



KIRFD EchoStation

***User's Guide
Version 2.0***

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Welcome to EchoStation

EchoStation is a repeater-control program for Windows 95/98/NT/2000 which makes it easy to set up a complete, fully-functional repeater or "announcement machine" using a personal computer.

Setup is as easy as installing the software, and connecting a transmitter and receiver to the PC's sound card. The transmitter can be controlled by VOX, or connected to the COM port with an interface such as the RIGBlaster from [West Mountain Radio](#).

EchoStation is perfect for portable and emergency use, or for clubs wishing to use a PC instead of specialized hardware to control a repeater. It also makes an excellent store-and-forward simplex repeater when connected to a single transceiver.

The software also lets you set up an "announcement machine" which plays scheduled voice announcements over your club's existing repeater, using a radio at another location, such as a home station.

All standard repeater functions are supported, such as COR, CW ID, voice ID, and courtesy tone.

Typical Uses

Club Announcements: Announce club information, upcoming meetings, and special events periodically over your club's repeater.

News Bulletins: Transmit Amateur Radio news bulletins (such as [ARRL Audio News](#) and [Amateur Radio Newslines](#)) on HF frequencies or through your local repeater.

Emergency Communications: Schedule periodic [SKYWARN](#) bulletins and other emergency-communications information.

Simplex Repeater: Set up a simplex repeater, using a personal computer and one transceiver, for portable or emergency use.

Temporary Repeater: Set up a temporary single-band or cross-band repeater, using a personal computer and two radios.

Repeater Link: Link two existing repeaters together from a third location.

What Does EchoStation Do?

EchoStation is software that lets you connect a personal computer to one or two radios, to create either a *repeater* or an *announcement machine*. The program takes care of all necessary functions, such as turning the transmitter on and off at appropriate times, and sending a CW ID or voice ID periodically.

Repeater-control circuits typically use specialized hardware to perform functions such as CW identification, tone generation, and timing. Since EchoStation implements all of these functions within its software, no such equipment is required. This makes EchoStation ideal for portable or emergency set-ups, or for clubs who wish to use an existing PC to control their repeater.

EchoStation uses your PC's built-in sound card to communicate with a transceiver (or a separate transmitter and receiver), by receiving audio signals from the receiver's speaker jack and sending audio signals to the transmitter's microphone input.

The program can run in any of four different modes:

- Announcement machine
- Duplex repeater
- Simplex repeater
- Simplex autopatch

Each of these modes is described below.

Announcement machine

An announcement machine plays any of several pre-recorded announcements at designated times. It is most commonly used to announce club meetings, hamfest information, news bulletins, etc. over an existing repeater. To prevent interference, it "listens" before transmitting to be sure the frequency is not already in use before beginning an announcement.

Note that EchoStation can run as a repeater and announcement machine at the same time.

Duplex repeater

A duplex repeater (a conventional repeater) receives on one frequency and transmits on another simultaneously. Anything received on one frequency is immediately re-transmitted on the other. Of course, this setup requires a separate transmitter and receiver, and some type of RF isolation to prevent the transmitter from interfering with the receiver. EchoStation also allows a telephone line to be connected, through a "voice modem", for autopatch capability.

Simplex repeater

A simplex repeater receives and transmits on the same frequency, but at different times. It picks up a signal on the receiver, begins "recording" it, and after the signal finishes, it turns on the transmitter and "plays it back". This can be accomplished using an ordinary transceiver and a single antenna. However, it is generally only usable for short transmissions, because there are long periods of silence between each one. This type of repeater is usually used for portable or emergency set-ups.

Simplex autopatch

A simplex autopatch allows telephone calls to be placed or received over a single radio frequency. In this mode, EchoStation connects to an FM transceiver, and switches it rapidly between receive and transmit. A station using the simplex autopatch sends touch-tone commands over the air to begin and end each call, and during the call, the two parties take turns speaking to each other.

What Else Do I Need?

The basic requirements for a EchoStation setup are:

- Personal computer with sound card
- EchoStation software

- Transceiver (or separate transmitter and receiver)
- Audio connection between sound card and radio(s)
- Push-to-talk connection between PC's COM port and transmitter (if transmitter does not have VOX)

These items are also recommended, but not always required:

- Carrier-detect connection between receiver and PC's COM port (required for simplex autopatch)
- Internal or external modem, connected to a telephone line (for remote-control link)
- Internal or external voice modem, connected to a telephone line (for Autopatch support)

PC Requirements

EchoStation is designed to run on Pentium-class computers running at 133 MHz or higher. It will also run on many 486-based systems, depending upon processor speed. The computer must have at least the following:

- 16MB RAM (64MB for NT 4.0; 128MB for Windows 2000)
- Microsoft Windows 95, 98, 98 Second Edition, NT 4.0, Millennium Edition (Me), or 2000
- 5MB free disk space, not including space for announcements
- Sound card, or built-in sound hardware, with appropriate Windows drivers installed
- One available COM port

Note that EchoStation will work with either a "half-duplex" or "full-duplex" sound card, except that a full-duplex card is required for duplex repeater mode. (Most recently-manufactured sound cards are full-duplex.)

In order to use Autopatch with EchoStation, a voice modem is also required. See [Autopatch Setup](#) for details.

Radio Requirements

The radio(s) connect to the computer's audio input and output connectors, and optionally also to a COM port. For connecting the transmitter to EchoStation, we recommend the RIGBlaster, available from [West Mountain Radio](#).

- The receiver (or transceiver) must have a line-out or speaker-out connector. A carrier-detect (or "busy") pin is also useful, but not required, except for simplex autopatch.
- The transmitter (or transceiver) must have a line-in or microphone jack. If the radio does not support VOX, it must also have a connector for push-to-talk (usually available at the microphone connector).

Licensing

EchoStation is free to download and distribute, and to "test drive" for 30 days. After 30 days, however, registration is required.

You must provide a callsign when registering. You will be issued a registration number, which must be entered in the Help/Registration window.

Once the software is registered, it may be installed and used on any number of computers, but the callsign used in the CW ID cannot be changed. If you wish to change the callsign, you must obtain a new registration number. (This will be provided free of charge if the callsign has been changed in the FCC database.) Minor changes to the ID, such as adding "DE" at the beginning or "/R" at the end, do not require a new key.

Registered users are also entitled to e-mail-based support. Many of the upcoming updates to the software will also be provided to registered users free of charge.

To register, please visit the EchoStation Web site: <http://www.synergenics.com/sc>

Before Installing

Before installing EchoStation, it is important to check the operation of your computer's sound card, and to be sure all connections between the sound card and the radio(s) are working.

System Requirements

Please be sure your hardware meets the following requirements:

PC Requirements

EchoStation is designed to run on Pentium-class computers running at 133 MHz or higher. It will also run on many 486-based systems, depending upon processor speed. The computer must have at least the following:

- 16MB RAM (64MB for NT 4.0; 128MB for Windows 2000)
- Microsoft Windows 95, 98, 98 Second Edition, NT 4.0, Millennium Edition (Me), or 2000
- 5MB free disk space, not including space for announcements
- Sound card, or built-in sound hardware, with appropriate Windows drivers installed
- One available COM port

Note that EchoStation will work with either a "half-duplex" or "full-duplex" sound card, except that a full-duplex card is required for duplex repeater mode. (Most recently-manufactured sound cards are full-duplex.) The sound card must be capable of recording and playing back 11.025 kHz 16-bit waveform audio. (Nearly all Windows-compatible sound cards meet this requirement.)

Radio Requirements

The radio(s) connect to the computer's audio input and output connectors, and optionally also to a COM port. For connecting the transmitter to EchoStation, we recommend the *RIGBlaster*, available from [West Mountain Radio](#).

- The receiver (or transceiver) must have a line-out or speaker-out connector. A carrier-detect (or "busy") pin is also useful, but not required, except for simplex autopatch.
- The transmitter (or transceiver) must have a line-in or microphone jack. If the radio does not support VOX, it must also have a connector for push-to-talk (usually available at the microphone connector). A push-to-talk connection is recommended for smoothest operation.

For more information, please see:

- [Connecting a Transceiver](#)
- [Connecting a Separate Transmitter and Receiver](#)

Checking Your Sound Card

It's a good idea to check your sound card to be sure it's working properly before installing EchoStation. You may need to make adjustments, especially to the Recording controls, before the software will work correctly.

The easiest way to check is as follows:

Playback Test

1. Connect a pair of speakers to the line-out or speaker connector. Be sure the speakers are turned on (if they are powered speakers), and the speaker volume is

halfway up. (This step is not necessary if your computer, monitor, or keyboard has speakers built in.)

2. From the Start menu, choose "Settings", then choose "Control Panel", then double-click "Sounds".
3. From the list of sounds, select "Default Beep".
4. Be sure there is a loudspeaker icon displayed next to Default Beep, then click the Play button (the triangle-shaped button next to the Preview icon). If the sound card is working correctly, you will hear a sound from the speakers.
5. If no loudspeaker icon appears next to any item in the list, try selecting a different Scheme.
6. If a sound is selected and a sound file name appears, but the Play button is disabled, it may be because the sound card or its drivers are not installed correctly. Consult the documentation that came with the sound card for more information.
7. If the sound appears to play, but no sound is heard, check your Volume level. Double-click the speaker icon in your System Tray, which is usually at the bottom-right of the screen. Be sure the Volume Control and Wave Output sliders are halfway up, and the Mute check box is not selected.

Record Test

1. Connect a microphone to the microphone jack. (This step is not necessary if your computer, monitor, or keyboard has a microphone built in.)
2. From the Start menu, choose Programs, Accessories, Multimedia, Sound Recorder.
3. Click the red button to begin recording, and speak into the microphone. You should notice some "blips" on the display at the center of Sound Recorder. After a few seconds, click Stop.
4. Click Rewind and then click Play. You should hear your voice playing back.
5. If you do not hear sound, check to be sure your Record Volume level is correct. Double-click the speaker icon in your System Tray, which is usually at the bottom-right of the screen. From the Options menu, choose Properties, select the "Recording" option, and then click OK. Be sure the "Recording" and "Microphone" sliders are at least halfway up, and that "Select" is checked for the microphone.

Finish Set-Up

To complete your sound-card set-up, it is necessary to enable the Line In audio, and to disable the microphone.

1. Open the Recording control, as described in Step 5 in Record Test, above.
2. Turn the Microphone slider down all the way, and turn the Line In slider about 3/4 of the way up. Be sure Line In is checked "Selected". Also, set the Recording level about 3/4 of the way up.

Note: If the above descriptions of the Volume controls do not match what you see on your computer, consult your sound card documentation for information on how to set volume levels.

Connecting a Transceiver

The most common EchoStation configuration is to connect an FM transceiver to the sound card and COM port of your PC. This configuration can be used either as a simplex repeater or as an announcement machine, since it is not necessary in either of those modes to transmit and receive simultaneously.

The connections should be made as follows:

- Transceiver to Sound Card (Receive Audio)
- Sound Card to Transceiver (Transmit Audio)
- COM Port to Transceiver (PTT Control)
- Receiver to COM Port (Carrier Detect; optional)

These connections are described in detail below.

Transceiver to Sound Card (Receive Audio)

This is usually a simple matter of running a shielded audio cable from the radio's speaker jack (or "line out" jack) to the Line In connector on the sound card. If you are unsure which connector on the sound card is Line In, consult the documentation that came with the sound card.

In some cases, the Line Out (or Rec Out) signal from the radio is not strong enough to be used with the sound card's Line In connector. The Microphone In connector can usually be used instead. In either case, be sure the sound card software's Recording control is set up to receive audio on the connector being used.

