Monitoring
the
Wake County
Trunked Radio System

Produced by:
Wake County Public Safety
919-856-6480

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Introduction

Wake County North Carolina is implementing a Motorola, 800 MHz 4.1 SmartZone™ trunked radio system. This system will support both analog and digital voice modes. The system is designed to expand the existing North Carolina State Highway Patrol (NCSHP) system, significantly improving interoperability between all local, county and state public safety agencies in Wake County.

"This radio system represents a massive improvement in emergency radio communications in Wake County," said Wake County's Public Safety Director John Rukavina. "Our fire, EMS and law enforcement agencies are eager to move from outdated VHF/UHF technology that cannot grow with Wake County. Additionally, our partnership with the State Highway Patrol will enhance interoperability and provide additional opportunities for use of new technology."

The new, shared system will add one simulcast and three INTELLIREPEATER™ subsystems to the existing NCSHP SmartZone trunked system providing reliable wide area coverage throughout Wake County's 12 municipalities, including the state capital of Raleigh. Seven trunked Radio Frequency (RF) sites in the system will contain 14 channels operating in a simulcast mode.

"Our primary goal with creating this system was to eliminate the coverage problems that continued to plague our aging legacy communications systems and improve all facets of emergency management," said Emergency Management Director for Wake County, Martin Chriscoe. "The system will significantly impact our ability to respond quickly and efficiently to large incidents in the area, but also smaller daily incidents that require a multiple agency response."

The Wake County Trunked Radio System (WCTRS) uses new digital technology that cannot be monitored with traditional radio scanners. Many individuals and organizations have a vested interest in monitoring the traffic on the WCTRS. These include:

Off duty law enforcement, fire, and EMS personnel.

Family members law enforcement, fire, and EMS personnel.

Volunteers that support law enforcement, fire, and EMS organizations.

Newspaper, TV and radio media.

Tow truck operators.

Amateur radio operators involved with SKYWARN spotter missions.

This guideline was developed to provide concise information on how to monitor the new digital Wake County Trunked Radio System.

How the System Operates

Trunked radio systems utilize techniques to allow multiple users on a limited number of voice or traffic channels. Trunked systems incorporate control functions to manage larger volumes of traffic and work off of the principle that not all users will utilize system resources all at one time. This, however, means that you have to control what resources are allocated, and in what priority for the various users. We need to remember that control messages are already utilized in some form by many conventional mobile communication systems. The simple voice statement "over" on a conventional analog two-way channel indicates to another user that the previous user is done talking and the system is now available for use by a different user. Within more advanced systems, control messages are exchanged as sub-audible tones that control access to the channel and specific functions of the radio communication.

Simplex operation means that the radio uses the same frequency to transmit and receive. This means that only one user can be talking at one time. If both "key up" at the same time, then the users will not be able to understand each other because neither will be receiving, as they will both be transmitting. Some systems provide control signaling along with the voice transmission that provides a level of intelligence that avoids these kinds of conflicts.

Duplex operation allows users to carry on a conversation much in the same way we use a regular telephone. Separate RF paths are assigned for the transmitter and receiver. This allows both parties to talk and listen simultaneously. (Except in the case of halfduplex). Let's compare simplex and duplex operation to trunked radio operation. With trunked radio operation, there is a base site or repeater that coordinates the communication between the various mobile units through the use of a control channel. This dedicated control channel provides the additional management of the system resources. In effect, it is acting as an "overseer" of the network and controls who can use the system, when they can use it and how they can use it. Usually, the control channel is a separate frequency channel that is designated as the dedicated control channel frequency and is different from the voice channels. Since the control channel is communicating in digital "words", the modulation has to support digital "1s" and "0s" to accomplish the transfer of data. Using a dedicated control channel is desirable in that it provides additional control of spectrum in larger systems. It allows for the control of system resources and offers added features not available in conventional radio communications.

The Wake County Trunk Radio System (WCTRS) is a SmartZone Type II trunk system marketed by Motorola under the ASTRO name. All of these systems operate in a 12.5 kHz bandwidth (Narrowband Operation). Motorola Type II systems refer to the second generation Motorola Trunking systems that replaced Fleets and Subfleets with the concept of talkgroups and individual radio IDs. ASTRO is the trademark name for Motorola's Digital Communications Solution. The original Motorola ASTRO implementation uses the standard SmartZone 3600-baud data channel and the digital voice solution is based on the common air IMBE (Improved Multiband Excitation) vocoder. The WCTRS can support up to 28 channels, 65535 unique radio IDs and 4000 talkgroups.

