



Fanvil Auto Provision Directions

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Directory

1	Introduction	4
1.1	The purpose of writing	4
1.2	Operation Process Overview	4
2	Config File Introduction.....	6
2.1	Common config file.....	6
2.2	Device config file	7
2.3	Encrypted config file	7
3	URL.....	9
3.1	URL format	9
3.2	URL parsing	9
4	Three Types of Auto Provision.....	11
4.1	DHCP Option	12
4.2	Sip PnP	14
4.3	Phone Flash	16
5	Update Content Introduction	17
5.1	Config update	17
5.2	Certificate Update.....	18
5.3	Phonebook Update.....	18
5.4	Firmware update.....	18
6	Glossary	20
7	Applicable Scope.....	22

1 Introduction

1.1 The purpose of writing

The document is written to enable developers, testers and customers to understand the overall operating mechanism of the Auto Provision deployment, so that the testers can fully test this feature and customers can implement the server side of Auto Provision deployment according to the specification.

1.2 Operation Process Overview

Fanvil terminal supports three types to get Auto Provision application parameters: sip PnP, DHCP option and Phone Flash. If you configure these three types simultaneously, it will get the application parameters of Auto Provision according to the following priority when the terminal starts:

DHCP option → PnP server → Phone Flash.

Supported transfer protocol: ftp, tftp, http, https.

Process:

1. Edit the config file to modify the content you want to update, then put it under the directory of the appropriate server and ensure that the server is open.

2. Login the web pages or enter phone LCD for editing (some phones do not support LCD), so as to start the type of Auto Provision of which parameters you want to obtain.

(eg: sip PnP, DHCP option, Phone Flash)

3. Restart the phone, it will get the URL containing the server address where the config file stored by the type of Auto Provision started in step 2.

4. The phone parses the URL, then the config files on the corresponding server will be auto downloaded to it. There are usually two config files, common config file and device config file. Either of them will be downloaded when the specified device config file name is the same as the common config file name. Naming rules of the specific config file and the URL format will be introduced in the following sections.

5. After the config files downloaded to the phone cache successfully, the phone will check whether the downloaded config files are same as the existing config files on itself, same to abandon the update, else to update the config file and record the digest of it.

6. The phone will detect whether the new config contains a new download, such as firmware download, phonebook download or certificate download. If it contains one, the phone will start the task to download the appropriate items. After the download task is done or it does not start already, the phone restart automatically (Give up the download after fail 5 times and record the failed items).

7. step 1-5 will run again after the restart. Check the config files in step 5 and give up the update

when they are the latest. Then start the task to download the corresponding items such as firmware, phonebook or certificate if it has one. The download task will be not cleared until it is successful.

8. Process ends.

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2 Config File Introduction

Fanvil terminal has two kinds of config files, one is the common config file whose name is fixed; another is the device config file which can be named by user or after the MAC address by default. The terminal will try to download and update them by the Auto Provision process.

Config file format:

- File header, 64 characters in length, ending with "\r\n".

Such as: "<< VOIP CONFIG FILE >> Version: 2.0002 "

Note the "Version: 2.0002" in the file header, the version number (eg 2.0002) will display on the appropriate location of the config file if the terminal updates successfully by the way of Auto Provision. If the config file does not include a version number, the digest will display instead.

- End of the file

Such as: "<< END OF FILE >>"

To update an option, the config file must include the module header belonging to it.

For example, if you want to modify the "Host Name:", the used config file must include the string of "<GLOBAL CONFIG MODULE>". The framework of it is as below.

```
<< VOIP CONFIG FILE >> Version: 2.0002
```

```
<GLOBAL CONFIG MODULE>
```

```
Host Name: VOIP
```

```
<< END OF FILE >>
```

- Supported format of the file: cfg, txt, xml.

2.1 Common config file

The common config file can take effect on all terminals of the same model.

Every product model has its own special common config file name, as follows:

Product model	Common config file name
C56	f0C00560000.cfg
C58	f0C00580000.cfg
C60	f0C00600000.cfg
C62	f0C00620000.cfg

Product model	Common config file name
C66	f0C00660000.cfg

The second and third digits represent the series name of the terminal.

The fourth and fifth digits represent the product model of the terminal.

The last four digits represent the hardware version of the terminal.

