# Nittany Amateur Radio Club

# W3YA

# 85 Repeater

### General Operation Overview

The State College 85-repeater operates on 146.850 MHz with a standard -600 kHz split. A truly regional machine, the 85-repeater covers most of central Pennsylvania and is centered on the State College area. There are eight receivers located on mountaintops sounding the State College region. Three of the receivers are at the main repeater site, and five receivers are located at remote locations. Having eight receivers at six sites greatly enhances the performance of the 85-repeater system. Talking on the 85 repeater is easy; simply push the talk button on your microphone and talk. All complex switching between the repeater's eight receivers is handled automatically.

The 85-repeater is a PL access machine; you do need a PL tone to access the repeater. Set your radio to transmit a PL tone of 146.2 Hz, and set your receive tone squelch to the same tone, 146.2 Hz. All modern 2-meter radios have this feature. Transmitting this tone will allow you full access to the system's base site and all remote receivers. Without this tone, you will not be able to access the 85 repeater.

The repeater always transmits its own PL tone of 146.2 Hz. It is recommended that you program your receiver's tone squelch function (CTCSS) to 146.2 Hz. This will eliminate many sources of local interference that enter your radio directly, i.e. signals not coming from the repeater such as computer and security systems. This type of interference tends to open your receiver's squelch with annoying noise bursts as you drive around town.

The NARC control operators can assist you if you have any questions.

The 85-repeater consists of one central transmitter and eight separate receivers located at six independent receiver sites. These remote sites are linked back to the main repeater transmitter. A receiver voting system selects the receiver with the best signal to be broadcast by the repeater's transmitter. Three of the eight receivers are located at the central transmitter site and operate only with PL access The remaining five receivers are located at remote locations; all five remote receivers require PL tone for access. This greatly reduces stray pickup from other repeater regions.

85-Repeater Sites

| Rx # | Site | Function | Mode |
|---|---|---|---|
| 1 | Little Flat - Wide North Antenna | Main Site | P.L. Access 146.2 Hz |
| 2 | Little Flat - South West Antenna | Main Site | P.L. Access 146.2 Hz |
| 3 | Little Flat - Broad East Antenna | Main Site | P.L. Access 146.2 Hz |
| 4 | Pine Grove Mountain | Remote Site | P.L. Access 146.2 Hz |
| 5 | Purdue Mountain | Remote Site | P.L. Access 146.2 Hz |
| 6 | Rattlesnake Mountain | Remote Site | P.L. Access 146.2 Hz |
| 7 | Lewistown (Blue Mountain) | Remote Site | P.L. Access 146.2 Hz |
| 8 | Woodward Mountain | Remote Site | P.L. Access 146.2 Hz |

## Repeater Features

**Repeater Voice ID**

The repeater speaks its call-sign ID every ten minutes in its own voice when the repeater is active. The repeater will always wait until you let up on your mic key before giving its voice ID. If you key up over top of the repeater's voice, it will simply switch to its CW ID.

**CW ID**

Normally, the repeater uses a voice ID. The CW ID is sent only if a repeater user transmits during voice ID. Example: The repeater sends, "W3YA/R" in international Morse code. The CW ID is also used during net operations.

**Repeater formats**

The 85-repeater supports multiple operational formats. This allows the repeater's operating parameters to be tailored to specific communication applications. Each memory format can support independent IDs, messages, timer settings, and courtesy tones. Example: The voice ID may be suppressed during net operations. Each format has a unique courtesy tone, which is used to identify the repeater's current format. Currently the 85-repeater can operate in the following operational formats:

Normal operation format

Net operation format

Stray-input noise reduction format

Severe weather alert format

**Specialized Courtesy Tones**

The 85-repeater has the ability to generate unique courtesy tones depending on the repeater's mode (format) of operation. The tones consist of one to three tones played in sequence. These tones change with the repeater's usage and are currently set of as follows:

Normal Operation – 600 Hz short beep

Net Operation – 1000 Hz long beep

Stray-input reduction mode – 2 beeps of differing tones (800 Hz & 1000 Hz)

Severe Weather Alert format – 3 beeps (300, 600, 900 Hz)

**Scheduler**

The 85-repeater has a multi-function scheduler that fully automates repeater operation. The scheduler contains a twenty-four-hour clock and a yearly calendar that permit repeater events to be scheduled to the minute. An example is to automatically change the repeater's format to net-operation format during scheduled nets such as the ARES and QCWA Sunday night nets.

**Voice Synthesizer**

The 85-repeater has its own voice. Sounding somewhat mechanical, the repeater has a vocabulary of 475 words. The repeaters voice is used to announce repeater formats, IDs, and alarms.

**Back-up redundancy**

In addition to the normal transmitter, power amplifier, and eight receivers, the 85-repeater incorporates a fully independent back-up transmitter and repeater controller.

**NOAA Severe Weather Emergency Broadcasts**

The 85-repeater has an interface to the NOAA weather broadcast system. When a severe weather alert is broadcast by the NOAA weather service, the repeater will re-broadcast the warning. The repeater will periodically announce the nature of the warning during the alert period determined by NOAA. The alert is cancelled automatically or can be cancelled by a control operator.

**Repeater Control**

The 85-repeater is operated for the Nittany Amateur Radio Club of State College, Pa, and is owned by Woody Brem K3YV. A control team monitors repeater operation, maintains equipment, and offers assistance to repeater users. Repeater use, policies, and rules are determined by W3YA licensee and the repeater owner.