The WCTRS operates from seven (7) main sites located through out the county. For monitoring purposes all of these sites simulcast the control channel and repeater channels. This provides continuous coverage over all of Wake County.

Equipment Required for Monitoring

The WCTRS is a digital trunk radio system. Currently there are only three (3) scanners on the market that will track and decode the WCTRS. These scanners are very new to the market and represent first and second generation technology.

Uniden American Corporation

BC296D - APCO P-25 Digital Handheld Scanner

The BC296D Digital Handheld Scanner is APCO P-25 Capable with 1000 channels, 10 banks, 10 priority channels and continuous band coverage.

PRODUCT FEATURE LIST

- APCO P-25 Digital Operation - Including 9600 Baud C4FM & CQPSK
- PC Control/Programming (Software Included)
- 1000 Channels, 10 Banks, 10 Priority Channels
- Continuous Band Coverage - 25MHz to 1.3GHz
- Preprogramed Service Searches (12)
- TrunkTracker IV - EDACS®, Motorola®, LTR, APCO
- CTCSS/DCS Decode
- S.A.M.E. Weather Alert - Specific Area Message Encoding - During a NOAA Weather or Emergency Alert, a code for your specific location will alert you to severe conditions in your immediate area.
- Alpha Tagging - Bank Channel and Search Range
- Backlit Keypad - Offers you added visibility for dialing at night or in low light.
- Holographic Backlit LCD Display

Street Price $525.00

⊘ BC796D - APCO P-25 Digital Scanner

The BC796D Digital Scanner is APCO P-25 Capable with 1000 channels, 10 banks, 10 priority channels and continuous band coverage.

PRODUCT FEATURE LIST

- APCO P-25 Digital Operation - Including 9600 Baud C4FM & CQPSK
- PC Control/Programming (Software Included)
- 1000 Channels, 10 Banks, 10 Priority Channels
- Continuous Band Coverage - 25MHz to 1.3GHz
- Preprogramed Service Searches (12)
- TrunkTracker IV - EDACS®, Motorola®, LTR, APCO
- CTCSS/DCS Decode
- S.A.M.E. Weather Alert - Specific Area Message Encoding - During a NOAA Weather or Emergency Alert, a code for your specific location will alert you to severe conditions in your immediate area.
- Alpha Tagging - Bank Channel and Search Range
- Backlit Keypad - Offers you added visibility for dialing at night or in low light.

Street Price $525.00

Uniden is currently offering a first generation model of the above radios. The BC250D APCO P-25 Capable Handheld Scanner and the BC785D APCO P-25 Capable Scanner are available in the market place. Both of these radios are “digital ready”. This means that in order to monitor all WCTRS in digital mode the optional BCi25D Digital Card is required. Additionally, the BCi25D Digital Card will only track 3600 baud systems. The WCTRS is a 3600 baud system so these radios could be used. However, for propose of this Guideline these radios were not recommended for two reasons, cost and functions. The combined cost of the BC250D/BCi25D or BC785D/BCi25D is greater than the BC296D or BC796D. While both sets of these radios look the same Uniden has made some improvements in the internal operation of the BC296D and BC796D.

Where to buy the Uniden BC296D - APCO P-25 Digital Handheld Scanner and BC796D - APCO P-25 Digital Scanner

Over the Internet at:

Communications Electronics Inc.
254 Wagner Road South
Ann Arbor, Michigan 48103-1940 USA
800-USA-SCAN or 734-996-8888
www.usascan.com

Scanners Unlimited
1199A Laurel Street,
San Carlos, CA 94070
650-573-1624
www.scannersunlimited.com

Scanner World, USA
17 Interstate Ave.
Albany, NY 12205
800-476-8050 or 518-436-9606
www.scannerworld.com

Scanner Master Corporation
40 Freeman Place
Needham, MA 02492
800-SCANNER or 781-292-1010
www.scannermaster.com

❸ Radio Shack Corporation PRO-96 Digital Trunking Handheld Scanner

This handheld scanner has an abundant memory capacity, able to store frequencies in 5500 memory channels. Plus, you can store up to 16,500 ID codes in one "working" 500 channel, 1500 ID code scanner with 11 "virtual" scanner pages of memory! This scanner follows APCO 25 digital and virtually all analog Motorola® and GE/Ericsson EDACS trunked systems. More and more cities are using these trunked systems, allowing city services to share the same set of frequencies. Conversations on these systems start on one frequency, then shift to a different one with each transmission. This scanner can follow these systems. Patent Pending.