Sound Card to Transceiver (Transmit Audio)

If the transceiver has a Line In connector, a shielded audio cable can be run directly from the sound card's Line Out connector to the radio's Line In connector. Otherwise, it is necessary to connect to the radio's microphone connector using an attenuating cable, or a cable with an attenuator connected. This prevents the radio's microphone circuit from becoming over-driven. 10 to 20 dB of attenuation is usually needed.

If an interface device such as the [RIGBlaster](#) is used, the correct attenuator is built-in. All that is necessary is to connect a shielded cable between the sound card's Line Out connector and the RIGBlaster's Line In connector, and to plug the RIGBlaster's microphone cable into the radio.

COM Port to Transceiver (PTT Control)

In most cases, it is necessary to wire the PC's COM port to the radio's push-to-talk circuit, to allow the computer to turn the transmitter on and off. (If the radio supports VOX, this connection can sometimes be omitted).

EchoStation uses the COM port's RTS and/or DTR pins to control the transmitter. The program asserts the pin(s) to switch the transmitter on, and drops the pin(s) to switch it off. The specific COM port to be used, and the choice of RTS and/or DTR, is selectable on the Transmitter tab of [System Setup](#) .

The PTT circuit in most radios "floats" high during receive, and is grounded to begin transmitting. A simple one-transistor switching circuit can be used to connect the COM port to this type of radio.

If an interface device such as the [RIGBlaster](#) is used, the PTT switching circuit is built-in. All that is necessary is to connect a standard serial cable between the computer's COM port and the connector on the back of the RIGBlaster, and to plug the RIGBlaster's microphone cable into the radio. The choice of RTS or DTR has no effect since the RIGBlaster responds to either.

Receiver to COM Port (Carrier Detect; optional)

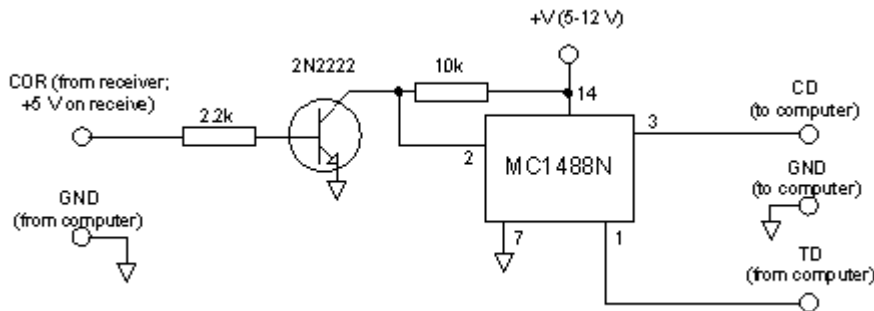
EchoStation must be able to detect whether the receiver is squelched (not receiving a signal), or un-squelched (receiving a signal). In most cases, the VOX capability built in to EchoStation is adequate for this purpose.

However, in some cases, it is desirable to rely upon a direct connection between the receiver and the PC, rather than using VOX. This arrangement can make the program more reliable with very quiet receivers, where a silent full-quieting transmission has approximately the same audio level as a squelched receiver. It also avoids the need for setting the VOX level precisely. This connection is also required for running EchoStation in Simplex Autopatch mode.

If the transceiver (or receiver) has a "channel busy" or "carrier detect" connection, often available on the back-panel accessory connector, it can be wired to the CD, DSR, or CTS pin of one of the PC's COM ports for this purpose. The specific COM port and pin to be used is selectable during set-up and configuration, and can even be shared with the PTT function, with the appropriate cabling. For configuration information, see [System Setup](#) .

If COM port carrier-detect is enabled in EchoStation, the program monitors the CD pin of the selected serial port, and considers the channel "busy" when the pin is asserted (high), and "squelched" when the pin is dropped (low, or negative). A simple interface circuit can be built which drives this RS-232 signal with the carrier-detect signal from the radio.

A sample interface circuit is shown below. The MC1488N chip is available from Radio Shack (276-2520). The negative supply voltage is "borrowed" from the computer's TD pin.



Connecting a Separate Transmitter and Receiver

Instead of a transceiver, it is possible to use a separate transmitter and receiver with EchoStation. This arrangement is typically used for a full-duplex repeater, where it is necessary to transmit and receive simultaneously. It might also be used for other modes if the transmit and receive frequencies are on different frequency bands.

Connecting a separate transmitter and receiver is very similar to connecting a transceiver.

The connections should be made as follows:

- Receiver to Sound Card (Receive Audio)
- Sound Card to Transmitter (Transmit Audio)
- COM Port to Transmitter (PTT Control)
- Receiver to COM Port (Carrier Detect; optional)

These connections are described in detail in the section [Connecting a Transceiver](#) .

Installing a Control Link

For simplex-repeater and announcement-machine use, it may be necessary to install a control link to the EchoStation setup to satisfy FCC rules for remotely-controlled stations. This may also be desirable for duplex repeater operation.

EchoStation supports the "wireline" type of control link in two different ways:

- Telephone modem connected to the PC, either internal or external
- Dedicated Internet connection

These two control-link modes are described in detail below.

Telephone Modem

This mode requires that a telephone line be available where the PC is located, and dedicated full-time to the control-link function. It is recommended that the telephone number be unpublished.

The telephone line connects to a conventional modem connected to the PC, either an external modem connected to a COM port, or an internal modem. When EchoStation starts, it initializes the modem and begins monitoring it for incoming "ring" signals.

As "ring" signals are detected, EchoStation counts the number of rings. When a specified number of rings is reached, EchoStation shuts down and disables the transmitter. This allows the control operator to shut down the repeater from locations where no computer terminal is available. Repeating this sequence re-enables the system.

Dedicated Internet Connection

As an alternative to the auto-answer modem, control-link commands may be sent to EchoStation over the Web, if the PC on which EchoStation is running is equipped with a full-time Internet connection. In this mode, EchoStation operates as a conventional HTTP (Web) server. A control operator with access to an Internet connection and Web-browser software can supply appropriate credentials (user name and password) and send commands to EchoStation remotely. This feature is entirely built in to EchoStation and requires no additional software.

For more information, see [Configuring a Control Link](#) .

Setting Up Autopatch

EchoStation supports autopatch on properly-equipped computers. The following items are required:

- Voice modem.
- Telephone line.

Voice Modem

A voice modem is a modem which is capable of exchanging sound, as well as data, over a telephone line. Many recently-manufactured modems support voice. If you plan to purchase a voice modem, look for modems which mention "voice mailbox" support in their product literature.

To be compatible with EchoStation, a voice modem must support the Windows Telephony API (TAPI). TAPI-compatible drivers for the voice modem are usually provided by the manufacturer, and are installed automatically when the modem itself is installed. Modems which claim to support Windows 98 or Windows 2000 in their product literature are very likely to be compatible with TAPI.

Many personal computers sold in recent years include an internal modem which supports voice. Check your computer's hardware documentation for details. Suitable PCI voice modems are now available for street prices under US\$30.

EchoStation does not support voice modems on Windows NT 4.0. If you are running Windows 95, you may need to download and install the latest Unimodem V drivers from [Microsoft](#).

Telephone Line

Of course, a telephone line must be connected to the voice modem. It is strongly recommended that this line not be shared with the control-link function. If a special dialing sequence is required to place a call over this line, such as dialing "9" first, be sure to set up the default Location properties from the Windows control panel.

For more information about EchoStation's Autopatch capabilities, see [Autopatch](#).

Simplex Autopatch Considerations

When running in Simplex Autopatch mode, EchoStation is used to make telephone calls over a simplex frequency. However, due to the rapid transmit-receive switching that is required in this mode, certain limitations apply:

- For best results, the transceiver (and the circuit used to connect it to the PC) should be able to switch rapidly between transmit and receive. Ideally, the transceiver should be able to switch in less than 10 milliseconds. This is usually not possible if mechanical relays are used.
- VOX on transmit cannot be used, and VOX on receive is not recommended. For best results, the receiver's carrier-detect signal should be connected to the computer's COM port, using a simple interface circuit. For more information, see [Connecting a Transceiver](#).

Fail-Safe Feature

A personal computer is a complex system, with hardware, peripherals, operating-system software, and application programs all working together. When a computer is used to control a radio transmitter, there is the possibility that a failure of any one of these components could cause the transmitter to be keyed continuously.

EchoStation supports a unique fail-safe feature which helps guard against this possibility. It uses a special, external circuit which allows the transmitter to be keyed only while a continuous "heartbeat" is being produced by the computer. This heartbeat is generated from within the EchoStation software itself. If the heartbeat stops, the transmitter is disabled.

There are two steps required for setting up the fail-safe feature:

1. Build a simple circuit which sits between the computer and the transmitter. An example of such a circuit is shown below.
2. Enable the fail-safe feature in the EchoStation configuration. This is a check box on the Transmitter tab of the General Setup window.

With the fail-safe feature in place, the following types of failures should be protected:

- Inadvertent keying of the transmitter before EchoStation starts.
- Power surges and hardware failures which cause the computer to "lock up".
- Operating-system, device-driver, and application-program crashes.

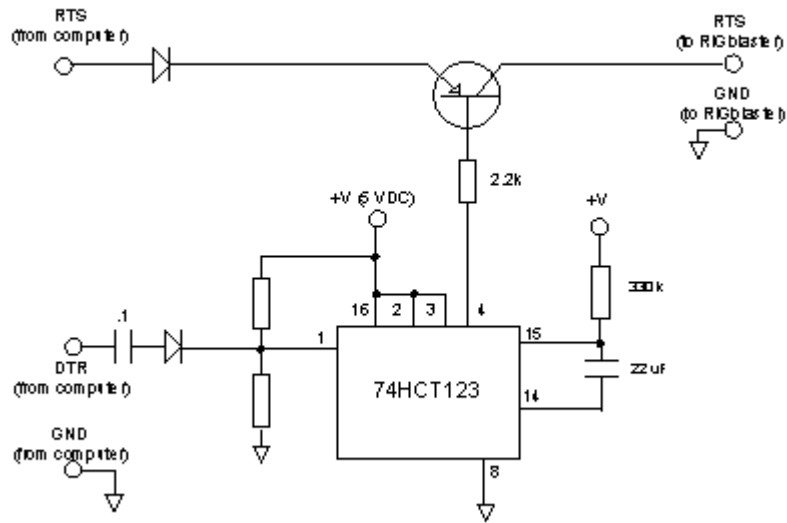
Technical Details

When the fail-safe feature is enabled, EchoStation sends a continuous train of pulses over the DTR line of the COM port, at a rate of 5 pulses per second. These pulses are only sent while EchoStation is running and functioning normally. The RTS line is used to key the transmitter as usual. (EchoStation can be configured to swap DTR and RTS.)

The circuit shown below uses a retriggerable monostable multivibrator to accept these pulses from the DTR line. The time constant of the one-shot is set to 5 seconds. If no pulses have been received in the past 5 seconds, the transistor disables the RTS line so that the transmitter cannot be keyed.

A similar circuit can be built using a 555 timer chip, although a few more components are required since the 555 is not retriggerable.

In this example, the circuit connects to the computer's COM port and the existing PTT interface (such as a RIGblaster). Of course, it is also possible to combine the fail-safe and PTT functions into a single circuit.



Choosing a Mode

During Setup, you will be asked to choose a mode. EchoStation can operate in any of three different modes:

- Duplex repeater
- Simplex repeater
- Simplex autopatch
- Announcement machine

For a description of each mode, see the section [What Does EchoStation Do?](#)

Although selecting a mode is required during set-up, you can easily change EchoStation to a different mode at any time.

Setting the Callsign

During Setup, you will be asked to enter a callsign. This is an important step because EchoStation will send the callsign (in CW) periodically in order to identify the transmissions.

