Synway AST Series

User Manual

Version 1.8.0.0

Synway Information Engineering Co., Ltd

www.synway.net

Contents

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Revision History

Version	Date	Comments
Version 1.0.0.0	2009-2	Initial publication
Version 1.1.0.0	2009-7	Add relative content on Dahdi driver
Version 1.2.0.0	2009-8	Add relative content about the new board model FXM3201P
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Version 1.6.0.0	2010-2	Significant revision
Version 1.7.0.0	2010-5	Add relative content about the new board models FXM3211P, FXM3210P, TEJ401E, TEJ801E, TEJ400E, TEJ800E.
Version 1.8.0.0	2011-3	Add relative content about the new board models TEJ400P, TEJ401P, TEJ800P, TEJ801P, TEJ400P(SSW), TEJ401P(SSW), TEJ800P(SSW), TEJ801P(SSW), TEJ100P(SSW), TEJ101P(SSW), TEJ200P(SSW), TEJ201P(SSW).

Note: Only major revisions to this manual itself recorded herein.

Preface

Thank you for choosing the Synway AST series boards which are designed to fully support open source IP PBX platform, such as Asterisk, Trixbox, Elastix, FreeSwitch and so on. Synway AST series includes three subseries.

Subseries	Board Model	Description
Synway FXM	FXM-8A/PCI	Use of modular structure and analog lines
	FXM-16A/PCIe	
	FXM3201P	
	FXM3201E	
	FXM3200P	
	FXM3200E	
	FXM3211P	
	FXM3210P	
Synway TEJ	TEJ-1A/PCI	Use of digital trunks (E1/T1/J1)
	TEJ-2A/PCI	
	TEJ-4A/PCI	
	TEJ101E	
	TEJ201E	
	TEJ101P	
	TEJ201P	
	TEJ100E	
	TEJ200E	
	TEJ100P	
	TEJ200P	
	TEJ401E	
	TEJ801E	
	TEJ400E	
	TEJ800E	
	TEJ401P	
	TEJ801P	
	TEJ400P	
	TEJ800P	
	TEJ401P(SSW)	
	TEJ801P(SSW)	
	TEJ400P(SSW)	
	TEJ800P(SSW)	
	TEJ101P(SSW)	
	TEJ201P(SSW)	
	TEJ100P(SSW)	
	TEJ200P(SSW)	
Synway CDC	CDC-1522A/PCI	CODEC board
	CDC-2522A/PCI	
	CDC-3522A/PCI	

The Synway FXM, TEJ and CDC series boards are respectively perfect substitutes for the AEX and TDM series analog voice cards, the TE series digital trunk cards, and the TC400B CODEC card from Digium Inc.

Since the FXM and TEJ boards integrate the capability of echo cancellation, there is no need to get it from extra modules or devices. Compared with similar products from other companies, they

are higher in integration and stronger in echo cancellation. Therefore, for use of FXM or TEJ boards, it is not necessary to purchase the VPMADT032 module (to enable echo cancellation) from Digium Inc.

The Synway AST driver program, as a link between the board hardware and open source IP PBX platform, is only used to set up the open source IP PBX platform, but not applicable to secondary development. This manual, as the help file for hardware installation, software installation, test and configuration of the Synway AST products, aims at those installation and maintenance technicians as well as the salesmen who are using the AST boards to set up open source IP PBX application systems.

This document consists of the following chapters.

Chapter 1 illustrates the IP PBX application models and scenarios set up by the Synway AST series boards.
Chapter 2 introduces how to install the Synway AST series boards.
Chapter 3 tells how to install and configure the board driver.
Chapter 4 introduces multiple IP PBX platforms and recommends reference manuals for the installation, configuration and testing of the SynAST driver on these platforms.
Appendix A provides answers to some problems that may occur when using the Synway AST series boards.
Appendix B shows the contact way of technical support and sales department in Synway.

Although Synway has scrupulously checked through this manual, but cannot guarantee the absence of errors and omissions. We sincerely apologize for any consequent inconvenience brought to you and will be very grateful if you kindly give your advice regarding amendments to this book.

Chapter 1   Overview

The driver for the Synway AST series boards (hereinafter referred to as 'AST), which is compatible and must be used with the Zaptel/Dahdi driver, can smoothly and seamlessly support open-source IP PBX platforms.