PRODUCT FEATURE LIST

- APCO 25 digital trunking including the newer systems using a 9600bps control channel
- Follows analog Motorola I, II, I/II and GE/Ericsson (EDACS) trunked radio systems
- It's preprogrammed with the most often-requested systems—if you live in a major metro area, your city's system is probably already loaded
- Expanded frequency coverage picks up local marine, police/fire, HAM, VHF-air, racing, CB, weather, FRS/GMRS/MURS and virtually every other popular scanner frequency as well
- FM/AM mode
- SAME (FIPS) weather alert
- Backlit display and keypad
- Channel scan
- Alpha display can show name of service
- Continuous Tone Controlled Selective Squelch (CTCSS) and Digital Coded Squelch (DCS) decoding
- TCXO for frequency stability; designed for new 6.25KHz channel spacing
- Frequency coverage: 25-54, 108-136.9875, 137-174, 216.0025-225, 406-512, 806-960MHz (except cellular), 1240-1300MHz
- PC interface
- Requires 4 “AA” batteries, not included

Street Price $499.99

Radio Shack Catalog #: 20-283 800MHz Scanner Antenna
Recommended for use with both brands of scanners

Designed specifically for 800MHz reception, this RadioShack Scanner Antenna is ideal for monitoring 800MHz trunked radio systems used by police, fire and emergency services.

Features:

- Compact—only 7" in height
- Male BNC connector

Street Price $14.99

Where to buy the Radio Shack PRO-96 Digital Trunking Handheld Scanner

Local Radio Shack Stores in Wake County:

Raleigh
350 E Six Forks Rd
Raleigh, NC 27609
919-835-1430

Garner
1474 Garner Station Blvd
Raleigh, NC 27603
919-772-6696

Raleigh
Capital Square
3133 Capital Boulevard
Raleigh, NC 27604
919-876-5965

Raleigh
Crab Tree Valley Mall
4325 Glenwood Ave
Raleigh, NC 27612
919-782-6028

Raleigh
Wilders Grove Shop Center
4111 New Bern Ave #127
Raleigh, NC 27610
919-231-6139

Raleigh
Mini City
4554 Capital Blvd
Raleigh, NC 27604
919-876-8775

Raleigh
Falls Village Shop Center
6643 Falls of the Neuse Rd.
Raleigh, NC 27615
919-847-1489

Cary
Crossroads Plaza
419 Crossroads Blvd
Cary, NC 27511
919-851-0332

Raleigh
Triangle Town Center
5959 Triangle Town Blvd
Raleigh, NC 27616
919-792-2051

Cary
Cary Towne Center
1105 Walnut Street
Cary, NC 27511
919-467-1879

Raleigh
Stonehenge Market
7432 Creedmoor Rd
Raleigh, NC 27613
919-847-9526

Raleigh
9660 Falls of Neuse Rd., Suite 165
Raleigh, NC 27615
919-841-1305

Morrisville
Park Place
9557 Chapel Hill Rd
Morrisville, NC 27560
919-469-4795

Fuquay Varina
Main Street Station
1009 E Broad St
Fuquay Varina, NC 27526
919-567-9986

Over the Internet At:

www.RadioShack.com

Scanners Unlimited
1199A Laurel Street,
San Carlos, CA 94070
650-573-1624
www.scannersunlimited.com

WCTRS
Frequencies and Talk groups

The WCTRS operates from seven (7) main sites located through out the county. For monitoring purposes all of these sites simulcast the control channel and repeater channels. This provides continuous coverage over all of Wake County.

To monitor the WCTRS, program the frequencies in Table 1 into your scanner. The WCTRS is currently active on about half of the allocated frequencies. As the system traffic increases more of the frequencies will be activated.

