North Raleigh Model Railroad Club

Application Note

FRS Radios for NRMRC Layouts

Issue 3
July 20, 2014

Table of Contents

Introduction

As NTRAK layouts grow larger, especially at regional meets and national conventions the use of low-cost, readily-available FRS radios eases the problem of good communications.

For prototype operating sessions on NTRAK layouts the use of radio communications is almost mandatory for communications with the Dispatcher and between train crews.

Two-Way Radios

The North Raleigh Model Railroad Club has been using radio communications for the successful operation of train show layouts for many years. The Club has decided to utilize radios designed for the Family Radio Service (FRS), one of the Citizens Band unlicensed services permitted by the FCC. The Club also decided that individual Members, rather than the Club, would be responsible for purchasing and maintaining these radios.

This section documents the requirements for FRS radios purchased by Members. Choice of manufacturer and vendor is left up to the individual Member. There are many manufacturers of FRS radios, including Audiovox, Cobra, Kenwood, Maxon, Motorola, Panasonic, Radio Shack, Sony and Uniden, among others. Note that most FRS radios available today also include GMRS channels, use of which requires a FCC license. Only FRS channels will be used at shows.

Requirements

The following requirements are mandatory for FRS radios purchased by Members:

Channels	14
Quiet Codes	38
Activation	Push-to-Talk
Connections	Speaker/Microphone Jacks

Quiet codes are a form of "selective calling." This means you can set the radio to a special code that only will allow radios set to that exact code to be able to call you. There are two methods in use, CTCSS (Continuous Tone Coded Squelch System) and DCS (Digital Coded Squelch), which are not compatible with one another. (Squelch is what keeps any two-way radio quiet between transmissions.) CTCSS is the preferred method and is used by Cobra, Motorola, Radio Shack and others. Be sure the radio you purchase uses CTCSS.

Some manufacturers refer to quiet codes as "privacy codes," which is misleading. ALL transmissions may be listened to by other FRS users or those people with scanners. Quiet codes are a filter, not a scrambler.

There is no uniformity among manufacturers for the numbering of quiet codes vs. the frequency of the quiet code tones. Be sure to keep your manual handy so you can match up the code number and frequency.

The following features are **recommended** for any radio purchased by Members:

> Low battery indication
> Power saving circuitry
> Belt clip (wrist strap minimum)

Alert signal
Headset or Ear Bud with Push-to-Talk
Microphone (usually extra cost option)

The following features are **not recommended** for FRS radios for train show use:

Voice activation
Channels or quiet codes that use dip-switches to set

Voice-activated systems are not really useable for train shows. Just about any surrounding noise sets them off. If you adjust them to be less sensitive, they cut out when you are speaking. The use of **voice activation is not permitted at Train Shows.**

Using the Radio

Radios should be equipped with fresh batteries at the start of each show, or the batteries fully charged if the radio is equipped with re-chargeable batteries.

All operating personnel must be equipped with a working radio which is turned on to the specified channel.

Voice activation (VOX) is prohibited. Use only a headset with a push-to-talk button. When first using the radio a brief "Radio Check" transmission is permissible. Use of FRS radios without a headset is permitted although strongly discouraged.

Phrases for Radio Communications

The following phrases for radio communications will be used in order to prevent confusion, and obtain the desired result by the recipient of the message.

The following nomenclature is used in the phrases:

- [color] is red, yellow, blue, alternate blue or green to designate the outside main, inside main, branch track, alternate branch track or mountain division, respectively.

- [name] train is a distinctive identification for a particular train, such as "GN passenger train."

- [location] is a distinctive identification for a particular location, such as "Jim's module" or "passenger station."

Note: because of the independent operation of each train, it is very important to identify both the [name] and [color].

Break-Aways, Derailments & Collisions

When a train breaks-away, derails or collides with another train there is an immediate requirement to inform the engineers of other trains that may be affected. Suggested phrase:

[name] on [color] at [location] has derailed, a breakaway, or collided with [name].

Other affected engineers must take care to stop their trains with sufficient clearance to prevent a collision with any stopped train.

Track Clear, Resume Operation

When a break-away, derailment or collision has been fixed/cleared, the engineer of the affected train must advise other affected engineers that the track is clear and operations can be resumed. Suggested phrase:

[name(s)] on [color] is/are clear. Resume.

Train Position

Frequently the engineer, or some other operator such as the Yardmaster, may need to know where a given train is located. The request should take the form:

Where is [name] on [color]? or Advise when [name] is passing [location]?

The response to these phrases is to state where the requested train is currently located, using one of the following responses:

[Name] is at [location] or [Name] is approaching [location] or [Name] is passing [location].

Track Blockage

Should one or more tracks become blocked for any reason there is an immediate need to inform all engineers of the danger. Suggested phrase:

[color] track(s) are blocked at [location].

On hearing this message all engineers on the affected track(s) must proceed at a dead slow speed up to the point of blockage, being careful to leave sufficient clearance so wrecking crews can do their work to clear the track(s).

Other Communications

Other communications and socializing over the radio should be kept to a minimum. When required, they should be clear and brief. Lengthy transmissions can prevent important messages from being heard.