When using the AST board to establish an open-source IP PBX platform, all that you should do is configure and operate the open-source IP PBX platform, without secondary development by using AST. See Figure 1-1 below for the set-up of the open-source IP PBX application system with the AST board.
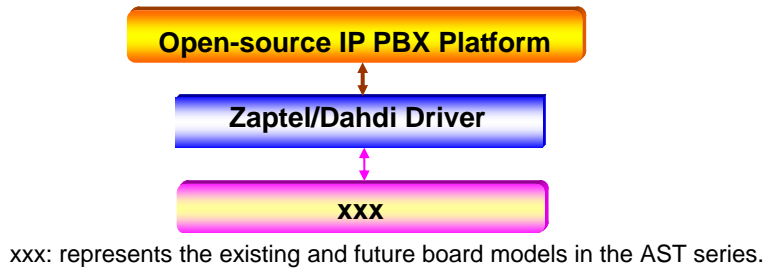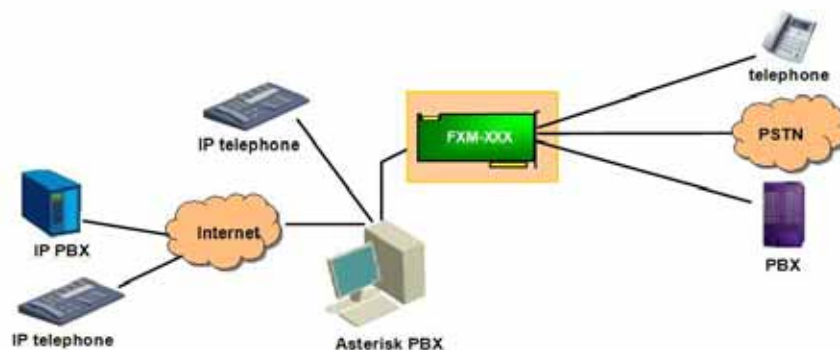

xxx: represents the existing and future board models in the AST series.

Figure 1-1 AST Driver Set-up

1.1 FXM

The Synway FXM series boards (hereinafter referred to as 'FXM') are analog voice boards newly developed for open source IP PBX system. FXM are high-performance and cost-effective , which support FXO (Foreign Exchange Office), FXS (Foreign Exchange Station) and FXC (composite module) and allow various configurations by using these three different modules to provide all features and functionalities of common voice boards. The FXM boards improve I/O speed by using DMA technique for data reading and writing on the basis of PCI bus, resulting in reduced CPU usage and increased board density per server. Figure 1-2 below is a typical application model with FXM.

xxx: represents the existing and future board models in the FXM series.

Figure 1-2 Application Model

1.2 TEJ

The Synway TEJ series boards (hereinafter referred to as 'TEJ') are digital trunks boards newly developed for open source IP PBX system. The TEJ are high-performance, cost-effective digital telephony interface boards and support E1, T1 and J1 environments. The environments are selectable on a per-board basis via software configuration. The TEJ boards improve I/O speed by using DMA technique for data reading and writing based on PCI bus, resulting in reduced CPU usage and increased board density per server.

The excellent combination of the TEJ driver and the Asterisk platform brings the following features to the TEJ series boards.

Supported Data Modes: Cisco HDLC, HDLC, PPP, Multi-link PPP, Frame Relay.

Supported Voice Modes:

- PRI CPE and PRI NET
  - NI1
  - NI2
  - EuroISDN
  - 4ESS(AT&T)
  - 5ESS(Lucent)
  - DMS100
- E&M
  - Wink
  - Feature Group B
  - Feature Group D
- FXO and FXS
  - Ground Start
  - Loop Start
  - Loop Start with Disconnect Detect

The TEJ series connect Asterisk Server with PSTN, Channel Bank or PBX via T1, E1 or J1 interface. The boards and the corresponding drivers can be used to establish a professional telephony network environment. Figure 1-3 and Figure 1-4 below are typical application models with TEJ.
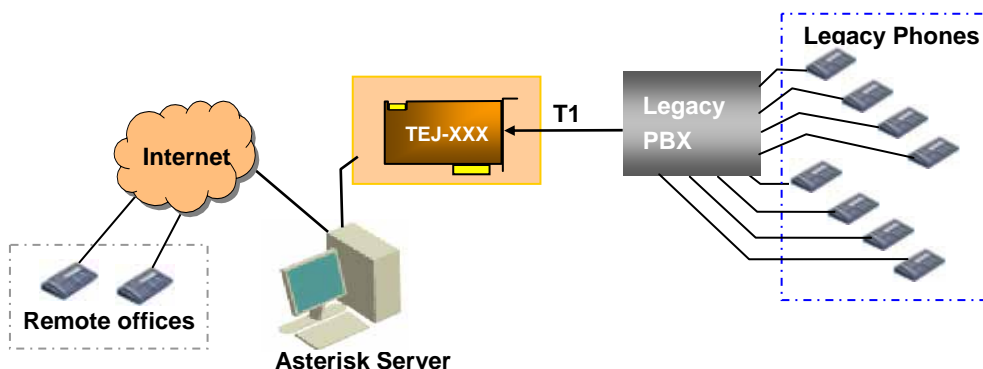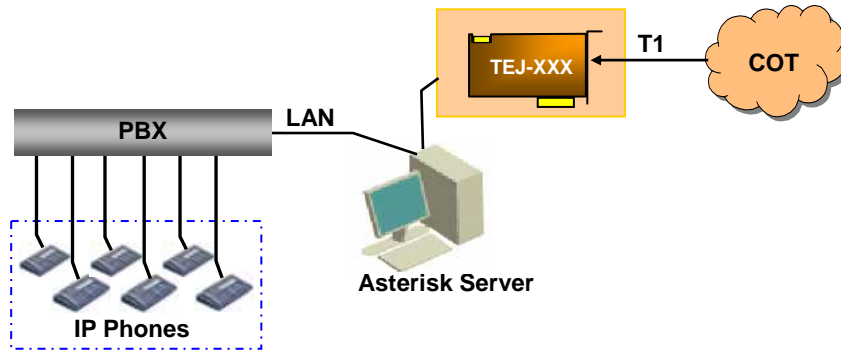

Figure 1-3 Application Model I: Traditional Telephony System

Note: XXX in Figure 1-3 and Figure 1-4 represents the existing and future board models in the TEJ series.