You should enter the callsign exactly as you would like it to be transmitted. For example, you may wish to identify as "DE W1QQ" rather than simply "W1QQ".

Although selecting a callsign is required during set-up, you can easily change EchoStation to use a different callsign at any time during the free-trial period.

Once the trial period expires, however, the callsign cannot be changed without obtaining a new registration key. For more information, see [Licensing](#) .

Configuring the Transmitter and Receiver

The Setup Wizard will ask for information about how the transmitter and receiver controls are connected to your PC. To get started, you can choose VOX for Receiver control, and any available COM port for Transmitter control. Be sure to select a COM port which is not already in use by a device such as a modem.

For more information about transmitter and receiver connections, see [Connecting a Transceiver](#).

Setting Up Audio

During Setup, you will be asked which sound-card ports your receiver and transmitter are connected to. EchoStation will use this information to help you set audio levels correctly, and to perform the necessary switching when going from transmit to receive.

If you have more than one sound device (e.g. sound card) installed on your PC, you will see a list of devices. Select the device you will use with your transmitter and receiver. (If you have only one sound card, this list will not appear).

Select the ports to which your receiver and transmitter are connected. The most common settings are "Line In" (or "Line") for the receiver, and "Speakers" for the transmitter. These settings are correct if the receiver audio is plugged into your sound card's line input, and the transmitter audio is connected to your sound card's speaker output, or line output.

EchoStation supports many other configurations. These can be set up after the program starts, from the Tools menu.

For more information about audio settings, see [Audio Setup](#).

Synthesized Voice Announcements

If the Synthesized Voice Option is installed, EchoStation can be set up to "read" a text file at a scheduled time, instead of playing a pre-recorded WAV file.

The Synthesized Voice Option harnesses the Microsoft Speech Engine to produce a (somewhat) natural-sounding, understandable voice. Several different voices are available. Because of the design of the Microsoft engine, this option is available only on Windows 98 and above (Windows 95 is not supported).

Due to its size, the Synthesized Voice Option for EchoStation is available as a separate download. For details, consult the Downloads section at the EchoStation Web site, <http://www.synergenics.com/sc/>.

After downloading and installing the option, re-start EchoStation. When creating a new event, the "Synthesized Voice Announcement" button should now be available.

Several options of the Microsoft Speech Engine are configurable. To change the settings, open the Windows Control Panel and double-click the Speech icon. For additional information, choose the About tab, and select Help.

Auto-Pause

If the Auto-Pause feature is enabled for long announcements, EchoStation will attempt to pause the announcement at an appropriate time between sentences. For more information, see [Announcement Setup](#).

XML Tags

While plain text can be used for synthesized voice announcements with good results, the Synthesized Voice Option also allows certain XML tags to be imbedded in the text to improve intelligibility. Some of the XML elements supported in this release are described briefly below.

<SAPI >

Enclose the entire document in <SAPI> and </SAPI> tags to signal that XML tags are being used.

<EMPH>

Places emphasis on the words contained by this element.

<PARTOFSP PART=xxx>

The part of speech of contained word(s). The PARTOFSP tag is used to force a particular pronunciation of a word (for example, the word "record" as a noun versus "record" as a verb).

Parameters: noun, verb, modifier, function, interjection, unknown

<PITCH MIDDLE=n>

Changes the pitch, for the whole document or for a certain section, by the specified amount up or down. Values may be positive (+) or negative (-), ranging from -10 to +10.

<RATE SPEED=n>

Sets the relative speed at which words are synthesized. The range is -10 to +10.

<SILENCE>

Produces silence for a specified number of milliseconds to the output stream.

<SPELL>

Spells out words, letter by letter, contained in this element.

<VOICE OPTIONAL=xxx REQUIRED=xxx>

Sets which voice implementation is used. Either the OPTIONAL or REQUIRED parameters may be supplied, or both. Each is a semicolon-delimited list of strings specifying the desired attributes.

<VOLUME LEVEL=n>

Sets the volume, either absolute or relative, of the speech block. The range is 0 to 100.

XML Tags Example

<SAPI>

This is a <EMPH>simple</EMPH> test.

Let's try <RATE SPEED="+5">speeding up for a while</RATE>

and <PITCH MIDDLE="-10">lowering pitch.</PITCH>

This is a sample, spelled <SPELL>sample</SPELL>.

You can either say <PARTOFSP PART="verb">record</PARTOFSP> or <PARTOFSP PART="noun">record</PARTOFSP>.

Let's get <VOLUME LEVEL="100">loud</VOLUME>

and <VOLUME LEVEL="50">soft.</VOLUME>

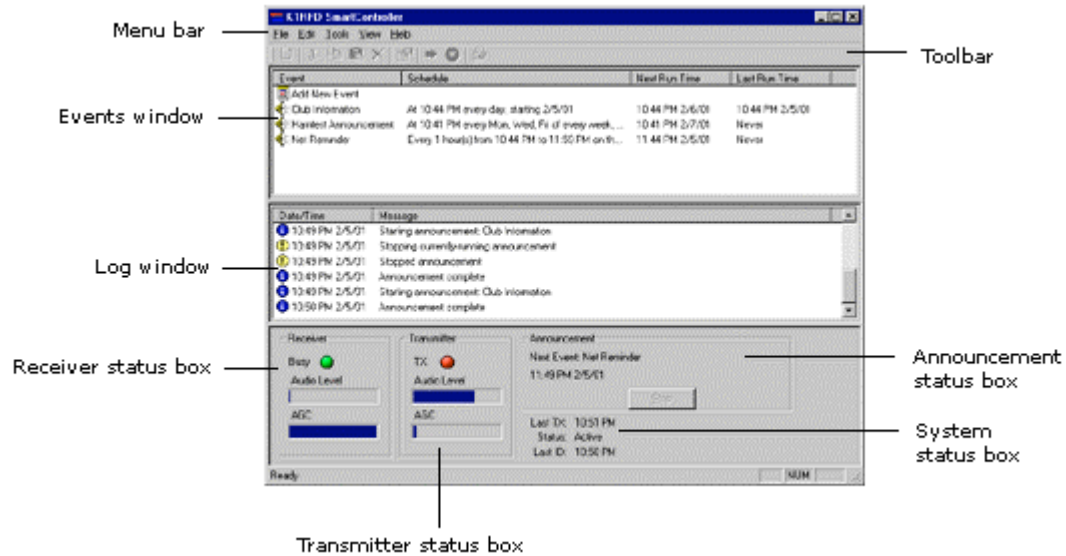
<VOICE REQUIRED="Age=Adult;Gender=Male" OPTIONAL="Name=Microsoft Sam">This is a male voice.</VOICE>

<VOICE REQUIRED="Age=Adult;Gender=Female">This is a female voice.</VOICE>

</SAPI>

Display Areas

A scaled-down view of the EchoStation screen is shown below. A brief description of each item follows.

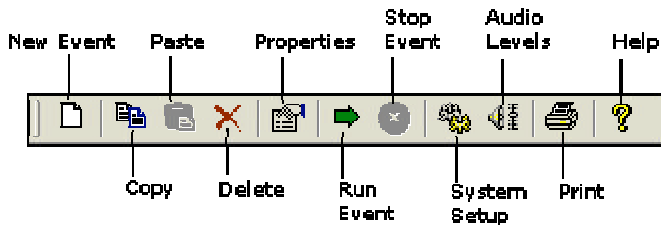


- **Menu bar:** Provides access to standard pull-down menus to control program settings, options, and commands.
- **Events window:** Lists each event by title, schedule, next run time, and last run time. The list updates itself as events are re-scheduled for their next run time.
- **Log window:** Shows the time and date that each scheduled event was run, along with other functions such as program startup and re-configuration.
- **Receiver status box:** Shows the status of the receiver. A green light indicates that the channel is in use. Bar graphs for audio level and AGC (if enabled) monitor incoming audio levels.
- **Transmitter status box:** Shows the status of the transmitter. A red light indicates that the transmitter is transmitting. Bar graphs for audio level and AGC (if enabled) monitor outgoing audio levels.
- **System status box:** Displays important information about the system, such as the time of the last transmission, last identification, and whether the receive channel is busy or active.
- **Announcement status box:** If an announcement is running, shows the name and source of the announcement; otherwise, shows the name and time of the next-scheduled announcement.
- **Toolbar:** Provides short-cut buttons for many commonly-used menu items.

Menus and Toolbars

Most of the functions of EchoStation can be accessed from the drop-down menus, and several are also available as toolbar buttons.

A diagram of the toolbar is shown below. For information about each item, see the Menu item descriptions below.



Each of the items on the Menu Bar is described briefly below.

File

New Event: Starts the New Event wizard to create a new event, such as a voice announcement.

Run Event Now: If an event is selected in the Events window, starts the selected event immediately, regardless of its schedule.

Stop Event: If an event (such as a voice announcement) is running, stops the event immediately.

Exit: Saves configuration settings and quits the program.

Edit

Copy: If an event is selected in the Events window, copies all information about the event to the Clipboard. This allows it to be pasted as text into another Windows application, or pasted as a new event into the Events window.

Paste: If an event had been copied to the clipboard with the Copy command, Paste creates a new event in the Events window, with the same name and properties. This is useful way to create a new event with similar properties without having to enter all of the properties again.

Delete: Removes the selected item from the Events window and deletes it permanently.

Properties: Displays information about the event selected in the Events window. This allows the information to be reviewed or changed. Double-clicking an event in the Events window also displays its properties.

Tools

System Setup: Displays the System Setup dialog, which allows you to make changes to basic system settings. There are tabs for General, Receiver, Transmitter, Repeater, DTMF, and Signals setup. See [System Setup](#) .

CW Setup: Displays the CW Setup dialog, which allows you to make changes to the

pitch, speed, and shape of CW messages (such as station IDs). See [CW Setup](#) .

Announcement Setup: Displays the Announcement Setup dialog, which allows you to make changes to the way announcements are made. See [Announcement Setup](#) .

Audio Setup: Displays the Audio Setup dialog, which allows you to set audio levels, choose audio devices, and set other audio preferences. See [Audio Setup](#) .

Control Link Setup: Displays the Control Link Setup dialog, which allows you to make changes to the wireline control link configuration. See [Configuring a Control Link](#) .

Autopatch Setup: Displays the Autopatch Setup dialog, which allows you to make changes to the autopatch configuration. See [Autopatch Setup](#).

View

Toolbar: Selecting this item displays or hides the Toolbar. A check mark appears next to this item when the toolbar is visible.

Status Bar: Selecting this item displays or hides the Status Bar (at the bottom of the screen). A check mark appears next to this item when the status bar is visible.

Help

Contents: Opens EchoStation Help and displays the table of contents.

Search: Opens EchoStation Help and displays the Search feature.

Index: Opens EchoStation Help and displays the Help Index.

Help on the Web: If you are connected to the Internet, opens your Web browser and navigates to the EchoStation Online Help section. This is an online version of EchoStation Help which may contain more recent information.

Software Updates: If you are connected to the Internet, choose this item to have EchoStation automatically check to see if a more recent version of the software is available for download.

Registration: Displays information about the registration of this copy of the software, with a link to the Registration information page on the Web. Choose this item to enter a callsign and registration number if you have purchased the software.

Sound Card Info: Displays detailed technical information about the sound devices installed on your PC. This information can be helpful when working with Support to solve sound-related problems.