The common config file is very helpful for taking Auto Provision deployment to mass terminals. For example, if you would like to update firmwares for 1000 terminals of C62 automatically, you just need a common config file of C62(f0C00620000.cfg) containing firmware parameters with deployment, then put it on the appropriate server which the configured Auto Provision process used.

2.2 Device config file

1. The device config file named after MAC address is just effective for the terminal with the corresponding MAC address. Its name is the MAC address to remove connectors. For example, The MAC address of C62 terminal is "00: 15: 65: 11: 3a: f8", so the config file name is "001565113af8.cfg".

2. The config file named by users. Users can customize its name. For example, user names a device config file name "name.cfg", then the phone will go to request and download the common config file and name.cfg from the relevant server.

3. Sip PnP and DHCP Option can specify the config file name according to the URL, such as [http:// user: password@192.168.2.2/name.cfg](http://user:password@192.168.2.2/name.cfg) or [http:// user: password@192.168.2.2/\\$input.cfg](http://user:password@192.168.2.2/$input.cfg), the second method is to let the user enter a file name via the LCD. If you do not specify [http:// user: password@192.168.2.2](http://user:password@192.168.2.2) or [http:// user: password@192.168.2.2 \\$ mac.cfg](http://user:password@192.168.2.2 $ mac.cfg), it will be named after Mac address.

2.3 Encrypted config file

If the downloaded config file is encrypted by AES, AES key is required to decrypt. The key must be 64 characters, which can be hexadecimal numeric characters (0 ~ F). Both the two types of config files can be encrypted. The corresponding key needs to be filled in the configuration item of "Config Encryption Key" and "Common Config Encryption Key" under the page of "web-> MAINTENANCE-> AUTO PROVISION" (As shown in Figure 1 the red circled part). Note that if the config file is not encrypted, but you fill in keys in the corresponding positions of the config file, then the phone will regard it as encrypted config file to handle.

Auto Provision Settings

Current Config Version	2.0002
Common Config Version	2.0002
CPE Serial Number	00100400XH020010000000010e597052
User	<input type="text"/>
Password	<input type="text"/>
Config Encryption Key	<input type="text"/>
Common Config Encryption Key	<input type="text"/>
Save Auto Provision Information	<input type="checkbox"/>

DHCP Option Settings >>

Plug and Play (PnP) Settings >>

Phone Flash Settings >>

TR069 Settings >>

图 1

3 URL

3.1 URL format

URL is the information which DHCP Option and Sip PnP acquired by the server, the url format is:

Server protocol:// user: password@Server Ip: port/path/Configuration name.

For example [http://user: password@192.168.1.3: 8181/C62/\\$ mac.cfg](http://user: password@192.168.1.3: 8181/C62/$ mac.cfg)

3.2 URL parsing

Each part of the functions and settings detailedly described as follows.

1. Server Protocol: transfer protocol used by the server, we support ftp, tftp, http and https protocol. This is required.
2. User and Password: when request to the server you need a user name and password, this is not essential items, such as login server does not require user name and password or fill in the page on the phone LCD (WEB-> MAINTENANCE-> AUTO PROVISION, as shown in figure 2 red circled part), if the server requires a user name and password but you forget to fill in them or fill in error on the web page, the phone will ask you to re-enter your user name and password on the LCD, and then fault will let you enter it again unless it is correct or abandoning update.

The URL format of not filling in username and password as follows :

Server protocol://Server Ip:port/path/Configuration name.

Auto Provision Settings

Current Config Version	2.0002
Common Config Version	2.0002
CPE Serial Number	00100400XH020010000000010e597052
User	<input type="text"/>
Password	<input type="text"/>
Config Encryption Key	<input type="text"/>
Common Config Encryption Key	<input type="text"/>
Save Auto Provision Information	<input type="checkbox"/>

DHCP Option Settings >>

Plug and Play (PnP) Settings >>

Phone Flash Settings >>

TR069 Settings >>

3. Server Ip: address of the server, such as 192.168.1.3. This is required.
4. Port: server port number, such as 8181, this is not a essential item, and it is filled only when a special server port is defined.

The URL format of not filling in port number is:

Server protocol://Server Ip/path/Configuration name.