Figure 1-4 Application Model II: VoIP Telephony System

1.3 CDC

The Synway CDC series boards (hereinafter referred to as 'CDC) are CODEC boards newly developed for open source IP PBX system. They are multi-channel boards with PCI 2.2 bus, supporting the hardware-based transformations between voice codecs. With the burst data transmission rate up to 132 MB/s and the PNP (plug and play) feature which eliminates the need for jumper leads, this series can be used on 3.3V/5V PCI slot and PCI-X slot.

Asterisk, in software and with Digium G.729a licensing, is capable of transforming the G.729A codec into other codecs for the purposes of call origination or termination, bridging disparate calls, or VoIP to TDM connectivity. These transformations in software are very expensive, in terms of MIPS, and require a substantial amount of CPU time to accomplish. The Synway CDC series uses the PCI-based DMA technique for data reading and writing, minimizing the CPU cost. It is fully compatible with the API functions of Asterisk and supports the transformations among G.711 A-Law, μ-Law and G.729A, which ideally cover the shortage of Asterisk. Besides, the CDC board has many DSPs on it to provide powerful voice processing, which brings a nearly real-time voice effect to users.

Figure 1-5 below is a typical application model with CDC.
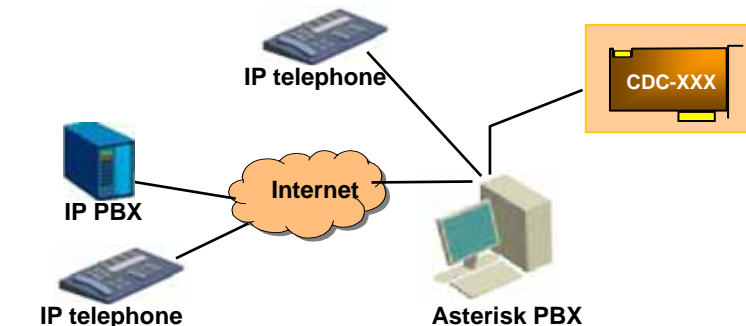
xxx: represents the existing and future board models in the CDC series.

Figure 1-5 Application Model

Chapter 2   Hardware Installation

Refer to the board model to find the relevant hardware manual. Install the board successfully before going to the next chapters for software installation. The hardware manual provided for your reference is under the directory '/doc/Hardware' of the installation package. Table 2-1 shows the corresponding relationship between the board model and the hardware manual.

Subseries	Board Model	Hardware Manual
FXM	FXM-8A/PCI	AST_FXM001
	FXM-16A/PCIe	
	FXM3201P	AST_FXM002
	FXM3201E	
	FXM3200P	
	FXM3200E	
	FXM3211P	AST_FXM003
	FXM3210P	
TEJ	TEJ-1A/PCI	AST_TEJ001
	TEJ-2A/PCI	
	TEJ-4A/PCI	
	TEJ101E	AST_TEJ002
	TEJ201E	
	TEJ101P	
	TEJ201P	
	TEJ100E	
	TEJ200E	
	TEJ100P	
	TEJ200P	
	TEJ401E	AST_TEJ003
	TEJ801E	
	TEJ400E	
	TEJ800E	
	TEJ401P	
	TEJ801P	
	TEJ400P	
	TEJ800P	
	TEJ401P(SSW)	AST_TEJ004
	TEJ801P(SSW)	
	TEJ400P(SSW)	
	TEJ800P(SSW)	
	TEJ101P(SSW)	
	TEJ201P(SSW)	
	TEJ100P(SSW)	
	TEJ200P(SSW)	
CDC	CDC-1522A/PCI	AST_CDC001
	CDC-2522A/PCI	

	CDC-3522A/PCI	

Table 2-1 Board Model and Corresponding Hardware Manual

Chapter 3   Driver Installation & Configuration

SynAST is the driver software for the Synway AST series boards. Its compilation, installation and configuration are all related closely to zaptel/dahdi and open source IP PBXs. So we suggest those who are familiar with the installation and configuration of open-source IP PBXs use the script in the installation package to complete the driver installation and configuration (see Section 3.1), and suggest others refer to Chapter 4 All Manuals for You.

3.1 By Script

Note: Do not forget to install the kernel header file linux-headers while you are installing the LINUX operating system. Make sure the Asterisk services are closed before you start the installation, checking by the command asterisk –r.

3.1.1   Based on Zaptel

First prepare the SynAST driver and zaptel software packages.

#cd /opt	*# enter the directory to source codes*
#tar –zxvf SynAST-1.8.0.0.tar.gz	*# decompress the synast driver*
#tar –zxvf zaptel-1.4.8.tar.gz	*# decompress the zaptel driver*
#cd SynAST-1.8.0.0	*# enter the directory to the synast driver*
#cd for_zaptel	*# enter the directory to the 'synway ast for zaptel' driver*
#./Setup install	*# install the driver*

Would you like to install SynAST AST package now? y   *# enter 'y' to install*

Please enter working zaptel directory [q](exit install) :

 # enter the full path to zaptel source codes

Would you like to open hardware echocan on boards? y

 # enter 'y' to enable the echo cancellation in hardware, enter 'n' to disable it

The following options will appear if there are TEJ series boards installed in the PC.

