Configuring Hardware Echo Cancellation on T1/E1 Multiflex Voice/WAN Interface Cards

The multiflex trunk (MFT) dedicated echo cancellation modules (dedicated ECAN modules) are daughter cards that attach to the second generation multiflex voice/WAN interface cards (MFT VWIC2 family). The dedicated ECAN modules are available in 32-channel and 64-channel configurations (EC-MFT-32 and EC-MFT-64), which match the requirements of the 1- and 2-port T1/E1 MFT VWIC2s, respectively. This chapter describes the configuration to enable additional echo cancellation effectiveness:

- Control of the echo canceller provided through the size of the echo cancellation buffer, ranging from 24 milliseconds (ms) to 128 ms
- Processing and memory resources to ensure robust echo canceller coverage independent from the configuration of the echo canceller or the demand placed on the general voice DSP resources

Prerequisites for Hardware Echo Cancellation on T1/E1 Multiflex Voice/WAN Interface Cards

Cisco IOS Image

To run hardware echo cancellation on T1/E1 interfaces, you must install an IP Plus or IP Voice image (minimum) of Cisco IOS Release 12.3(14)T or a later release.

Baseboard and Daughter Card Configuration

Hardware echo cancellation is restricted to the same baseboard voice/WAN interface card (VWIC) on which the daughter card (EC-MFT-32 and EC-MFT-64) is installed and cannot be shared by other T1/E1 controllers.

Hardware Echo Cancellation Tail Length

If you are using hardware echo cancellation, the value for tail length is set to 128 ms. This is not configurable and cannot be changed.

Information About Hardware Echo Cancellation on T1/E1 Multiflex Voice/WAN Interface Cards

Table 10 lists the names and descriptions of the baseboard modules and daughter cards that offer hardware echo cancellation on T1/E1 multiflex voice/WAN interface cards.

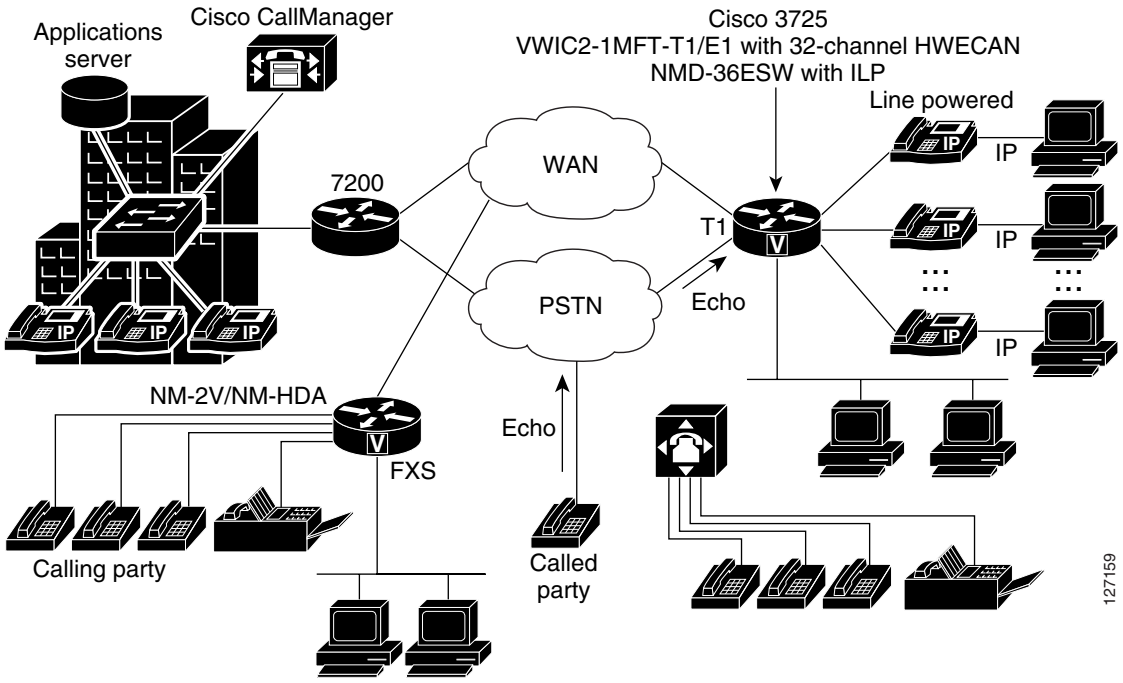
Table 10 Modules with T1/E1 Multiflex Voice/WAN Interface Cards with Echo Cancellation Functionality