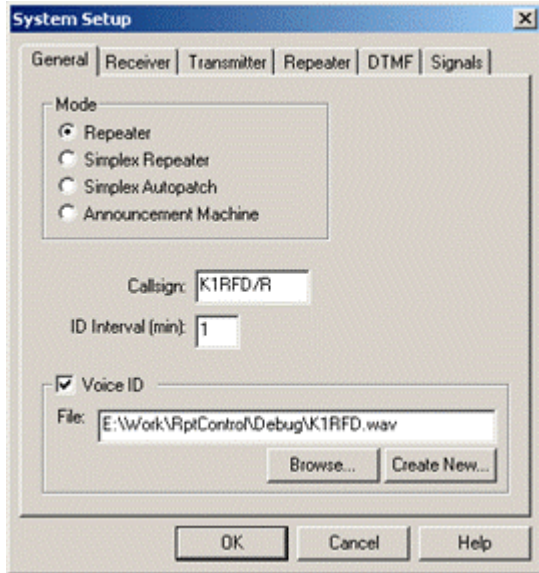
About EchoStation: Displays the version number and build number of the software. This information should be mentioned when contacting Support with questions about the software.

System Setup

System Setup allows you to set basic features of EchoStation. Choose one of the tabs along the top to view the General, Receiver, Transmitter, Repeater, DTMF, or Signals options. Each of these tabs is described in detail below.

General Tab

The General Tab configures the system mode, callsign, and ID options.



Mode: Choose the appropriate mode for EchoStation. The following modes are available:

- Repeater
- Simplex Repeater
- Simplex Autopatch
- Announcement Machine

For a brief description of each mode, see [Modes](#). For additional repeater options, see [Repeater Setup](#).

Callsign: Set the machine's callsign exactly as you would like it to be transmitted in the CW ID. For example, a repeater might be identified as "DE K1RFD/R".

If you are using a registered copy of EchoStation, the basic callsign you enter must match the registered callsign. For more information, see [Licensing](#).

ID Interval: Set the time, in minutes, in between each CW ID. To comply with FCC rules, this should be no more than 10 minutes.

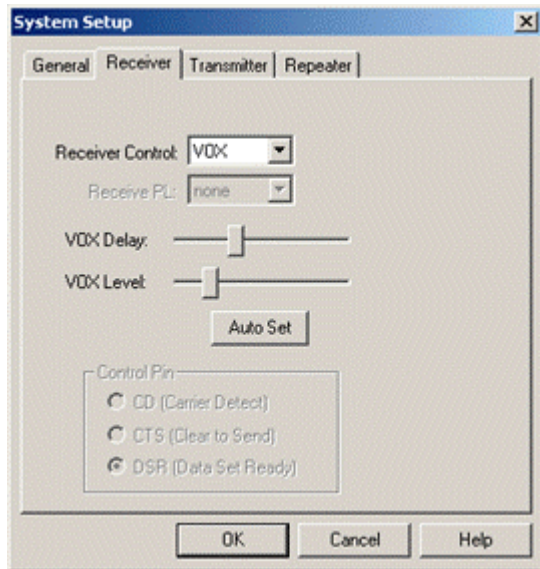
Voice ID: Check this box to enable Voice ID. If enabled, a voice ID will be used at certain times to supplement the CW ID. The voice ID will be played at the end of announcements, and in duplex repeater mode when the receiver is inactive and the system "wakes up" the transmitter to identify.

File: Enter the full path and filename of a WAV or MP3 file, or choose the Browse button to locate one.

Create New: Choose this button to record a new WAV file for the voice ID. You will be prompted for a file name, and then your system's Sound Recorder application will be started. You may then record a brief ID announcement, and choose Exit from Sound Recorder to save the new file.

Receiver Tab

The Receiver tab configures the connection between your receiver (or transceiver) and your PC.



Receiver Control: From the drop-down list, select the COM port to which the receiver's channel-busy signal is connected, or choose VOX if you wish EchoStation to be triggered by receiver audio instead. For more information about the optional channel-busy connection, see [Connecting a Transceiver](#) .

Receive PL: If CTCSS (continuous tone-controlled squelch) is desired on receive, select the desired tone frequency from the list. To disable this feature and use conventional squelch, select "none".

Depending upon the design of your receiver and the way it is connected to the PC, CTCSS tones may be filtered out by your receiver before they reach EchoStation, and be undetectable. In many cases, a better option is to enable the tone-squelch option on your receiver, if available.

VOX Delay: If you are using VOX control for the receiver, this slider sets the VOX delay. This is the time between loss of audio signal and drop of carrier detect. Note that this is *not* the same as the repeater "hang" time. The range of values is 0 (to the far left) and 2 seconds (to the far right). Normally, this should be set to a very short delay. If the VOX level is properly adjusted, this can usually be set to 0.

VOX Level: If you are using VOX control for the receiver, this slider sets the peak audio level at which EchoStation's VOX is triggered. Move the slider to the left to decrease the level, or move it to the right to increase it. To set the VOX level, be sure the receiver is squelched, move the slider all the way to the left, then move the slider slowly to the right

until the green "Busy" light in the System Status box goes out. Or, use the Auto Set button, described below.

Auto Set: Click this button to set the VOX level automatically while the receiver is squelched. EchoStation will monitor the receiver's audio level for 5 seconds and set the VOX level slightly higher than the peak level received.

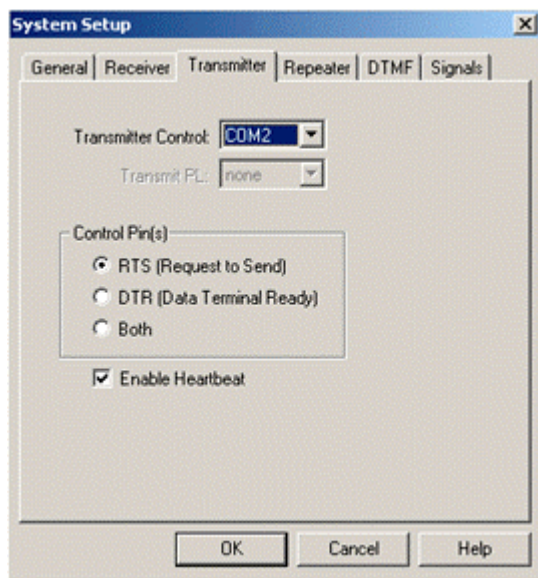
Notes:

- The VOX level may need to be re-set after any adjustments are made to the receiver's audio level.
- Changes to the VOX sliders take effect immediately, to make adjustments easier.

Control Pin: If you are not using VOX to monitor the receiver, select the COM port's RS-232 pin to which the receiver's channel-busy (or "carrier detect") circuit is connected. This must match the design of your interface device. For more information about the channel-busy connection, see [Connecting a Transceiver](#).

Transmitter Tab

The Transmitter tab configures the connection between your PC and your transmitter (or transceiver).



Transmitter Control: From the drop-down list, select the COM port to which the receiver's push-to-talk (PTT) line is connected. If the transmitter supports VOX (and you wish to use it), or you wish to control the transmitter manually, choose VOX. For more information about the PTT connection, see [Connecting a Transceiver](#).

Transmit PL: If you wish to encode a CTCSS tone on the transmitted audio, select the desired tone frequency from the list. If no such tone is desired, select "none".

Depending on the design of your transmitter and the way it is connected to the PC, CTCSS tones generated by EchoStation may be filtered out by your transmitter's audio circuits. In many cases, a better option is to enable the tone-encoding option on your transmitter, if available.

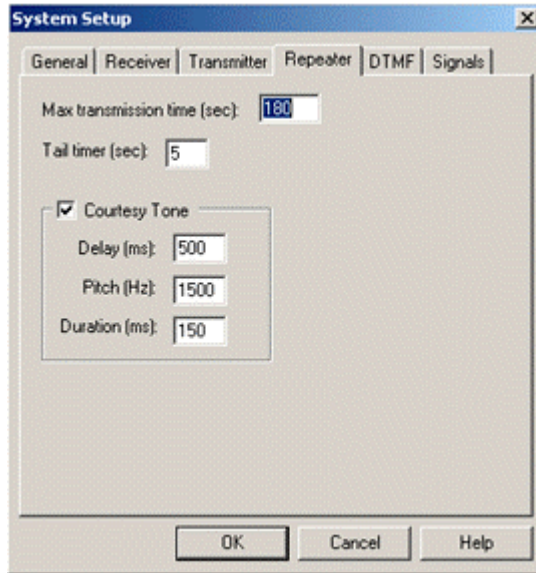
Control Pins: If using PTT to control the transmitter, select the COM port's RS-232 pin to which the PTT circuit is connected. EchoStation will raise (assert) the specified pin(s) to

transmit, and drop (lower) the pin(s) to stop transmitting. This must match the design of your interface device. Many PTT interfaces, such as the [RIGBlaster](#), will respond to *either* RTS or DTR, so the setting of this control may not matter. For more information about the PTT connection, see [Connecting a Transceiver](#).

Enable Heartbeat: Check this box to enable EchoStation's fail-safe feature. For more information, see [Fail-Safe Feature](#).

Repeater Tab

The Repeater tab configures EchoStation's repeater functions. These settings apply only if Repeater Mode is selected on the General tab.



Max transmission time: Sets the maximum allowable time for a received signal. This configures a timer begins running each time a received signal begins. For a duplex repeater, a common setting is 180 seconds (3 minutes). For a simplex repeater, a much lower setting is suggested, such as 20 seconds. (Long transmissions through a simplex repeater result in long periods of silence.) Setting this value to 0 disables the time-out feature.

If the timer expires, the receiver is temporarily disabled. If the system is running in duplex-repeater mode, EchoStation will send the CW message "TIMEO" when the receiver times out. When the received signal ends, the receiver is re-enabled.

Tail timer: Sets the "hang time" for the repeater. This setting applies differently for Duplex and Simplex modes:

In Duplex mode, this controls how long EchoStation waits after the end of a received signal before turning *off* the transmitter. Typical settings are 5 to 10 seconds.

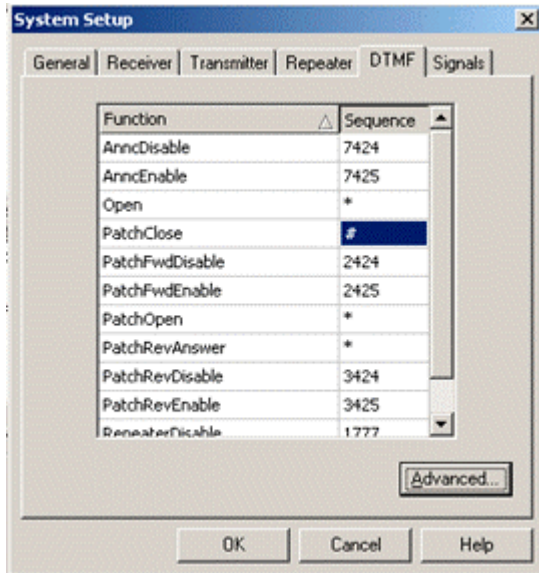
In Simplex mode, this controls how long EchoStation waits after the end of a received signal before turning *on* the transmitter. Typical settings are 0 or 1 second.

Courtesy Tone: Enables or disables the "courtesy tone" in duplex mode. The courtesy tone is a short "beep" to signal that one station has finished and another can begin transmitting. It encourages stations using a repeater to pause between transmissions to allow others to break in.

The delay, pitch, and duration of the tone can be set. If a Courtesy Tone signal has been assigned (see the Signals tab), the signal will be played instead of a tone.

DTMF Tab

The DTMF tab sets up DTMF (TouchTone) command sequences for various functions. The left-hand column shows the name of the function, and the right-hand column shows the sequence of DTMF digits which, when received by EchoStation through the receiver, will activate it.



Functions are listed in alphabetical order. To change a DTMF sequence for a particular function, click twice in the right-hand column until a flashing cursor appears, then type in the new sequence. The only characters allowed are the digits 0-9, letters A-D, and the * and # characters. Do not use spaces or other punctuation.