SELECT TEJ MODE [t, e, j] :e   *# select the tej mode, or the driver will be installed in e1 mode*

SELECT TEJXAPCI [75, 120]ohm   *# set the impedance of the TEJ pci board, 75 for coaxial cables, 120 for twisted-pair cables*

SELECT TEJ201E [75, 120]ohm   *# set the impedance of the tej201e board, 75 for coaxial cables, 120 for twisted-pair cables*

3.1.2 Based on Dahdi

First prepare the SynAST driver and dahdi software packages.

Note: To publish a dahdi version, there are two ways: one is to publish driver and tools together, and the other is to publish driver and tools separately. Here is a version for which driver and tools are published together. For how to install those versions for which driver and tools are published separately, see Appendix A FAQ.

```
#cd /opt                              # enter the directory to source codes

#tar –zxvf SynAST-1.8.0.0.tar.gz      # decompress the synast driver

#cd SynAST-1.8.0.0                    # enter the directory to the synast driver

#cd for_dahdi                         #enter the directory to the 'synway ast for dahdi' driver

#./Setup install                      # install the driver
```

Would you like to install SynAST AST package now? y   # enter 'y' to install

Please enter working dahdi directory [q](exit install) :

                                                        # enter the full path to dahdi source codes

Would you like to open hardware echocan on boards?y

                    # enter 'y' to enable the echo cancellation in hardware, enter 'n' to disable it

The following options will appear if there are TEJ series boards installed in the PC.

SELECT TEJ MODE [t, e, j] :e   # select the tej mode, or the driver will be installed in e1 mode

SELECT TEJXAPCI [75, 120]ohm   # set the impedance of the TEJ pci board, 75 for coaxial cables, 120 for twisted-pair cables

SELECT TEJ201E [75, 120]ohm   # set the impedance of the tej201e board, 75 for coaxial cables, 120 for twisted-pair cables

3.1.3 Configure Boards Order

If you have multiple boards and the order changes after the system restart, you may use the following commands to reset the board order.

```
./Setup config
```

Would you like to configure the cards order now? (y/n) y

Card Type	Serialno
fxm8apci	no1
fxm8apci	no2
tejxapci	no3
tejxapci	no4

Adjust Card Type [fxm8apci,tejxapci] (q) : fxm8apci	# [ ] in this line automatically lists only the same models of 2 or more than 2 boards. Enter q to exit.
Adjust Card Order (Comma separated):no2,no1	#Upon executing this command, the two fxm8apci boards will be loaded in a no2, no1 sequence.

Note: If users do not configure the order of loading, the boards will be loaded according to Serialno from small to large. However, users can modify the file /tmp/synast_cardlist to rearrange the loading boards. If the file /tmp/synast_cardlist does not exist, execute the command touch /tmp/synast_cardlist to create it. The format of /tmp/synast_cardlist is Card Type: Serialno. The board with the serial number listed in the front is loaded earlier. Only upon restart does this modification go into effect.

3.1.4 Automatic Configuration

There are two scripts for automatic configuration astcfg_dahdi and astcfg_zaptel in the driver installation package. They can achieve the same purpose respectively as zapconf and dahdi_genconf. You can use the following commands to configure the board.

If based on zaptel:

#>astcfg_zaptel asterisk

If based on dahdi:

#>astcfg_dahdi asterisk

3.2 Manually

Note: Do not forget to install the kernel header file linux-headers while you are installing the LINUX operating system.

3.2.1 Manual Installation

3.2.1.1 Based on Zaptel

Step1:   Install the zaptel driver

#cd /opt	*# enter the directory to the package of zaptel source codes*
#tar –zxvf zaptel-1.4.8.tar.gz	*# decompress the source codes*
#cd zaptel-1.4.8	*# enter the directory to zaptel source codes*
#./configure	

#make   # compile the driver

#make install   # install the driver

#modprobe zaptel   # load the driver

Step2:   Install the SynAST driver

#cd /opt   # enter the directory to the package of SynAST source codes

#tar –zxvf SynAST-1.8.0.0.tar.gz   # decompress the source codes

#cp –rf   /opt/SynAST-1.8.0.0/for_zaptel/src/fxm/fxm8apci   /opt/zaptel-1.4.8

copy the fxm8apci driver to the zaptel directory. You should copy a driver that corresponds to your used AST board (see the table below to find each board model and its corresponding driver) to replace the part 'fxm/fxm8apci' of this command. If the zaptel version is above 1.4.11, where you should copy to is /opt/zaptel-[version]/kernel.

#cd /opt/zaptel-1.4.8/fxm8apci   # enter the directory to SynAST source codes in zaptel. If the zaptel version is above 1.4.11, execute the command #cd /opt/zaptel-[version]/kernel/fxm8apci.