TABLE 1

ACTIVE FREQUENCIES

866.2000 MHz	Active
866.2625 MHz	Active
866.4625 MHz	Active
866.6250 MHz	Active
866.7625 MHz	Active
866.9625 MHz	Active
867.1500 MHz	Active
867.2625 MHz	Active
867.7875 MHz	Active
867.9625 MHz	Active
868.1500 MHz	Active
868.5375 MHz	Active
868.5625 MHz	Active Control Channel
868.7875 MHz	Active Control Channel

Talk groups are "channels" that are assigned to agencies for specific uses. The scanner can be configured to "scan" lists of talk groups or hold on one. The tables 2-4 list talk groups for the various agencies using the WCTRS.

TABLE 2

Wake County Fire

Talk Group ID #	Alpha Tag	Description
33088	FIRE ALERT	Fire Alert
32816	FIRE DISP 1	Fire Dispatch 1
32832	FIRE DISP 2	Fire Dispatch 2
34000	RFD ALERT	Raleigh Fire Alert
33984	HQ DISP	RFD Headquarters
36640	APEX DISP 1	APEX Fire Dispatch
32848	FIRE OPS 1	Fire Operations 1
32864	FIRE OPS 2	Fire Operations 2
32880	FIRE OPS 3	Fire Operations 3
32896	FIRE OPS 4	Fire Operations 4
32912	FIRE OPS 5	Fire Operations 5
32928	FIRE OPS 6	Fire Operations 6
32944	FIRE OPS 7	Fire Operations 7
32960	FIRE OPS 8	Fire Operations 8
33152	FIRE OPS 9	Fire Operations 9
33168	FIRE OPS 10	Fire Operations 10
33184	FIRE OPS 11	Fire Operations 11
33200	FIRE OPS 12	Fire Operations 12
32976	FIRE NORTH	Fire North
32992	FIRE SOUTH	Fire South
33008	FIRE EAST	Fire East
33024	FIRE WEST	Fire West
33216	P S TAC 13	Public Safety Tac 13
33232	P S TAC 14	Public Safety Tac 14
33248	P S TAC 15	Public Safety Tac 15
33264	P S TAC 16	Public Safety Tac 16
33280	P S TAC 17	Public Safety Tac 17
33296	P S TAC 18	Public Safety Tac 18
33312	P S TAC 19	Public Safety Tac 19
33328	P S TAC 20	Public Safety Tac 20
33344	P S TAC 21	Public Safety Tac 21
33360	P S TAC 22	Public Safety Tac 22
33376	P S TAC 23	Public Safety Tac 23
33392	P S TAC 24	Public Safety Tac 24
33408	P S TAC 25	Public Safety Tac 25
33424	P S TAC 26	Public Safety Tac 26
33440	P S TAC 27	Public Safety Tac 27
33456	P S TAC 28	Public Safety Tac 28
33488	P S TAC 29	Public Safety Tac 29

TABLE 2+Cont

33504	P S TAC 30	Public Safety Tac 30
33520	P S TAC 31	Public Safety Tac 31
33536	P S TAC 32	Public Safety Tac 32
33552	P S TAC 33	Public Safety Tac 33
33568	P S TAC 34	Public Safety Tac 34
33584	P S TAC 35	Public Safety Tac 35
33888	P S TAC 36	Public Safety Tac 36
33904	P S TAC 37	Public Safety Tac 37
33920	P S TAC 38	Public Safety Tac 38
33936	P S TAC 39	Public Safety Tac 39

Wake County EMS

TABLE 3

Talk Group ID #	Alpha Tag	Description
35168	EMS ALERT	EMS Alert
34416	EMS DISP 1	EMS Dispatch #1
34432	EMS DISP 2	EMS Dispatch 2
34448	EMS OPS 1	EMS Ops 1
34464	EMS OPS 2	EMS Ops 2
34480	EMS OPS 3	EMS Ops 3
34496	EMS OPS 4	EMS Ops 4
34800	ADMIN - CITY	EMS Admin - City
34816	ADMIN - NORTH	EMS Admin - North
34832	ADMIN - SOUTH	EMS Admin - South
34848	ADMIN - EAST	EMS Admin - East
34864	ADMIN - WEST	EMS Admin - West