5. Path: the path where config file stored. If there is a secondary or tertiary directory, this item is required.
6. Configuration name: the name of config file. It refers to a device config file name. the name of the common config file is immutable. This option has four types of filling as follows.
 1. It can be not filled. If not filled, a device config file named after the default mac address is downloaded.
 2. It can be written as "\$mac.cfg", this an approach also downloaded to the mac address of the device configuration file named.
 3. It can be written as "\$input.cfg", this awareness is to allow the user to manually input device configuration file name on the LCD.
 - 4 The last name of the device is specified configuration file, such as name1.cfg or name2.cfg etc.

The screenshot displays the 'Auto Provision Settings' section of a web interface. It includes the following fields and values:

Current Config Version	2.0002
Common Config Version	2.0002
CPE Serial Number	00100400XH020010000000010e597052
User	<input type="text"/>
Password	<input type="password"/>
Config Encryption Key	<input type="text"/>
Common Config Encryption Key	<input type="text"/>
Save Auto Provision Information	<input type="checkbox"/>

Below the settings are expandable sections: DHCP Option Settings >>, Plug and Play (PnP) Settings >>, Phone Flash Settings >>, and TR069 Settings >>.

图 2

4 Three Types of Auto Provision

There are three Types of Fanvil Auto Provision: DHCP Option ,Sip PnP and Phone Flash.
Corresponding web page: MAINTENANCE->AUTO PROVISION

Auto Provision Settings

Current Config Version	2.0002
Common Config Version	2.0002
CPE Serial Number	00100400XH020010000000010e597052
User	<input type="text"/>
Password	<input type="text"/>
Config Encryption Key	<input type="text"/>
Common Config Encryption Key	<input type="text"/>
Save Auto Provision Information	<input type="checkbox"/>

DHCP Option:

DHCP Option Settings >>

DHCP Option Setting	DHCP Option 66
Custom DHCP Option	66 (128~254)

Sip PnP:

Plug and Play (PnP) Settings >>

Enable PnP	<input type="checkbox"/>
PnP Server	224.0.1.75
PnP Port	5060
PnP Transport	UDP
PnP Interval	1 hour(s)

Phone Flash:

Phone Flash Settings >>

Server Address	0.0.0.0
Config File Name	<input type="text"/>
Protocol Type	FTP
Update Interval	1 hour(s)
Update Mode	Disabled

Corresponding config file options:

<AUTOUPDATE CONFIG MODULE>

config	Web page
Download Username:	// User
Download Password:	// Password
Config File Name:	// Config File Name
Config File Key:	// Config Encryption Key
Common Cfg File Key:	// Common Config Encryption Key
Download Server IP:0.0.0.0	// Server Address
Download Protocol:1	// Protocol Type
Download Mode:0	// Update Mode
Download Interval:1	// Update Interval
DHCP Option:0	// Custom DHCP Option
PNP Enable:0	//Enable PnP
PNP IP:224.0.1.75	//PnP Server
PNP Port:5060	// PnP Port
PNP Transport:0	// PnP Transport
PNP Interval:1	// PnP Interval
Save Provision Info:0	// Save Auto Provision Information

4.1 DHCP Option

WAN Mode of the phone must be DHCP to use DHCP Option.

There are four options available for DHCP Option, DHCP option 66, DHCP option 43, Custom DHCP Option and DHCP Option Disable.

Custom DHCP Option's setting range is 128 ~ 254, DHCP Option Disable means closing DHCP Option.

Restart the phone or wait for a renewal of DHCP server after setting, then the phone will request for option information from the DHCP server. If the server reply the option information you requested, you will see the corresponding option information from the capture package replied from the server. Filter "bootp" and view the ACK package to get the URL which the phone will parse.

When obtaining an application parameter of Auto Provision through DHCP Option mode, the user can optionally choose one option. For example, If DHCP option 43 is selected, it will have the following field values in the "DHCP discover message" and "DHCP request message" which terminal sends to the server.

Option: (t=55,l=7) Parameter Request List

Option: (55) Parameter Request List

Length: 7

Value: 011c0302042b06

1 = Subnet Mask

28 = Broadcast Address

43 = Vendor-Specific Information

It will have the following field values in the “DHCP offer message” and “DHCP ACK message” which the server sends to the terminal.