Note: While using a zaptel above version 1.4.11 on CDC boards, you need to follow the path '/opt/zaptel-[Version]/kernel/cdcx522apci/Makefile' to open the file 'Makefile' and add the sentence 'EXTRA_CFLAGS+=   -DZAP1412'   to   behind 'EXTRA_CFLAGS:=-DSTANDALONE_ZAPATA -DBUILDING_TONEZONE'. To enable the echo cancellation in hardware, modify the file '/opt/zaptel-1.4.8/fxm8apci/Makefile', changing it from EXTRA_CFLAGS:=-DSTANDALONE_ZAPATA -DBUILDING_TONEZONE -D__TONE_DETECT__'   to   'EXTRA_CFLAGS:=-DSTANDALONE_ZAPATA -DBUILDING_TONEZONE -D__TONE_DETECT__ -D HWEC_OPEN'.

#make   # compile the driver

#insmod fxm8apci.ko   # load the driver

Note: When using other AST series boards except FXM-8A/PCI, you should refer to Table 3-1 to find the corresponding driver file and use the filename to replace the parts 'fxm' and 'fxm8apci' in the above commands.

Subseries	Board Model	Directory to Source Codes	Driver File	Remark
FXM	FXM-8A/PCI	fxm8apci	fxm8apci.ko	Follow the above example.
	FXM-16A/PCIe	fxm16apcie	fxm16apcie.ko	Use the name of the driver

	FXM3201P FXM3201E FXM3200P FXM3200E FXM3211P FXM3210P	fxm32	fxm32.ko	file which corresponds to the board model you use to replace the parts 'fxm' and 'fxm8apci' in the above commands.
TEJ	TEJ-1A/PCI TEJ-2A/PCI TEJ-4A/PCI	tejxapci	tejxapci.ko	
	TEJ101E TEJ201E TEJ101P TEJ201P TEJ100E TEJ200E TEJ100P TEJ200P TEJ101P(SSW) TEJ201P(SSW) TEJ100P(SSW) TEJ200P(SSW)	tej21	tej21.ko	
	TEJ401E TEJ801E TEJ400E TEJ800E TEJ401P TEJ801P TEJ400P TEJ800P TEJ401P(SSW) TEJ801P(SSW) TEJ400P(SSW) TEJ800P(SSW)	tej84	tej84.ko	
CDC	CDC-1522A/PCI CDC-2522A/PCI CDC-3522A/PCI	cdcx522apci	cdcx522apci.ko	

Table 3-1 Board Model and Corresponding Driver

3.2.1.2 Based on Dahdi

Step1: Install the dahdi driver

#cd /opt   *# enter the directory to the package of dahdi source codes*

#cd dahdi   *# enter the directory to dahdi source codes*

#make   *# compile the driver*

#make install   *# install the driver*

#modprobe dahdi   *# load the driver*

 Step2: Install the SynAST driver

Note: To publish a dahdi version, there are two ways: one is to publish driver and tools together, and the other is to publish driver and tools separately. Here is a version for which driver and tools are published together. For how to install those versions for which driver and tools are published separately, see <u>*Appendix A FAQ*</u>*.*

#cd /opt   *# enter the directory to the package of SynAST source codes*

#tar –zxvf SynAST-1.8.0.0.tar.gz *# decompress the source codes*

#cp –rf /opt/SynAST-1.8.0.0/for_dahdi/src/fxm/fxm8apci /opt/dahdi/linux/drivers/dahdi

          # copy the fxm8apci driver to the dahdi directory

#cd /opt/dahdi/linux/drivers/dahdi/fxm8apci

          # enter the directory to SynAST source codes in dahdi

Note: While using dahdi-2.2 or above versions, you need enter the path '/opt /dahdi /linux /drivers /dahdi /fxm8apci/Kbuild' to change the sentence in the file Kbuild 'EXTRA_CFLAGS := -I$(src)/.. -Wno-undef -I/usr/include $(ECHOCAN)' to be 'EXTRA_CFLAGS := -I$(src)/.. -Wno-undef -I/usr/include $(ECHOCAN) -DDAHDI22'. To enable the echo cancellation in hardware, add -D HWEC_OPEN to the end of this sentence.

#make   *# compile the driver*

#insmod fxm8apci.ko   *# load the driver*

Note: When using other AST series boards except FXM-8A/PCI, you should refer to Table 3-2 to find the corresponding driver file and use the filename to replace the parts 'fxm' and 'fxm8apci' in the above commands.

Subseries	Board Model	Directory to Source Codes	Driver File	Remark
FXM	FXM-8A/PCI	fxm8apci	fxm8apci.ko	Follow the above example.
	FXM-16A/PCIe	fxm16apcie	fxm16apcie.ko	Use the name of the driver file which corresponds to the board model you use to replace the parts 'fxm' and 'fxm8apci' in the above commands.
	FXM3201P FXM3201E FXM3200P FXM3200E FXM3211P FXM3210P	fxm32	fxm32.ko	
TEJ	TEJ-1A/PCI TEJ-2A/PCI TEJ-4A/PCI	tejxapci	tejxapci.ko	

	TEJ101E TEJ201E TEJ101P TEJ201P TEJ100E TEJ200E TEJ100P TEJ200P TEJ101P(SSW) TEJ201P(SSW) TEJ100P(SSW) TEJ200P(SSW)	tej21	tej21.ko
	TEJ401E TEJ801E TEJ400E TEJ800E TEJ401P TEJ801P TEJ400P TEJ800P TEJ401P(SSW) TEJ801P(SSW) TEJ400P(SSW) TEJ800P(SSW)	tej84	tej84.ko
CDC	CDC-1522A/PCI CDC-2522A/PCI CDC-3522A/PCI	cdcx522apci	cdcx522apci.ko

Table 3-2 Board Model and Corresponding Driver

3.2.2 Manual Configuration

Here we take the FXM-16A/PCIe and TEJ-4A/PCI boards for the example, to show you how to configure systems. Please read the section applicable to your driver environment.