Each event (such as a voice announcement) is also listed. For example, an event called "Bulletin" would be listed as "Event: Bulletin". If a sequence is assigned to an event, the event will be triggered immediately when the sequence is received, regardless of its schedule.

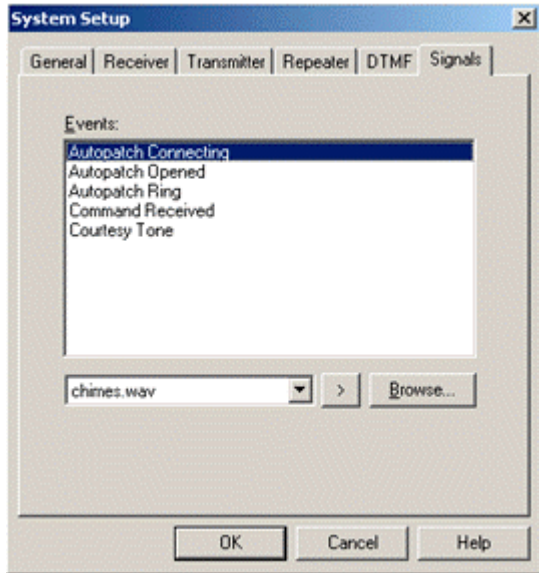
Avoid assigning the same sequence to different functions, since the results will be unpredictable. An exception is the PatchOpen and PatchRevAnswer functions, which can have the same sequence.

For a list of functions and their descriptions, see [DTMF Functions](#).

Advanced: Allows configuration of EchoStation's DTMF decoder parameters, including frequency tolerance, twist, and signal-to-noise ratio. Adjust these parameters only if DTMF performance needs to be improved, for example, if digits are frequently missed or excessive falsing is occurring.

Signals Tab

The Signals tab sets up WAV files to associate with certain events. These sounds are known as *signals*. This tab is similar to the Sounds control panel in Windows, except that it applies only to EchoStation.



To view or change the signal associated with an event, click on the event in the list at the top. The short name of the associated WAV file will appear in the drop-down list at the bottom (or "(none)" if no file is associated). To change the file, select a different item from the drop-down list, or choose Browse to select another WAV file not listed.

To preview the selected WAV file, click on the > button. After a moment, the sound will be heard.

For a list of signals and their descriptions, see [Signals](#) .

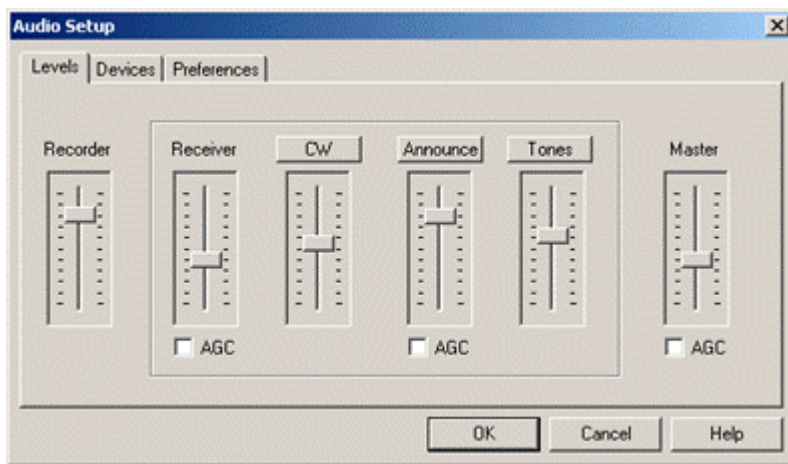
Audio Setup

Audio Setup allows you to set volume levels, sound-card devices, sound-card ports, and preferences.

There are three tabs available. Each displays a different page of information. Each of the three pages is illustrated and described below.

Levels Tab

Settings on the Levels tab control the sound level (or volume) of each audio source used by EchoStation. Each level control is represented as a slider. When the slider is moved to the bottom, the level is zero, and when the slider is moved to the top, the level is at maximum.



Depending on the preferences you have selected on the Preferences tab, some of the sliders shown above may not appear.

Each of the sliders is described below.

Recorder: Sets the level for recording new announcements. This slider controls the volume of sound-card device and port you selected in the Recorder section of the Devices tab ([see below](#)). For example, this might control the level of a microphone plugged into your sound card.

By default, EchoStation will turn this level up while you are recording, and turn it off at all other times. If you prefer to control the level yourself using the Windows volume controls, you can disable this feature on the Preferences tab.

Some sound cards do not allow record levels to be set. In this case, the Recorder slider will be disabled.

Receiver: Sets the level for audio coming from the receiver (or transceiver). This slider controls the volume of the sound-card device and port you selected in the Receiver section of the Devices tab ([see below](#)). For example, this might control the level of the line-in jack on your sound card. Adjust this level if the receiver audio is too soft or noisy, or seems to be over-driving the sound card.

By default, EchoStation will turn this level off while you are recording, but keep it up (at the chosen level) at all other times. If you prefer to control the level yourself using the Windows volume controls, you can disable this feature on the Preferences tab.

Some sound cards do not allow record levels to be set. In this case, the Receiver slider will be disabled.

AGC: Enables or disables AGC (automatic gain control) on the receiver audio. AGC often helps compensate for wide variations in volume, although it can sometimes cause an objectionable "pumping" effect.

Note that Receiver AGC is applied *after* EchoStation gets audio from the sound card, so it will *not* help avoid over-driving the sound card's input circuits.

CW: Sets the volume level of EchoStation's CW (Morse) generator. Adjust this level if the CW tones seem to be too loud or soft, compared to other audio sources. To change other aspects of the CW generator, select CW Setup from the Tools menu. See [CW Setup](#). Click the CW button to generate a brief test message.

Announce: Set the volume level of Announcement events. Adjust this level if announcements seem to be too loud or soft, compared to other audio sources. Click the CW button to generate a brief test announcement.

AGC: Enables or disables AGC (automatic gain control) on the announcement audio.

Tones: Sets the volume level of EchoStation's tone generator. (The tone generator is used for signals such as the repeater courtesy beep.) Adjust this level if the tones seem to be too loud or soft, compared to other audio sources. Click the Tones button to generate a brief test tone.

Master: Sets the volume level of sound which is sent to your transmitter. This slider controls the volume of the sound-card device and port you selected in the Transmitter section of the Devices tab (see below). For example, this might control the level of the speaker jack on your sound card. Increase this level if the transmitted audio is too soft or noisy, or decrease it if it seems to be over-driving the transmitter.

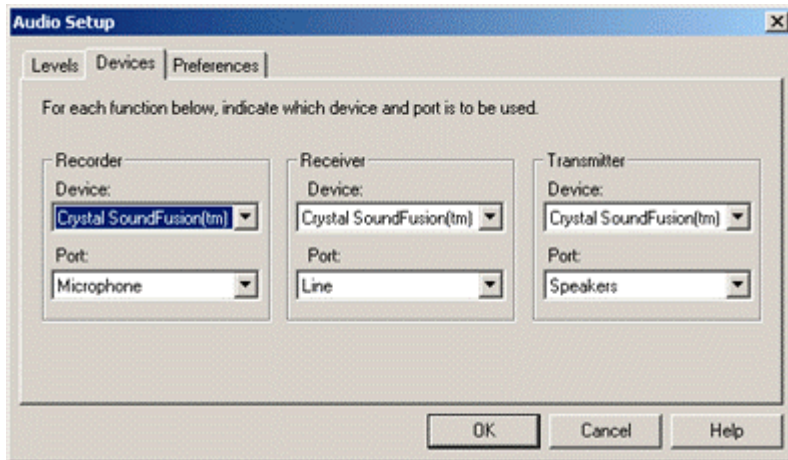
If you prefer to control the level yourself using the Windows volume controls, you can disable this slider on the Preferences tab.

AGC: Enables or disables AGC (automatic gain control) on the transmitted audio. AGC often helps compensate for wide variations in volume, although it can sometimes cause an objectionable "pumping" effect.

Note: If Autopatch is available, level controls for telephone-line audio are adjustable on the Levels tab of the Autopatch Configuration window.

Devices Tab

Settings on the Devices tab allow you to tell EchoStation how your transmitter, receiver, and recording source are connected to your computer. This allows EchoStation to select these devices appropriately and control their levels.



There are separate sections for setting up the Recorder, Receiver, and Transmitter. In each section, there is a drop-down box for selecting a Device and a Port.

If you have more than one sound card installed on your PC, each available sound card will be listed in the Device box. Select the one you wish to use for each function.

The Recorder settings control which sound-card device and port (jack) you wish to use for recording new announcements from within EchoStation. (It does not affect the way you make recordings when EchoStation is not running). For example, if you want to make recordings with a microphone connected to the Microphone jack of your sound card, select the Microphone port.

The Receiver settings control which sound-card device and port (jack) you have connected your receiver (or audio from your transceiver) to. For example, if the speaker output of your receiver is connected to the Line In jack of your sound card, select the Line In port. If your sound card has more than one line-in port, be sure to select the correct one.

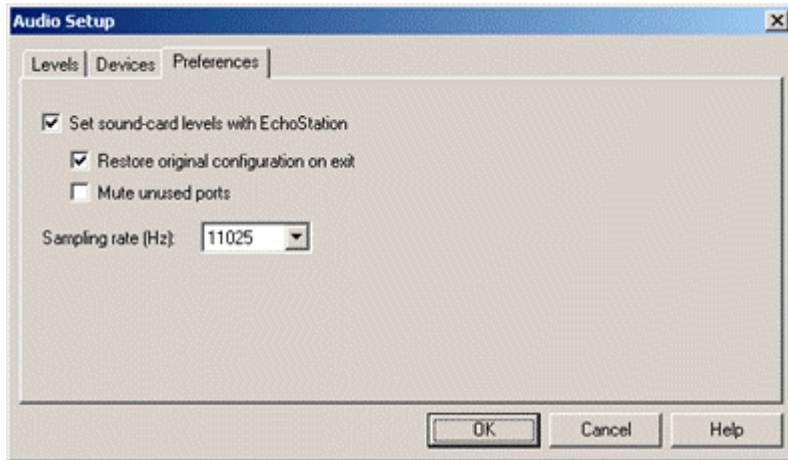
The Transmitter settings tell EchoStation which sound-card device and port (jack) you have connected your transmitter (or audio to your transceiver) to. For example, if the microphone input of your transmitter is connected to the Speaker jack of your sound card, select the Speakers port. If your sound card has more than one output port, be sure to select the correct one.

Many sound cards have both a speaker output and a line output. For these cards, there may be only one port listed in the drop-down box. If this is the case, one of the following situations usually applies:

- The speaker level and the line-out level are controlled by the same volume control. In this case, the Master slider in EchoStation will control both at the same time.
- The line-out level is not adjustable. In this case, the Master slider in EchoStation will adjust the speaker level, but will have no effect on the line-out level. If you are using the line-out connection, use each of the other sliders to control its level.
- One or more line-out or speaker jacks on your sound card can be switched on and off with software that came with the sound card. In this case, use the sound-card software to switch on the jack you connected to your transmitter.

Preferences Tab

Settings on the Preferences tab control the way EchoStation interacts with your sound card.



Each of the items on this page is described below.

Set sound-card levels with EchoStation: When this box is checked, EchoStation will set up all of your sound-card levels when the program starts, regardless of how they had been set previously. When this box is checked, the Recorder, Receiver, and Master sliders on the Levels page will be available. Checking this box is recommended because all sound levels can be controlled by EchoStation, and EchoStation will "remember" the correct settings. Otherwise, the record and playback levels must be set using the Windows Volume Control, or the software that came with your sound card.