Option: (t=43,l=29) Vendor-Specific Information

Option: (43) Vendor-Specific Information

Length: 29

Value: 746674703a2f2f3139322e3136382e312e3131382f246d61...

“Value” in “Option: (t=43, l=29) Vendor-Specific Information” is the hexadecimal form of the URL which is the path to download the config file. The Value is [http://192.168.1.118/\\$mac.cfg](http://192.168.1.118/$mac.cfg). Fanvil terminal supports \$mac replacement. The value of the URL can be [http://ip/\\$mac.cfg](http://ip/$mac.cfg) or [http://ip/mac.cfg?mac=\\$mac.cfg](http://ip/mac.cfg?mac=$mac.cfg)

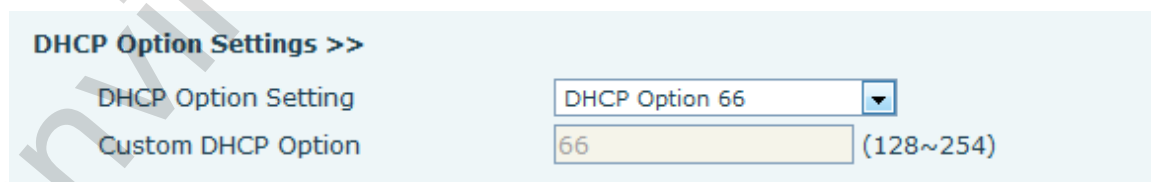
“DHCP option 66” and “DHCP custom option” application parameters are similar to the DHCP option 43 above.

Note:

Fanvil terminal also supports URL form of [http://ip/\\$input.cfg](http://ip/$input.cfg). If the “Value” in the above “Option: (t = 43, l = 29) Vendor-Specific Information” is [http://192.168.1.118/\\$input.cfg](http://192.168.1.118/$input.cfg), the phone will pop up a dialog box of inputting terminal corresponding configuration ID values, the ID value is assigned by the administrator. After entering the terminal corresponding configuration ID values, the terminal will automatically download the config file of the corresponding ID from the server. Fanvil terminal supports \$input replacement simultaneously, The value of the URL can be [http://ip/\\$input.cfg](http://ip/$input.cfg) or [http://ip/input.cfg?input=\\$input.cfg](http://ip/input.cfg?input=$input.cfg).

Some HTTP/HTTPS/FTP servers require authentication of username and password, then Fanvil terminal has two methods for this. firstly, you can add username and password in the URL, for example, [http://username:passwd@ip/\\$mac.cfg](http://username:passwd@ip/$mac.cfg). secondly, URL without username and password, then the terminal will pop up a dialog box to request user enter username and password for authentication.

Option 66:



The screenshot shows a configuration window titled "DHCP Option Settings >>". It contains two rows of settings:

DHCP Option Setting	DHCP Option 66
Custom DHCP Option	66 (128~254)

Option 43:

DHCP Option Settings >>

DHCP Option Setting: DHCP Option 43
 Custom DHCP Option: 43 (128~254)

Custom DHCP Option:

DHCP Option Settings >>

DHCP Option Setting: Custom DHCP Option
 Custom DHCP Option: 234 (128~254)

DHCP OptionDisable:

DHCP Option Settings >>

DHCP Option Setting: DHCP Option Disabled
 Custom DHCP Option: 0 (128~254)

4.2 Sip PnP

Plug and Play (PnP) Settings >>

Enable PnP:
 PnP Server: 224.0.1.75
 PnP Port: 5060
 PnP Transport: UDP
 PnP Interval: 1 hour(s)

As shown:

Enable PnP: whether to start Sip PnP

pnp Server: pnp server address

pnp Port: pnp server port number

pnp Transport: Transport Protocol

pnp Interval: time interval polling to check the time interval between two requests

Restart the phone after setting, it will send the Subscribe package to the pnp server, then the server return notify package with URL. the phone parse URL after receiving it.

If you start the PnP server to push deployment, it will periodically send SUBSCRIBE message to the server after the terminal start, The format of Message Header of SIP SUBSCRIBE message is as follows.