3.2.2.1 Configure Zaptel

Step1:   Follow the table below to modify the configuration file.

Config Board Model File	TEJ-4A/PCI				FXM-16A/PCIe (top 4 slots: trunk; bottom 4 slots: station)
/etc/ zaptel.conf	E1 Mode		T1/J1 Mode		
	ISDN	SS1	ISDN	SS1	
	loadzone=us defaultzone=us				

span=1,1,0,ccs,hdb3
bchan=1-15
dchan=16
bchan=17-31
span=2,1,0,ccs,hdb3
bchan=32-46
dchan=47
bchan=48-62
span=3,1,0,ccs,hdb3
bchan=63-77
dchan=78
bchan=79-93
span=4,1,0,ccs,hdb3
bchan=94-108
dchan=109
bchan=110-124
 	
Note: For the configuration to support channel bank, span=1,0,0,cas,hdb3 fxols=1-15,17-31
	span=1,1,0,cas,hdb3
	cas=1-15,17-31:1111
	span=2,1,0,cas,hdb3
	cas=32-46,48-62:1111
	span=3,1,0,cas,hdb3
	cas=63-77,79-93:1111
	span=4,1,0,cas,hdb3
	cas=94-108,110-124:1111
		span=1,1,0,esf,b8zs
		bchan=1-23
		dchan=24
		span=2,1,0,esf,b8zs
		bchan=25-47
		dchan=48
		span=3,1,0,esf,b8zs
		bchan=49-71
		dchan=72
		span=4,1,0,esf,b8zs
		bchan=73-95
		dchan=96
			span=1,1,0,esf,b8zs
			e&m=1-23
			span=2,1,0,esf,b8zs
			e&m=25-47
			span=3,1,0,esf,b8zs
			e&m=49-71
			span=4,1,0,esf,b8zs
			e&m=73-95
				#fxo module
				fxsks=1
				fxsks=2
				fxsks=3
				fxsks=4
				fxsks=5
				fxsks=6
				fxsks=7
				fxsks=8
				#fxs module
				fxoks=9
				fxoks=10
				fxoks=11
				fxoks=12
				fxoks=13
				fxoks=14
				fxoks=15
				fxoks=16

Table 3-3 Zaptel Configuration

Step2:   Apply the configuration result.

#ztcfg –vv

Note: If a device has multiple AST boards on it, the on-board channels are numbered according to the order in which the board drivers are loaded; if the AST boards are of the same model, the channels are numbered by the distance from near to far between the on-board PCI/PCIe slots and the CPU. You are allowed to get the information about span number by executing the command '#cat /proc/zaptel/[span number to be checked]'.

3.2.2.2 Configure Dahdi

Step1:   Follow the table below to modify the configuration file.

Board Model / Config File	TEJ-4A/PCI				FXM-16A/PCIe (top 4 slots: trunk; bottom 4 slots: station)
/etc/ dahdi/ system.conf	E1 Mode		T1/J1 Mode		
	ISDN	SS1	ISDN	SS1	
	loadzone=us defaultzone=us				

span=1,1,0,ccs,hdb3	span=1,1,0,cas,hdb3	span=1,1,0,esf,b8zs	span=1,1,0,esf,b8zs	#fxo module
bchan=1-15	cas=1-15,17-31:1111	bchan=1-23	e&m=1-23	fxsks=1
dchan=16	span=2,1,0,cas,hdb3	dchan=24	span=2,1,0,esf,b8zs	fxsks=2
bchan=17-31	cas=32-46,48-62:1111	span=2,1,0,esf,b8zs	e&m=25-47	fxsks=3
span=2,1,0,ccs,hdb3	span=3,1,0,cas,hdb3	bchan=25-47	span=3,1,0,esf,b8zs	fxsks=4
bchan=32-46	cas=63-77,79-93:1111	dchan=48	e&m=49-71	fxsks=5
dchan=47	span=4,1,0,cas,hdb3	span=3,1,0,esf,b8zs	span=4,1,0,esf,b8zs	fxsks=6
bchan=48-62	cas=94-108,110-124:1111	bchan=49-71	e&m=73-95	fxsks=7
span=3,1,0,ccs,hdb3		dchan=72		fxsks=8
bchan=63-77		span=4,1,0,esf,b8zs		#fxs module
dchan=78		bchan=73-95		fxoks=9
bchan=79-93		dchan=96		fxoks=10
span=4,1,0,ccs,hdb3				fxoks=11
bchan=94-108				fxoks=12
dchan=109				fxoks=13
bchan=110-124				fxoks=14
				fxoks=15
Note: For the				fxoks=16
configuration to support				
channel bank,				
span=1,0,0,cas,hdb3				
fxols=1-15,17-31				

Table 3-4 Dahdi Configuration

Step2: **Apply the configuration result.**

#dahdi_cfg –vv

Note: If a device has multiple AST boards on it, the on-board channels are numbered according to the order in which the board drivers are loaded; if the AST boards are of the same model, the channels are numbered by the distance from near to far between the on-board PCI/PCIe slots and the CPU. You are allowed to get the information about span number by executing the command '#cat /proc/dahdi/[span number to be checked]'.