Module Name		Description
Baseboard	VIC2-1MFT-T1/E1[1]	1-port RJ-48 multiflex voice trunk (T1/E1)
	VIC2-2MFT-T1/E1[1]	2-port RJ-48 multiflex voice trunk (T1/E1)
	VWIC2-1MFT-T1/E1	1-port RJ-48 multiflex voice/WAN trunk (T1/E1)
	VWIC2-2MFT-T1/E1	2-port RJ-48 multiflex voice/WAN trunk (T1/E1)
	VWIC2-1MFT-G703[2]	1-port RJ-48 multiflex trunk (E1 G.703)
	VWIC2-2MFT-G703[2]	2-port RJ-48 multiflex trunk (E1 G.703)
Daughter cards for hardware echo cancellation	EC-MFT-32	32-channel echo canceller module for multiflex trunk
	EC-MFT-64	64-channel echo canceller module for multiflex trunk

1. The VIC2-1MFT-T1/E1 and VIC2-2MFT-T1/E1 voice modules do not support WAN connectivity.
2. Although unstructured G.703 operation is particular to E1 operation, the VWIC2-1/2MFT-G703 cards also support structured T1 operation.

Figure 16 shows a sample network topology with a Cisco 3725 router using hardware echo cancellation.

Figure 16 Sample Network Topology for the T1/E1 Multiflex Voice/WAN Interface Cards with Echo Cancellation Module



How to Configure Hardware Echo Cancellation on T1/E1 Multiflex Voice/WAN Interface Cards

To configure hardware echo cancellation on T1/E1 multiflex voice/WAN interface cards, complete the following tasks.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **card type** {**e1** | **t1**} *slot subslot*
4. **voice-card** *slot*
5. **voice-port** {*slot-number*/*subunit-number*/*port* | *slot*/*port*:*ds0-group-number*}
6. **echo-cancel enable type** [**hardware** | **software**]
7. **echo-cancel coverage** {**24** | **32** | **48** | **64**}
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**card type** {**e1** | **t1**} *slot subslot* **Example:** `Router(config)# card type t1 1 0`	Sets or changes the card type to E1 or T1. • *slot*—Specifies the slot number. Range can be 0 to 6, depending on the platform. • *subslot*—Specifies the VWIC slot number. Range can be 0 to 3, depending on the host module or platform. • When the command is used for the first time, the configuration takes effect immediately. • A subsequent change in the card type will not take effect unless you enter the **reload** command or reboot the router. **Note** When you are using the **card type** command to change the configuration of an installed card, you must enter the **no card type** {**e1** | **t1**} *slot subslot* command first. Then enter the **card type** {**e1** | **t1**} *slot subslot* command for the new configuration information.
Step 4	**voice-card** *slot* **Example:** `Router(config)# voice card 1`	Enters voice card configuration mode. • Specify the slot location using a value from 0 to 5.