Via: SIP/2.0/UDP 192.168.1.45:5060;branch=z9hG4bK3102710241234624733

From: <sip:MAC=000810a99948@224.0.1.75>

To: <sip:MAC=000810a99948@224.0.1.75>

Call-ID: 322432620212850-163241588724467@192.168.1.45

CSeq: 1 SUBSCRIBE

Contact: <sip:192.168.1.45:5060>

Max-Forwards: 70

User-Agent: voip phone

Expires: 0

Event:ua-profile;profile-type="device";vendor="Fanvil";model="VOIP PHONE";version="V2.0.114.51"

Accept: application/url

Content-Length: 0

Any SIP servers compatible with the particular message server will respond and send back a SIP NOTIFY message including the server URL of Auto Provision, The Message Header of SIP NOTIFY message is as follows:

Via: SIP/2.0 / [transport] [local_ip]: [local_port]; branch = [branch]

From: <sip:MAC= 000810a 9994a192.168.1.169>

To: <sip:MAC= 000810a 9994a192.168.1.169>

Call-ID: 176851610432700-321342882818040@192.168.1.14

CSeq: 3 NOTIFY

Max-Forwards: 70

Content-Type: application / url

Subscription-State: terminated; reason = timeout

Event: ua-profile; profile-type = "device"; vendor = "Fanvil"; model = "VOIP PHONE"; version = "V2.0.97.44"

Content-Length: 29

[http://192.168.1.118/\\$mac.cfg](http://192.168.1.118/$mac.cfg)

[http://192.168.1.118/\\$mac.cfg](http://192.168.1.118/$mac.cfg) in the NOTIFY message is the URL of the config file to be downloaded.

Note:

PnP mechanism can support two forms of \$mac and \$input to get the config file, as well as server username and password authentication.

4.3 Phone Flash

Phone Flash Settings >>

Server Address	<input type="text" value="192.168.1.3/C62"/>
Config File Name	<input type="text" value="c62config.cfg"/>
Protocol Type	<input type="text" value="HTTP"/>
Update Interval	<input type="text" value="1"/> hour(s)
Update Mode	<input type="text" value="Update After Reboot"/>

As shown:

Server Address: address of the server, it can carry the path where the config file stored, username and password the server requires and the port number of the server. Username and password can be filled in the web page or entered on the LCD when downloading the config file.

Config File Name: the name of the device config file. This item is same with the Configuration name described in the URL section, you can reference the URL section for the detail.

Protocol Type: the server type, there are four kinds of server can be selected:ftp, tftp, http and https

Update Interval: Time interval between two downloads.

Update Mode: There are three types of Phone Flash update mode: Disable, Update After Reboot and Update at Time Interval.

5 Update Content Introduction

Fanvil Auto Provision deployment can update four items as follows.

config files, firmware, phonebook, and certificate.

These four items can simultaneously updated in an Auto Provision deployment, the update order is: Profiles> Certificates> Phone book> Firmware

(Note: These new series of video phones such as D900, D600 and D400 support only the config files and firmware update)

5.1 Config update

Process:

1. Login the web page or enter phone LCD for editing ,so as to start a type of Auto Provision such as sip PnP, DHCP option,or Phone Flash.
2. You need to configure the URL and ensure the corresponding server is open when using the type of DHCP Option or sip Pnp. When using the Phone Flash, configure the URL directly on the web page, Modify the corresponding config file and put it into the server of specified URL and make the server open.
3. Restart the phone.
4. The phone parses the URL, then the config files on the corresponding server will be auto downloaded.which to obtain the configuration file exists in the server type and address, user name and password (this may not be configured in the URL, you can manually enter on the LCD), device configuration file names.
5. By parsing the phone to the appropriate server configuration file URL to download the two obtained only device profile name and generic configuration file with the same name when it only download the generic configuration file. The first step down after two profiles is to calculate the value of the corresponding configuration files Digest put on the value stored in the system's Digest download records for comparison, only two different values will update this Digest downloaded configuration files, whether directly lost. If the two values are different Digest, updated and put this Digest re-recorded in the system, is present in the configuration file, saved in <AUTOUPDATE CONFIG MODULE> below, Digest values are not visible to the user.
6. Check the config file format, correct, update and check into the system need to download the item (the following will be introduced one by one to download the project) if there is transferred to download to download items.
7. Save the configuration file to the flash. The phone will automatically restart repeat 1-5