3.3 Driver Uninstallation

Close the Asterisk service and then go into the driver installation package to execute the following command.
/Setup remove

Chapter 4   All Manuals for You

Except this manual, we provide all the documents shown below in Table 4-1 which involve the installation, configuration and test of several IP PBX platforms the Synway AST series boards support. Please choose what you need for your actual performance. All manuals we provide are put under the directory '/doc/Software' in the installation package. See Table 4-1 for details.

IP PBX	Applicable Manual	Remark
Asterisk	Platform(Asterisk)_InstManual.pdf	Applicable to installing any version of Asterisk with the Synway AST series boards.
	FXM3201P based Asterisk System Installation and Setup Manual.pdf	Specific to installing the Asterisk-1.6.0.10 system with the Synway FXM3201P board.
Trixbox	Platform(Trixbox)_InstManual.pdf	Applicable to installing any version of Trixbox with the Synway AST series boards.
	Trixbox 2.8.0.3 Installation Manual.pdf	Specific to installing Trixbox 2.8.0.3 system with the Synway TEJ-1A/PCI and FXM3201P boards.
Elastix	Elastix 1.5.2 Installation Manual.pdf	Specific to installing the Elastix 1.5.2 system with the Synway TEJ-1A/PCI and FXM3201P boards.
FreeSwitch	Platform(FreeSwitch)_InstManual.pdf	Applicable to installing any version of FreeSwitch with the Synway AST series boards.
	FXM3201P based FreeSWITCH System Installation and Setup Manual.pdf	Specific to installing the FreeSWITCH-1.0.4 system with the Synway FXM3201P board.
Yate	Platform(Yate)_InstManual.pdf	Applicable to installing any version of Yate with the Synway AST series boards.

CallWeaver	Platform(CallWeaver)_InstManual.pdf	Applicable to installing any version of CallWeaver with the Synway AST series boards.
AsteriskNOW	Platform(AsteriskNow)_InstManual.pdf	Applicable to installing any version of AsteriskNow with the Synway AST series boards.
	AsteriskNOW 1.5.0 Installation Manual.pdf	Specific to installing the AsteriskNOW 1.5.0 system with the Synway TEJ-1A/PCI and FXM3201P boards.

Table 4-1 IP PBX and Applicable Installation Manual

Note: Once you come across some problems in installing, read Appendix A FAQ in this file first.

Appendix A FAQ

Q1:   Why do noises appear while using the FXM-8A/PCI or FXM-16A/PCIe board?

It may be due to the incomplete downloading of the firmware after Zaptel/Dahdi installation. Please make sure the network is well connected when you execute the command ./Setup install.

Q2:   Why do the indicators on the TEJ boards always flash with the circuitry already connected?

It may be due to the incorrect configuration of the board impedance. You can test by pulling the corresponding jumper cap out or plug it into the board.

Q3:   How to determine the board arrangement when there are more than one AST board?

If zaptel is configured automatically, you may check /etc/zaptel.conf or /etc/dahdi/system.conf to see the board arrangement.

If zaptel is configured manually, you may execute the command #cat /var/log/messages | grep "Launching card" to check the board arrangement.

If the board arrangement is determined by their serial number, pay attention to the time when you execute the command.

Q4:   How to install the SynAST driver in a dahdi version for which driver and tools are published separately?

Please download the driver and tools of dahdi separately.

  1. By Script

        #cd /opt   *# enter the directory to source codes*

        #tar –zxvf SynAST-1.8.0.0.tar.gz   *# decompress the SynAST driver*

        #cd SynAST-1.8.0.0   *# enter the directory to the SynAST driver*

        #cd for_dahdi   *# enter the directory to the 'synway ast for dahdi' driver*

        #./Setup install   *# install the driver*

        Would you like to install SynAST AST package now? y   *# enter 'y' to install*

        Please enter working dahdi directory [q](exit install) : /opt/dahdi_driver

                                                        # enter the directory to dahdi_driver source codes

        Please enter dahdi_tools source directory [q](exit install):

                                                        # enter the directory to dahdi_tools source codes

        SELECT TEJ MODE [t, e, j] :e   *# select the tej mode, or the driver will be installed in e1 mode*

        SELECT TEJXAPCI [75, 120]ohm   *# set the impedance of the TEJ pci board, 75 for coaxial*

cables, 120 for twisted-pair cables

    SELECT TEJ201E [75, 120]ohm   *# set the impedance of the tej201e board, 75 for coaxial cables, 120 for twisted-pair cables*

2. Manually

    #cd /opt   *# enter the directory to the package of SynAST source codes*

    #tar –zxvf SynAST-1.8.0.0.tar.gz   *# decompress the source codes*

    #cp –rf /opt/SynAST-1.8.0.0/for_dahdi/src/fxm/fxm8apci /opt/dahdi_driver/drivers/dahdi

      # copy the fxm8apci driver to the dahdi_driver directory.

    #cd /opt/dahdi/linux/drivers/dahdi/fxm8apci

      # enter the directory to SynAST source codes in dahdi

    #make   *# compile the driver*

    #insmod fxm8apci.ko   *# load the driver*

    #cd /opt/dahdi_tools   *# enter the directory to dahdi tools*

    #./configure

    #make   *# compile dahdi_tools*

    #make install   *# install dahdi_tools*

Q5: How to solve the problem that the system reports error in loading channel_unicall.so when you start Asterisk after restarting ISDN in a system ever installed with SS1?