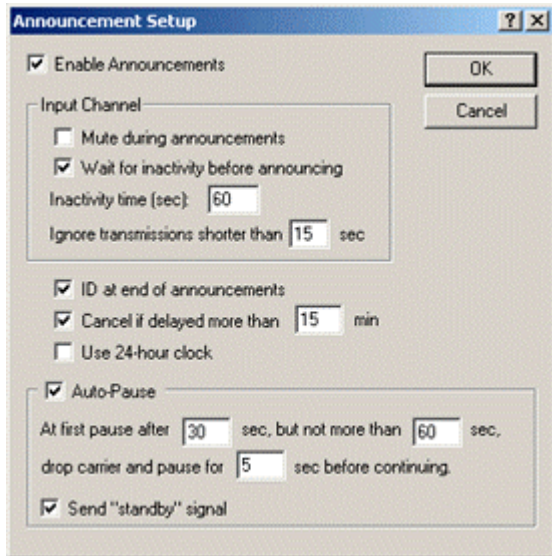
Restore original configuration on exit: When this box is checked, EchoStation will return your sound card's settings to the way they were before the program started. This is useful if you use more than one sound-card application on your computer, and you have set up the levels to work correctly with another program.

Mute unused ports: When this box is checked, EchoStation will temporarily turn down or disable any ports which are not used for the Recorder or Receiver. This can be a useful safeguard against playing undesired sounds over the air, such as microphone or CD audio.

Sampling rate (Hz): Sets the audio sampling rate used internally by SmartController. Although the default setting of 11025 is recommended for most applications, you may experience better audio quality by setting this to the sampling rate of the WAV or MP3 files you are using for announcements. In particular, many MP3 files use a sampling rate of 8000 Hz.

Announcement Setup

Announcement Setup allows you to configure the way EchoStation runs Announcement events. The Announcement feature is available in any of EchoStation's modes.



Enable announcements: When this box is checked, announcements will be aired on schedule. Clear this box to disable all scheduled announcements. (When announcements are disabled, they may still be started manually.)

Mute during announcements: Check this box to mute the receiver while an announcement is playing. This setting applies only to duplex repeater mode. If this box is not checked, any received signals will be re-transmitted while an announcement is playing.

Wait for inactivity before announcing: Check this box to instruct EchoStation to wait until the channel is inactive before playing an announcement. This setting is recommended in order to reduce objectionable interference. If this feature is enabled, when an announcement comes due, EchoStation will first check the channel to be sure it is not busy. If it is busy, EchoStation will delay the announcement until the channel is inactive, up to a maximum time as described below.

Inactivity time: This box controls the length of time, in seconds, EchoStation will wait after the last signal drops before declaring the channel "inactive".

Ignore transmissions shorter than n sec: In determining "inactivity", set this value to instruct EchoStation to ignore short transmissions. A common application of this feature is to ignore the remote repeater's CW ID when determining whether the repeater is busy.

ID at end of announcements: Check this box to instruct EchoStation to send a CW ID immediately after the announcement plays, unless it has already identified within the past 15 seconds. This feature is generally not necessary in repeater mode, but in Announcement Machine mode, it ensures that the station identifies before it goes off the air, as FCC rules require.

Cancel if delayed more than n min: Check this box to instruct EchoStation to cancel a scheduled announcement if it is delayed due to constant activity on the channel. This prevents announcements from becoming "stacked up" to play after a long period of

activity. If an announcement is automatically cancelled in this way, a special message is added to the Log window, and the announcement is re-scheduled for the next applicable time.

Use 24-hour clock: Check this box to display all times in 24-hour format, rather than am/pm format.

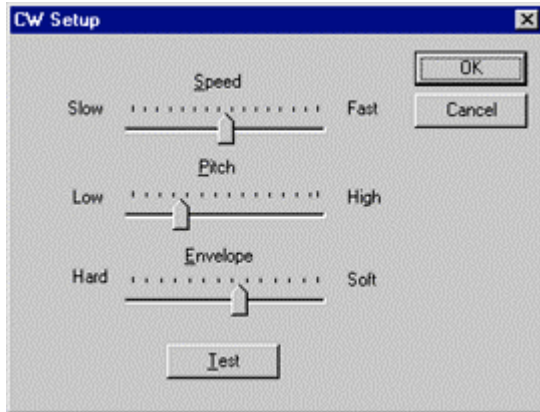
Auto-Pause: Check this box to enable the Auto-Pause feature. The Auto-Pause feature breaks long announcements into a sequence of smaller transmissions, to allow repeater time-out timers to reset themselves. EchoStation automatically tries to pause an announcement during natural periods of silence, to avoid interrupting an announcement in mid-sentence.

At first pause after x sec, but not more than y sec, drop carrier and pause for z sec before continuing: When Auto-Pause is enabled, EchoStation will begin looking for a one-second gap in the announcement after x seconds. When a gap is found, the announcement is paused, the transmitter is dropped for z seconds, and then the announcement resumes. If no such gap is found, EchoStation will pause the announcement anyway after y seconds.

Send "standby" signal: Check this box to have EchoStation send a Morse "standby" signal (AS) immediately after pausing the announcement. This helps remind listeners that the announcement is not finished, and there is more to come.

CW Setup

CW Setup provides sliders for controlling the sound of the CW ID and any other CW messages generated by EchoStation.



Speed: Use this slider to control the speed of the CW transmissions. The approximate range is 5 words per minute (Slow) to 30 words per minute (Fast).

Pitch: Use this slider to control the frequency of the tone used for CW transmissions. The approximate range is 300 Hz (Low) to 3000 Hz (High).

Envelope: Use this slider to control the shape of the CW waveform generated by EchoStation. Setting the slider to the "hard" position causes no shaping at all, which can result in spurious signals or "key clicks". Setting the slider to the "soft" position makes the shape very gradual, which may make it difficult for the messages to be understood.

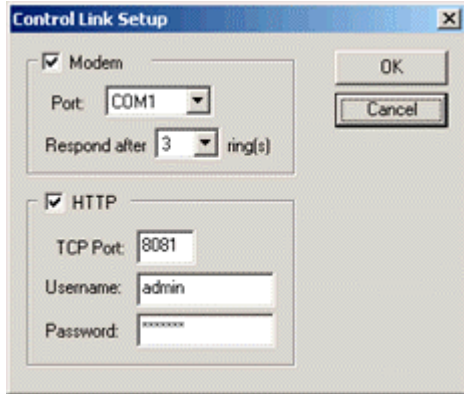
Test: Click the test button to try a set of new settings. EchoStation will key the transmitter (if connected), identify (if necessary), then send a string of three V's.

If you would like to make changes after hearing the test message, wait until the test completes, adjust the sliders, and click Test again.

Note: To change volume of the tones produced by the CW generator, select Audio Setup from the Tools menu, and adjust the CW slider. See [Audio Setup](#) .

Configuring a Control Link

Control Link Setup provides options for configuring a control link. You can choose to set up a modem for basic dial-in control, or to set up EchoStation's Web (HTTP) interface to accept commands over the Internet. You can also enable both methods at once.



Modem

To enable dial-in modem access, check Modem and specify the COM port and the number of rings. Be sure to select the correct COM port to which your modem (internal or external) is attached.

HTTP

To enable remote access using a Web browser, check HTTP and specify the TCP port, along with a username and password.

The normal TCP port for HTTP is 80. However, you must choose a different port number if you are already running a Web server on your PC. In any case, choose a port number which is not already in use on your PC, and which is available through your Internet (or internal) connection; some firewalls block ports other than 80.

If the HTTP feature is enabled, you can access EchoStation's basic control page from any standard Web browser. You will need to know the IP address of your PC. For example, if your PC's IP address is 1.2.3.4, and the TCP port is 8081, the URL to access the control page would be:

<http://1.2.3.4:8081/>

For more information about the control-link feature, see [Installing a Control Link](#).

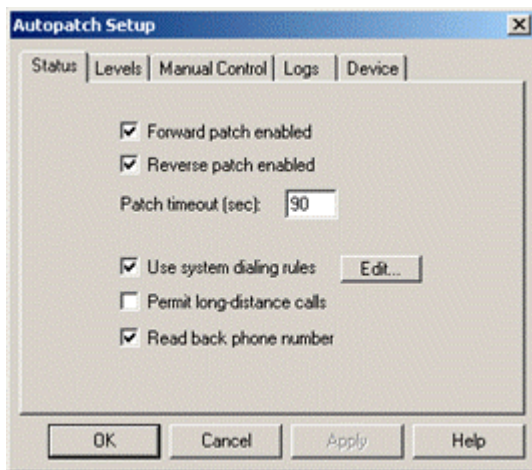
Autopatch Setup

Autopatch Setup allows you to configure EchoStation's Autopatch functions. Choose one of the tabs along the top to view the Status, Levels, Manual Control, Logs, and Device options. Each of these tabs is described in detail below.

Note: All tabs except for the Device tab are unavailable unless a compatible voice modem is installed and configured. For more information about voice-modem devices, see [Setting Up Autopatch](#).

Status Tab

The Status tab configures basic autopatch options.



Forward patch enabled: Check this box to enable forward autopatch; clear it to disable. Only when Forward Patch is enabled can the autopatch be opened with the OpenPatch DTMF command.

Reverse patch enabled: Check this box to enable reverse autopatch; clear it to disable. Only when Reverse Patch is enabled can the autopatch be answered with the PatchRevAnswer DTMF command.

Patch timeout (sec): Sets the maximum time, in seconds, that EchoStation will allow the autopatch to remain connected when there is no activity on the receiver. If no signals are received during this time, EchoStation closes (hangs up) the patch.

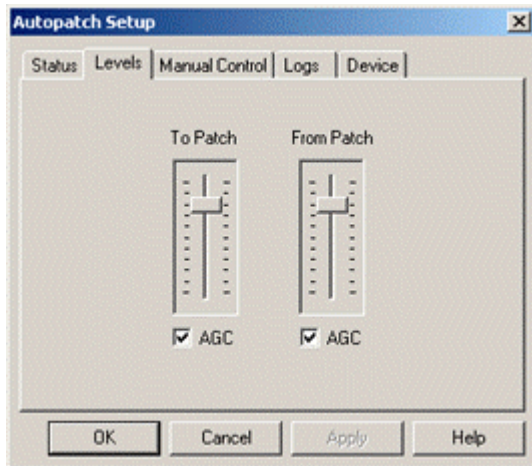
Use system dialing rules: Check this box to have EchoStation convert outgoing telephone numbers according to the dialing preferences of the currently-selected Location. Dialing preferences can be set up by choosing the Edit button, or by opening the Telephony applet from the Windows Control Panel. For example, this feature allows EchoStation to automatically dial "9" before each call, if the telephone line requires it.

Permit long-distance calls: Check this box to allow all outgoing telephone numbers to be accepted. Clear it to block long-distance numbers from being dialed. If "Use system dialing rules" is checked, a number is considered long-distance if Windows reports it as such according to the current dialing rules. Otherwise, a number is considered long-distance if it is 10 digits or more in length.

Read back phone number: Check this box to have EchoStation announce the digits of the telephone number while it is being dialed. This is often helpful to ensure that the telephone number was received correctly over the air, avoiding wrong numbers.

Levels Tab

The Levels tab controls the audio levels to and from the telephone line during an autopatch call.