5.2 Certificate Update

Process: The config file upgrade steps 1-5

6. Check the configuration file format, correct, update and check into the system need to download the item, if the certificate is to start the download URL to download the certificate, the certificate configuration file download configuration elements are:

```
<< VOIP CONFIG FILE >> Version: 2.00 02
```

```
<AUTOUPDATE CONFIG MODULE>
```

```
Auto etc Url: tftp :// 192.168.2.29/OpenVpn.bin
```

```
<< END OF FILE >>
```

The URL mean to the tftp server 192.168.2.29 catalog, certificate file to download OpenVpn.bin

7. To save the contents of the corresponding position

5.3 Phonebook Update

The phone supports xml, csv, vcf three formats of the phone book download

Process: The configuration file upgrade steps 1-5

6. Check the configuration file format, correct, update and check into the system need to download the item, if you have the phone starts the download URL to download the certificate, the certificate configuration file download configuration elements are:

```
<< VOIP CONFIG FILE >> Version: 2.00 02
```

```
<AUTOUPDATE CONFIG MODULE>
```

```
Auto Pbook Url: tftp :// 192.168.2.29 / contact.csv
```

```
<< END OF FILE >>
```

The URL mean to the tftp server 192.168.2.29 directory, go to the phone book download contact.csv

7. Saved to the appropriate location

5.4 Firmware update

Process: The configuration file upgrade steps 1-5

6. Check the configuration file format, correct, update and check into the system need to download the item, if there is a firmware download URL will begin downloading the certificate, the certificate configuration file download configuration elements are:

```
<< VOIP CONFIG FILE >> Version: 2.00 02
```

```
<AUTOUPDATE CONFIG MODULE>
```

```
Auto Image Url: tftp :// 192.168.2.29 / firmware.z
```

<< END OF FILE >>

The URI mean to the tftp server 192.168.2.29 catalog file to download fimware.z

Start downloading the file header of 64 bytes is recognized only if the file is able to upgrade to this station to the phone system

7. Saved to the corresponding position

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6 Glossary

Glossary name	Explanation
PnP	Plug and Play
MAC Address	MAC (Media Access Control) address, otherwise known as hardware address, is used to define the location of the network device. In the OSI model, the third layer(the network layer)is responsible for IP address , and the second layer (the data link layer) is responsible for the MAC address. So a host has an IP address, and each network location has a MAC address belonging to itself.
DHCP	Dynamic Host Configuration Protocol, is a local area network protocol using UDP protocol to work.It has two main purposes: one is to automatically assign IP addresses for the internal network or network service providers;another is to be a means of central management of all the computer for the users or internal network administrators.
FTP	File Transfer Protocol (FTP: File Transfer Protocol) so that you can share files between hosts. FTP uses TCP to generate a virtual connection for control information, and then generates a separateTCP connection for data transfer. TELNET control connection using a similar protocol between the host exchange commands and messages. File transfer protocol is TCP / IP protocol to transfer files between two computers on the network, FTP is one of the protocol on TCP / IP network and INTERNET earliest use, it belongs to the network protocol group application layer . FTPclient can give the server issue commands to download files, upload files, create or change
HTTP	Hypertext Transfer Protocol (HTTP-Hypertext transfer protocol) is a more specified rules to communicate with each other between the browser and the web server, web document transfer protocol to transmit data through the Internet.
HTTPS	HTTPS (full name: Hypertext Transfer Protocol over Secure SocketLayer), is safe for the target HTTP channel, simply, is a safe version of HTTP. That added HTTP SSL layer, security is the basis of HTTPS SSL, encryption and therefore the details you needSSL. It is a URI scheme (abstract identifier system), syntax similar to HTTP : system. HTTP is used to secure data transmission. https:URL that it uses the HTTP, HTTPS exists but is different from the default HTTP port and an encryption /authentication layer (between HTTP and TCP).

TFTP	TFTP (Trivial File Transfer Protocol, Simple File Transfer Protocol) is a TCP / IP protocol suite, is used between the client and server for simple file transfer protocol, providing not complicated, overhead file transfer service. Port number is 69.
URL	Uniform resource locator (URL, Uniform English Resource Locator abbreviation) is also known as the page address, the address is the Internet standard resource.
AES	A block AES (Advanced Encryption Standard) encryption standard adopted.

7 Applicable Scope

This document is appropriate for all the C, D Series of Fanvil terminals.

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