1.   Enter the Asterisk directory previously installed with SS1 and execute the following command:

    #make uninstall

2.   Enter the Asterisk directory to be installed with ISDN and execute the following command:

    #make install

Q6: How to determine the use of Zaptel or Dahdi for Asterisk?

For Asterisk-1.4.21 and versions below, use Zaptel; for Asterisk-1.4.22 and versions above, use Dahdi.

Q7: How to solve the problem that the system fails to detect the hangup at remote end as the volume of the recorded busy tone is quite low?

Modify the file main/dsp.c under the Asterisk directory, changing the previous content '#define DEFAULT_THRESHOLD 512' to '#define DEFAULT_THRESHOLD 448'. The value can be reduced again if the problem is not solved yet.

Q8: How to solve the problem that the for_zaptel driver fails to be installed in the system

of Ubuntu 8.10, kernel 2.6.27-7-server?

Use the for_dahdi driver.

Q9: How to solve the problem that when using China SS1 to make a call outside, errors occur in R2 connection and consequently lead to call failure?

1. First visit the website http://bbs.openvox.cn/viewthread.php?tid=697&extra=&page=1 to download the three patches mfcr2.c, mfcr2.h, unicall.h.

2. Use mfcr2.c to replace astunicall-1.4.18-0.2/unicall-0.0.5pre1/libmfcr2-0.0.3/mfcr2.c

3. Use mfcr2.h to replace astunicall-1.4.18-0.2/unicall-0.0.5pre1/libmfcr2-0.0.3/mfcr2.h

4. Use unicall.h to replace astunicall-1.4.18-0.2/unicall-0.0.5pre1/libunicall-0.0.3/unicall.h

5. Execute the command mkdir /usr/include/zaptel

6. Execute the command cp astunicall-1.4.18-0.2/zaptel-1.4.9.2/kernel/zaptel.h /usr/include/zaptel

7. Install following the file readme under astunicall-1.4.18-0.2.

Q10: How to solve the problem that the configuration files zaptel.conf and zapata.conf cannot be found under dahdi?

/etc/dahdi/system.conf under dahdi corresponds to /etc/zaptel.conf under zaptel. The configuration files system.conf and zaptel.conf, although differ in name, are the same in content.

/etc/asterisk/chan_dahdi.conf under dahdi corresponds to /etc/asterisk/zapata.conf under zaptel. The configuration files chan_dahdi.conf and zapata.conf, although differ in name, are the same in content.

Q11: How to solve the failure of FXM boards to receive the calling party number?

If you are using a version of **zaptel**, please uninstall it first. Then install a **dahdi** version and operate as follows (take the FXM-8A/PCI board for example).

Execute the command 'echo 32 > /sys/module/fxm8apci/parameters/ringdebounce'. Then test if the board can well receive the calling party number. If the reception still fails, change 32 in this command to 16 or 8 and retest.

Note: If the file /sys/module/fxm8apci/parameters/ringdebounce does not exist, modify the command to 'echo 32 >/sys/module/fxm8apci/ringdebounce'.

Q12: How to use the function of FXM series boards to adjust recording and playback volumes?

This volume adjustment function is valid to all channels on the same kind of boards. The value range of the parameter x is 1~255 which represents the DB value of $20\log(x/10)$.

To adjust the recording volume for FXM-8A-PCI, execute the command:
echo x > /sys/module/fxm8apci/parameters/recvolume;
To adjust the playback volume for FXM-8A-PCI, execute the command:

echo x > /sys/module/fxm8apci/parameters/playvolume;

To adjust the recording volume for FXM-16A-PCIe, execute the command:

echo x > /sys/module/fxm16apcie/parameters/recvolume;

To adjust the playback volume for FXM-16A-PCIe, execute the command:

echo x > /sys/module/fxm16apcie/parameters/playvolume

To adjust the recording volume for FXM-32, execute the command:

echo x > /sys/module/fxm32/parameters/recvolume

To adjust the playback volume for FXM-32, execute the command:

echo x > /sys/module/fxm32/parameters/playvolume

Q13: How to solve the problem that TEJ digital boards cannot be configured through the WEB interface while using Elastix 1.6-11?

Use the file Span.pm in the driver installation package to replace /usr/lib/perl5/site_perl/5.8.8/Dahdi/Span.pm.

Appendix B Technical/Sales Support

Thank you for choosing Synway. Please contact us should you have any inquiry regarding our products. We shall do our best to help you. However, our technicians and salesmen are mainly responsible for maintaining our boards and providing relative technical support. If there are problems about Asterisk, please keep touch with Digium Inc. for help.

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