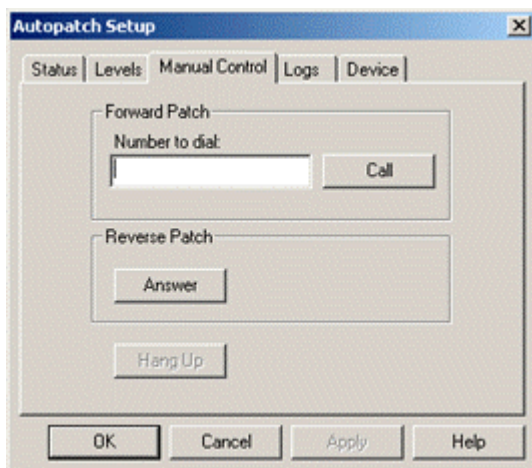


To patch: Controls the level of audio from the receiver to the telephone line. Check the AGC box to have EchoStation maintain this level automatically.

From patch: Controls the level of audio from the telephone line to the transmitter. Check the AGC box to have EchoStation maintain this level automatically.

Manual Control Tab

The Manual Control tab allows autopatch calls to be placed or answered directly from the PC. This may be useful during configuration and testing.



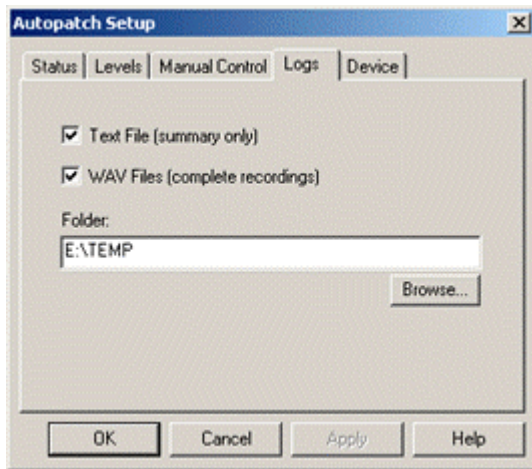
Number to dial: Enter the telephone number to be called, exactly as it would be entered via DTMF commands. Click **Place Call** to initiate the call.

Answer: If an incoming call is causing the reverse patch to ring, click Answer to open the line.

Hang Up: Click to terminate a forward or reverse patch call.

Logs Tab

The Logs tab configures the way EchoStation logs autopatch calls. Automatic logging is useful for keeping track of autopatch use and for meeting third-party traffic logging requirements.



Text file: Check this box to create a simple text file of autopatch activity. This creates a file called "patchlog.txt" and adds one line to the file each time an autopatch call is attempted or answered. The file records the date, time, and duration of the call, along with the telephone number (for forward-patch calls only).

WAV files: Check this box to have the entire sound of each autopatch call recorded as a separate WAV file. Each file is named according to the date and time the call began. Since a great deal of disk space is required, this option is recommended only if the autopatch is used sparingly. EchoStation will not record a new file unless at least 10MB of free space is available on the selected drive.

Folder: Sets the disk folder in which log files (both text and WAV) will be saved. Be sure there is sufficient free space on the selected disk.

Device Tab

The Device tab selects the voice-modem device used by EchoStation for autopatch.

Voice-modem device: From the drop-down list, select the voice-modem device to be used for autopatch. If no compatible voice-modem devices or drivers are installed, no selection is available. (See [Setting Up Autopatch](#) for more information.)

Multiple items will appear if more than one voice-modem device is installed. In particular, on Windows 2000 and above, voice-over-IP devices such as H.323 drivers may be listed.

DTMF Functions

AnncDisable	Disables automatically-scheduled announcements. Stops any announcement in progress.
AnncEnable	Enables automatically-scheduled announcements.
PatchClose	Closes (hangs up) the autopatch.
PatchFwdDisable	Disables forward autopatch. Stops any autopatch call in progress.
PatchFwdEnable	Enables forward autopatch, if available.
PatchOpen	Begins a forward-autopatch call. If forward autopatch is enabled, EchoStation responds with a PatchReady signal, and is ready to accept the phone number.
PatchRevAnswer	Answers a reverse-autopatch call, if reverse autopatch is enabled, and a PatchRing signal has been heard.
PatchRevDisable	Disables reverse autopatch. Stops any autopatch call in progress.
PatchRevEnable	Enables reverse autopatch, if available.
RepeaterDisable	Disables the transmitter. Un-keys the transmitter immediately.
RepeaterEnable	Enables the transmitter.
Event _____	Triggers the specified event (announcement).

Signals

The following signals are generated by EchoStation.

Signal	Meaning
Autopatch Connecting	Indicates that the telephone number has been accepted and is being dialed. (The dialing is not heard over the air.)
Autopatch Opened	Indicates that the autopatch has been successfully opened, and EchoStation is ready to receive a telephone number to be dialed.
Autopatch Ring	Indicates that a call is being received over the autopatch telephone line. Send the PatchOpen command to answer it.
Command Received Up	Indicates that a DTMF command has been successfully received, and the associated feature, if any, has been enabled.
Command Received Down	Indicates that a DTMF command has been successfully received, and the associated feature, if any, has been disabled.
Courtesy Tone	Indicates that the next station may begin transmitting. No signal is sent unless Courtesy Tone is enabled in the Repeater configuration tab. If no signal is associated with Courtesy Tone, a beep is sent instead.

Using Autopatch

EchoStation supports Autopatch features on computers equipped with an internal or external voice modem. Autopatch is available in the Repeater, Simplex Repeater, and Simplex Autopatch modes.

Voice Modem

A voice modem is a modem which is capable of exchanging sound, as well as data, over a telephone line. Many recently-manufactured modems support voice. If you expect to purchase a voice modem, look for modems which mention "voice mailbox" support in their product literature.

To be compatible with EchoStation, a voice modem must support the Windows Telephony API (TAPI). TAPI-compatible drivers for the voice modem are usually provided by the manufacturer, and are installed automatically when the modem itself is installed. Modems which claim to support Windows 98 or Windows 2000 in their product literature are very likely to be compatible with TAPI.

EchoStation does not support voice modems on Windows NT 4.0. If you are running Windows 95, you may need to download and install the latest Unimodem V drivers from [Microsoft](#).

Forward and Reverse Autopatch

EchoStation supports both "forward autopatch" and "reverse autopatch".

Forward autopatch allows an amateur station, usually a portable or mobile station, to place a telephone call remotely through EchoStation. The amateur sends a sequence of DTMF (TouchTone) digits to *open* the autopatch, and then sends the telephone number to be called. Through the voice modem, EchoStation connects to the telephone line, dials the number, then sets up an audio connection between the phone line and the radio equipment, so that the two parties can hear each other. (Since the amateur cannot receive and transmit simultaneously, the conversation is "half duplex"). Once the conversation is finished, the amateur sends another DTMF sequence to *close* the autopatch and hang up the phone line.

Reverse autopatch is similar, except that the third party, not the amateur, initiates the call. The third party calls the number of the phone line connected to the voice modem. As the line rings, EchoStation keys the transmitter and plays a special tone signal over the air. Any amateur station (or a control station) may then send a DTMF sequence to *open* the autopatch and answer the call.

Using special DTMF signals over the air, or commands on the Web control-link, control operators can selectively enable or disable forward or reverse autopatch. EchoStation also allows outgoing long-distance calls to be blocked.

Opening the Patch

To begin a forward-autopatch call, a station sends the DTMF *PatchOpen* command over the air. (The default *PatchOpen* command is *). If forward autopatch is enabled, the patch is opened and the *PatchOpen* signal is played over the air. This informs the station that EchoStation is ready to accept a telephone number.

The station then sends the digits of the telephone number and drops the carrier. EchoStation responds by connecting to the phone line, dialing the digits, and switching to the PatchActive state. While the patch is active, the station and the third party can hear each other and carry on a conversation.

For more information about DTMF signals, see [General Setup](#).

Answering Reverse Patch

When a caller dials the phone number of EchoStation's telephone line, and Reverse Patch is enabled, EchoStation keys the transmitter and begins playing the *PatchRing* signal over the air. Any station which knows the correct PatchAnswer DTMF command may send it over the air. This opens the patch and the conversation can begin.

Closing the Patch

To end an autopatch call (either forward or reverse), a station sends the DTMF *PatchClose* command over the air. (The default *PatchClose* command is #). This hangs up the phone line and closes the patch.

Call Logging

EchoStation offers three options for logging of autopatch calls:

- None: No logging is done, although the progress of the call is displayed in the Events window.
- Summary: The date, time, and duration of the call, along with the telephone number (for forward patch), is logged to a text file.
- Recording: In addition to the summary log, an audio recording of the entire call is saved to disk as a WAV file. Each call is stored as a separate file. (No recording is saved if less than 10 MB of disk space is available.)

Special Notes

- To support enhanced features such as long-distance blocking and phone-number translation, EchoStation does not allow the originating station to dial the number directly through the phone line; therefore, no dial tone is heard over the air. This may be confusing to amateurs who are accustomed to conventional autopatch systems. Consider using a dial-tone sound as the *PatchOpen* signal to help avoid confusion.
- In Simplex Autopatch mode, due to the periodic transmit-receive switching, the originating station should key the mic and then pause briefly before sending DTMF commands, to be sure the entire command is received correctly.
- In Simplex Repeater mode, opening the patch causes EchoStation to switch to Simplex Autopatch mode temporarily. After the patch is closed, EchoStation reverts to normal Simplex Repeater operation.
- Autopatch calls are considered third-party traffic over amateur radio. Please familiarize yourself with FCC rules governing third-party traffic.

Starting EchoStation Automatically

To ensure that your repeater or announcement machine stays on the air, you may wish to set up your computer to start EchoStation each time it is re-booted.

The easiest way to do this is to place a shortcut to EchoStation in your computer's Startup folder. If you are unsure how to do this, consult your Windows documentation. If you are running Windows NT or 2000, you will also need to enable auto-logon.

If you set up EchoStation to start automatically, it is recommended that you disable any Windows sounds which play when your system starts. Otherwise, EchoStation may not be able to initialize itself, because the sound card may be busy.

In Control Panel, choose Sounds, select the item "Start Windows" from the list, and then select the item "[none]" from the list of Names.

Special Note for Windows Me Users

Unlike other versions of Windows, Windows Me (Millennium Edition) asserts the RTS and DTR signals on all COM ports when it starts up. This means that your rig will begin transmitting when Windows Me starts, and will remain transmitting until a program which uses the COM port (such as EchoStation) is started.

For this reason, it is strongly recommended that you put a shortcut to EchoStation in your Startup folder if you are using Windows Me. Otherwise, a temporary power disruption which causes the computer to reboot will key your transmitter indefinitely.

If you do not want EchoStation to start automatically, you can put a shortcut to some other communications program in your Startup folder instead.

Fail-Safe Feature

If you are planning to use EchoStation for unattended, remote operation, consider taking advantage of the fail-safe feature. See the section [Fail-Safe Feature](#) for details.

Creating an Event

EchoStation allows you to create any number of scheduled events. The most common type of event is a voice announcement, which consists of a Windows sound file (also known as a WAV file), or an MPEG file (MP3), to be played over the air at certain times of day. If the optional Synthesized Voice feature is installed, EchoStation can "read" a text file instead.

Each event has a name, a source, and a schedule. Event names can be of any length and need not be unique. However, you may wish to use distinct names for each event to make them easier to track and edit. An example of a "source" is a WAV or MP3 file for a voice announcement.

EchoStation provides a considerable amount of flexibility in setting up a schedule for an event. Events may be scheduled on a daily, weekly, monthly, or one-time-only basis, and can be configured to repeat at a specified interval throughout the day.

The scheduling system is very similar to the Scheduled Tasks application in Microsoft Windows. Those already familiar with Scheduled Tasks will find EchoStation's Event Scheduler easy to navigate.

