Scratch 4 Internationalisation Options 5 Enable Camera 6 Add to Rastrack 7 Overclock 8 Advanced Options 9 About raspicconfig	Ensures that all of the SD card storage is available to the OS Change password for the default user (pi) Choose whether to boot into a desktop environment, Scratch, or the command-line Set up language and regional settings to match your location Enable this Pi to work with the Raspberry Pi Camera Add this Pi to the online Raspberry Pi Map (Rastrack) Configure advanced settings Information about this configuration tool
<se<sup>-</se<sup>	lect> < <mark>Finish&gt;</mark>

3. Configure Raspberry Pi to use static IP (Optional)

Raspberry Pi default is using DHCP. It is better to set static IP for raspberry pi so that it is easy configure iPad application to connect.

Open terminal in Raspberry Pi

- Run "sudo nano /etc/network/interfaces" to edit network configure file. pi@raspberry8 ~ \$ sudo nano /etc/network/interfaces

- You get following screen. You need to edit line "iface eth0 inet dhcp" to become "iface eth0 inet static"



- Add IP address information. Change IP address match to your network. address 192.168.1.156 netmask 255.255.255.0 network 192.168.1.0 broadcast 192.168.1.255 gateway 192.168.1.1



- Press "Ctrl+x" to exit editor. Press "y" to save modified file.

### 4. Restart Raspberry Pi

- 5. Download driver from your Windows system
- Go to Manson HCS-3100 website

http://www.manson.com.hk/products/detail/148



- Click tab "Apps for Raspberry Pi". Then download "manson\_driver" from this web site



## 6. Upload driver to Raspberry Pi

- Use Winscp to transfer manson\_driver to raspberry pi. Open Winscp and select SCP for file protocol.

🔤 Login - WinSCP		
Vew Site	Session Eile protocol: SCP SFTP SCP FTP WebDAV User name: Save	Port number: 22 Password: Advanced
Tools	E Login	Close Help

- Enter IP address for your raspberry pi. Enter User name and password as well. The default user name for raspberry pi is "pi"

🏜 Login - WinSCP	
New Site	Session File protocol: SCP Host name: Port number: 192.168.1.156 22 User name: Password: pi Save Advanced
	Login Close Help

- Click "Login" to connect to raspberry pi

- The left hand side in following screen is files in your Windows PC and right hand side is file in raspberry pi

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- Right click on "manson\_driver", then select upload to upload driver to raspberry pi

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### - Select default directory to upload

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- 7. Change Manson driver to be executable
- The manson\_driver should be changed to executable before it can be run.
- Goto directory you save manson\_driver in. (/home/pi in this example)
- Run "chmod a+x manson\_driver" in terminal to change manson\_driver to executable"

- 8. Run Manson driver as service in Raspberry Pi
- Add /home/pi/manson\_driver into /etc/rc.local
- Run "sudo nano /etc/rc.local" in terminal.

😣 🗆 💷 pi@raspberry9: ~		
pi@raspberry9 ~ \$ sudo n	nano /etc/rc.local	l i

- Add line "/home/pi/manson\_driver" before exit 0



- Press "Ctrl+x" to exit editor. Press "y" to save modified file.

- Restart Raspberry Pi.