	Command or Action	Purpose
Step 5	**voice-port** {*slot-number*/*subunit-number*/*port* | *slot*/*port*:*ds0-group-number*} **Example:** `Router(voice-card)# voice-port 3/0:0`	Enters voice port configuration mode and specifies the voice port. • The *slot-number* argument identifies the slot where the voice interface card (VIC) is installed. Valid entries are from 0 to 3, depending on the slot in which it has been installed. • The *subunit-number* identifies the subunit on the VIC where the voice port is located. Valid entries are 0 or 1. • The *port* argument identifies the voice port number. Valid entries are 0 and 1. or • The *slot* argument is the slot in which the voice port adapter is installed. Valid entries are from 0 to 3. • The *port* argument is the voice interface card location. Valid entries are 0 to 3. • The *ds0-group-number* argument indicates the defined DS0 group number. Each defined DS0 group number is represented on a separate voice port. This allows you to define individual DS0s on the digital T1/E1 card.
Step 6	**echo-cancel enable type** [**hardware** | **software**] **Example:** `router(config-voiceport)# echo-cancel enable type hardware`	Enables hardware echo cancellation. • The **hardware** keyword is the default. Echo cancel coverage is hardcoded for 128 ms. • This command is needed only to configure the **software** keyword to effect software-based (DSP) echo cancellation or to restore the **hardware** default. **Note** The **hardware** and **software** keywords are available only when the optional hardware echo cancellation module (EC-MFT-32 or EC-MFT-64) is installed on the multiflex VWIC.
Step 7	**echo-cancel coverage** {**24** | **32** | **48** | **64**} **Example:** `Router (config-voiceport) # echo-cancel coverage 24`	Adjusts the echo canceller by the specified number of milliseconds. • These coverage options are applicable only if you configured the **echo-cancel enable type software** command in the previous step. • If you configured the **echo-cancel enable type hardware** command in the previous step, this value is set to 128 ms. • The default for software echo cancellation is 64 ms.
Step 8	**exit** **Example:** `Router(config-voiceport)# exit`	Exits controller cofiguration mode and returns the router to privileged EXEC mode.

Examples

This section provides the following examples for verifying echo cancellation:

- show echo-cancel hardware status: Example, page 102
- show call active voice echo-canceller summary: Example, page 102
- show call active voice echo-canceller CallID: Example, page 102

show echo-cancel hardware status: Example

The output in this section shows that hardware echo cancellation is enabled on slot 1.

```
Router_3725# show echo-cancel hardware status 1

VWIC HWECAN 1/0 is UP.
Software version:4.4.803 , Date:Feb  6 16:58:57 2004
Tail length:128     Tone disabler type:G.165    Fax notify: Off
Device:VWIC_8MBPS_1TIEC_TL128_MS_1P  Max Channels:32
Only Port0 have Local HWECAN Connectivity.


 ECAN CH     ASSIGNED      DSP ID      VOICEPORT       EC      NLP     COV          LAW
 ============================================================================================
    1          yes          1/1         1/0:1.1        on      off      on         u-Law


Total assigned channel(s):1
Total device(s) in the slot 1
```

show call active voice echo-canceller summary: Example

The output in this section shows summary information for the hardware echo cancellation.

```
Router_3725# show call active voice echo-canceller summary


  Call ID      Port       DSP/Ch     Codec    Ecan-type   Tail    Called #     Dial-peers
 ============================================================================================
   0xE71      1/0:1.1       1/1      g729r8       HW      128ms     1000           1/10


1 active call found
number of hardware ecan channels:1
number of software ecan channels:0
```

show call active voice echo-canceller CallID: Example

The output in this section shows hardware echo canceller information for an active voice call.

```
Router# show call active voice echo-canceller E71

Device:VWIC HWECAN 1/0 Channel Id = 1 Tail = 128Ms
Software version:4.4.803 , Date:Feb  6 16:58:57 2004
        Echo Canceller:On   Tail-length:128ms
        H-Register:Update   Modem tone disable:Ignore 2100Hz tone
        Worst ERL :6dB     Residual Control:Cancel only
        High level compensation:Off
        Tx Power = 0.0dB  Tx Avg Power = 0.0dB
        Rx Power = 0.0dB  Rx Avg Power = 0.0dB
        ERL = 1.0dB     ACOM = 0.0
```

```
3 Reflectors(Tails) = (90, 0, 0)Ms, Max Reflector = 90Ms
Ecan Status words 0x1C, 0x00
EC Lib version:9155
```

More detailed syntax information about the commands used with this feature is documented in the Cisco IOS Release 12.4 Voice Command Reference.