When you create a new event, EchoStation launches the Scheduled Event Wizard, which leads you through each step. The steps are as follows:

- Select the type of event you want to create.
- Choose the source of the event. For example, select a WAV file to be used for a voice announcement, or a text file to be used for a synthesized voice announcement.
- Choose a name for the event, and select whether it will be scheduled daily, weekly, monthly, or one time only.
- Set the start time of the event, and other information about its schedule. (This information varies depending on the type of schedule that was selected.)
- Confirm the settings and finish.

Choosing a Source

Each event you create must have a source. For a Recorded Voice Announcement event, you must choose an existing WAV or MP3 file, or create a new one. For a Synthesized Voice Announcement event, you must choose an existing Text file, or create a new one.

Recorded Voice Announcement

For a Recorded Voice Announcement event, you have three options:

- Obtain a WAV or MP3 file from an outside source and copy it to the PC on which EchoStation is installed
- Record a WAV or MP3 file yourself, using software supplied with your computer or your computer's sound card
- Create and record a new sound file while EchoStation is running, as you run the Scheduled Event Wizard

Note that the second option, recording a WAV or MP3 file using another software package, usually requires that you exit EchoStation before you begin recording. This is because most sound card drivers allow only one application to use the card at a time. (If you create a new sound file from within the Wizard, this switching is done automatically).

If the file you would like to use is already stored on your computer, click Browse and locate the file.

If you would like to create a new WAV file, click Create New. A window will appear asking you to supply a new file name. Choose a name and click OK. The Windows Sound Recorder (or a similar application) will open. Click Record (usually a red circle) and begin speaking into the microphone. When you are finished, click Stop. You can play back the file or edit it. When you are satisfied with the results, choose "Exit and return to EchoStation" from Sound Recorder's File menu.



The exact steps described above may be different if your computer's sound-card software has installed an application which takes the place of Windows Sound Recorder. Consult the software documentation for more information. For more information about Sound Recorder, consult Sound Recorder's Help menu.

Instead of a microphone, you may prefer to record a WAV file from a different source, such as an audio CD, or a line-in source. For more information about different audio setups, see [Audio Setup](#).

Formats

Sound files can be recorded and stored in any of several different formats. EchoStation will always try to convert sound files to 11.025 kHz, 16-bit mono, since this is the format it uses internally. (This internal format can be changed. See [Audio Setup](#) for details.) If you are recording WAV files specifically for use with EchoStation, you will get best results when using this format. However, most other standard formats will also work acceptably well.

Synthesized Voice Announcement

If you have the Synthesized Voice option installed, you can set up EchoStation to "read" a text file. Choose an existing text file as the event source. If you need to create a new text file to use as a source, use Windows Notepad or WordPad to create one. If you use another text-editing program, be sure to save the document as a "plain text" (or "ASCII") file. It should have a .TXT extension.

For more information, see [Synthesized Voice Announcements](#).

Setting a Schedule

The first step in setting up a schedule is to decide whether the event will be scheduled daily, weekly, monthly, or one time only.

An event scheduled *daily* runs at a specific time every day, or every other day, every third day, and so on.

An event scheduled *weekly* also runs at a specific time, but can be set up to run only on certain days of the week. It can also be set up to skip a certain number of weeks.

An event scheduled *monthly* runs only on a specific day of the month, or can run on a specific weekday of the month, for example, the 3rd Tuesday. Specific months can also be skipped.

An event scheduled *one time only* runs only at a specific time on a specific date.

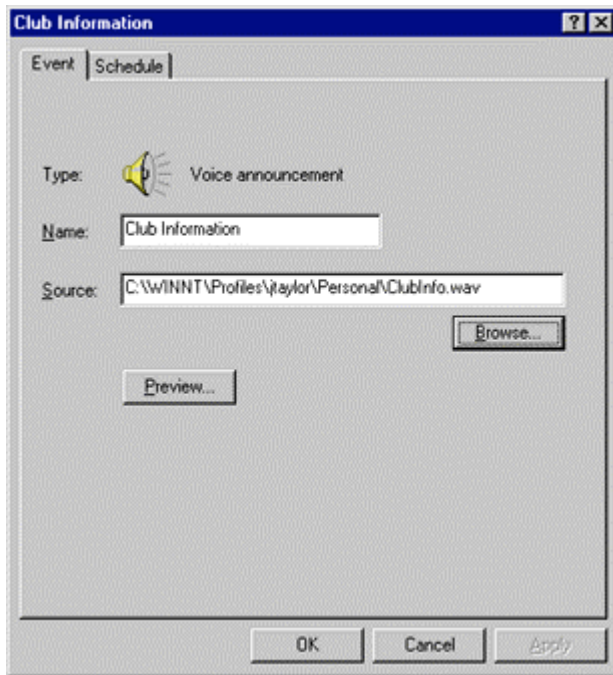
Regardless of which type of schedule is selected, the event can also be set up not to start until a specific date, and can be set up to run repeatedly several times throughout the day. See the section [Advanced Scheduling Options](#) for more information.

Making Changes

Once an event has been created, its name, source, schedule, and trigger sequence can be changed at any time.

To make changes to an event, select the event in the Events window, and choose Properties from the Edit menu. (As a shortcut, you can also double-click the event, or select the event and click the Properties button on the Toolbar).

Event Tab

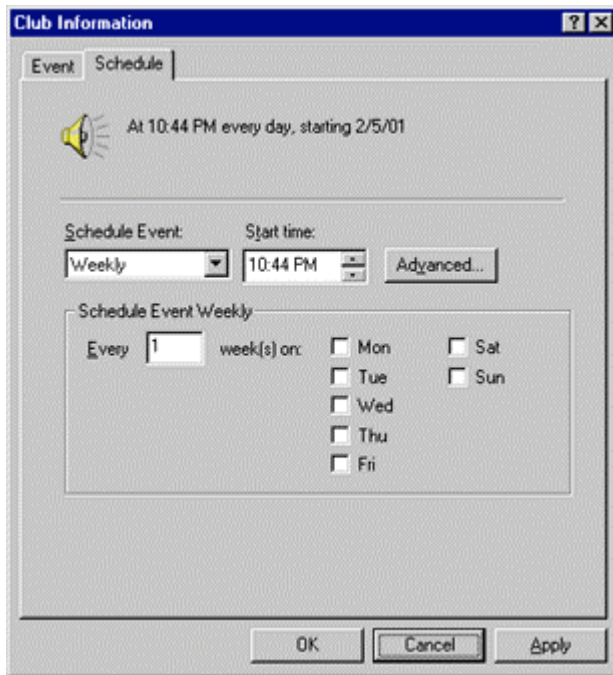


The Event tab displays the event type, name, and source. To change the name, type a new name. To change the source, type the full path to the desired source file, or choose Browse to open a window which lets you select one. For voice announcements, the source must be a valid WAV or MP3 file.

To preview the source, choose Preview. For voice announcements, a sound-player application will open, and the announcement can be played. (Depending on your sound-card and transmitter setup, you may not be able to hear the sound unless you connect speakers or headphones to the same sound-card jack the transmitter is connected to.) You must close the sound-player application in order to continue.

You may optionally assign a DTMF (TouchTone) sequence to the event. When this sequence is received over the air, the event will trigger immediately, regardless of its schedule. To disable this feature, leave this box blank.

Schedule Tab



The Schedule tab displays a summary of the event's schedule, and allows you to make changes. To change the type of schedule, select a different item from the Schedule Event drop-down list. Different options will appear depending on the type of schedule; a Weekly schedule is shown above.

Even after making changes, the description of the schedule at the top of the window will not change immediately.

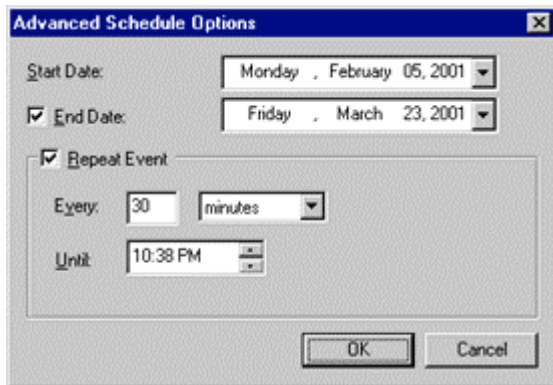
To access Advanced scheduling features, click Advanced. For more information, see [Advanced Scheduling Features](#).

Advanced Scheduling Features

Two advanced scheduling features are available:

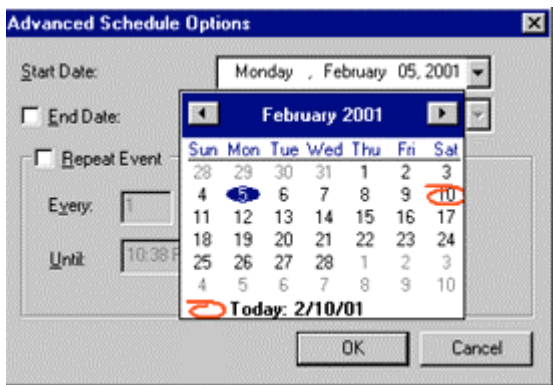
- For events on a daily, weekly, or monthly schedule, the event can be "held" so as not to start until a specific date. The event can also be set up to terminate on a given date.
- For events on any type of schedule, the event can be set to run at the designated date and time, and then to repeat at a designated interval during the day until a designated time.

To access Advanced features, open the Properties page for an event, select the Schedule tab, and click Advanced.



By default, the start date is the date the event was originally created. To change the start date, type in a new date, or choose the drop-down button to display a calendar. Navigate through the calendar and click on the desired date.

To change the end date, check the End Date box and designate an end date in the same fashion.



To set up a repeating event, check the Repeat Event box, and enter the appropriate information. If you would like the event to repeat until the end of the day, enter 11:59 PM as the ending time.

Automatic, Local, and Remote Control

Part 97 of the Federal Communications Commission (FCC) rules, which apply to the Amateur Radio Service, describe the control-operator requirements for specialized stations such as repeaters. Before you put EchoStation into service, please familiarize yourself with these rules. This section is not intended as a substitute, but it provides some guidance based on common interpretations of these rules. Remember that compliance with FCC rules is solely the responsibility of the licensees.

Repeaters may operate under automatic control. This means that a repeater may function without a control operator on duty to monitor its transmissions.

Most other types of stations require a control operator, a licensed amateur who can make operating adjustments to the station, either locally or remotely. Such stations are said to be under either "local control" or "remote control".

Most interpretations of the rules hold that a control operator must monitor a simplex repeater or an announcement machine, since neither fits the FCC's definition of a "repeater". This means that if you intend to use EchoStation as a simplex repeater or announcement machine, you (or another control operator) will either need to be close to the equipment, or have immediate access to it over a control link.

EchoStation helps fulfill this requirement by supporting two types of wireline control links. For more information, see [Installing a Control Link](#).

Getting Help

Updated product, registration, and support information is always available on the Web at <http://www.synergenics.com/sc>.

Registered users receive free e-mail technical support. You may submit a question on the Web site, or by sending e-mail to support@synergenics.com.

EchoStation is only part of a complete system, which includes radio equipment, a sound card, and a computer. If you suspect that your question is not about the EchoStation software itself, you may get faster and more accurate information by contacting the manufacturers of these components directly.

Here are some other useful links on the Web:

General Information

[Federal Communications Commission](#) (Amateur Radio rules)

[Microsoft Corporation](#) (Windows software)

Sound Cards

[Creative Labs](#)

[Diamond Multimedia](#)

[I/O Magic](#)

[Voyetra Turtle Beach, Inc.](#)

Other Links

[West Mountain Radio](#) (amateur radio sound-card interfaces)

[Simplex Repeaters](#) (information page and e-mail list)

[The Repeater Builder's Technical Information Page](#)