Wake County Sheriff Department

TABLE 4

Talk Group ID #	Alpha Tag	Description
32016	WSODISP1	WSO Disp-Emer&Disp
32032	WSODISP2	WSO Disp-Traffic
32048	WSODISP3	WSO Disp-Check Out Ch
32064	WSODISP4	WSO Disp-Emer Alt
32112	WSOPAT1	WSO Patrol Event 1
32128	WSOPAT2	WSO Patrol Event 2
32144	WSOPAT3	WSO Patrol Event 3
32160	WSOPAT4	WSO Patrol Event 4
32176	WSOSRO1	WSO School Resource Offcr
32496	WSOWAR	WSO Patrol Warrant Sqd
32512	WSOTRANS	WSO Transport
32192	WSOSRT1	WSO Patrol SRT-Entry
32208	WSOSRT2	WSO Patrol SRT-Negotiator
32224	WSOSRT3	WSO Patrol SRT-Ops
32240	WSOCID1	WSO CID 1
32256	WSOCID2	WSO CID 2
32272	WSOCID3	WSO CID 3

TABLE 4+Cont

32288	WSODV1	WSO CID 4-D&V
32304	WSODV2	WSO CID 5-D&V
32320	WSODV3	WSO CID 6-D&V
32336	WSOJUD1	WSO Judic Svc-Field
32352	WSOJUD2	WSO Judic Svc-Field
25712	WSOCOURTS	WSO Judic Svc-Courts
32384	WSOMOP1	WSO Mutual Ops 1-Future
32400	WSOMOP2	WSO Mutual Ops 2-Future
32416	WSOMOP3	WSO Mutual Ops 3-Future
32432	WSOMOP4	WSO Mutual Ops 4-Future
32624	WSODET1	WSO Detention 1-PSC
25616	WSODET2	WSO Detention 2-Hammond
32448	WSODET3	WSO Detention 3-Transport
32480	WSO TRAIN	WSO Admin Training

Fuquay-Varina

TABLE 5

Talk Group ID #	Alpha Tag	Description
35200	FV_DISP	Fuquay-Varina PD Disp1
35216	FV_PAT1	Fuquay-Varina PD Patrol 1
35232	FV_TRAF1	Fuquay-Varina PD Traffic 1
35248	FV_IVES1	Fuquay-Varina PD Invest 1
35264	FV_CA1	Fuquay-Varina PD Comm Aff 1
35312	FV_PAT2	Fuquay-Varina PD Patrol 2
35328	FV_IVES2	Fuquay-Varina PD Invest 2
35344	FV_CA2	Fuquay-Varina PD Comm Aff 2
35664	FV_PAT3	Fuquay-Varina PD Patrol 3
35648	FV_IVES3	Fuquay-Varina PD Invest 3
35632	FV_CA3	Fuquay-Varina PD Comm Aff 3

Garner

TABLE 6

Talk Group ID #	Alpha Tag	Description
35376	G_PDDISP	Garner PD Dispatch
35392	G_PDOPS2	Garner PD Ops 2
35408	G_PDOPS3	Garner PD Ops 3
35424	G_PDOPS4	Garner PD Ops 4
35472	G_PDSRT1	Garner PD SRT 1
35488	G_PDSRT2	Garner PD SRT 2
35504	G_PDSRT3	Garner PD SRT 3
35520	G_PDIVES	Garner PD Invest
35536	G_PDADMN	Garner PD Admin
35584	G_PDTAC	Garner PD Tactical

LE

TABLE 7

Talk Group ID #	Alpha Tag	Description
35680	LEEAST_DISP	LE East (Region)

Wendell

TABLE 8

Talk Group ID #	Alpha Tag	Description
35744	W_PDOPS1	Wendell PD Ops 1
35760	W_PDOPS2	Wendell PD Ops2
35776	W_PDADMN	Wendell PD Admin

Zebulon

TABLE 9

Talk Group ID #	Alpha Tag	Description
35824	Z_PDOPS1	Zebulon PD Ops 1
35840	Z_PDOPS2	Zebulon PD Ops 2
35856	Z_PDADMN	Zebulon PD Admin

Knightdale

TABLE 10

Talk Group ID #	Alpha Tag	Description
35888	K_PDOPS1	Knightdale PD Ops1
35904	K_PDOPS2	Knightdale PD Ops2
35920	K_PDADMN	Knightdale PD Admin

Wake Forest

TABLE 11

Talk Group ID #	Alpha Tag	Description
35952	WF_PDDISP	Wake Forest PD Disp
35968	WF_PDTAC1	Wake Forest PD TAC 1
35984	WF_PDTAC2	Wake Forest PD TAC 2
36000	WF_PDTAC3	Wake Forest PD TAC 3
36016	WF_PDADMN	Wake Forest PD Admin
36032	WF_PDCOM	Wake Forest PD Comm
36048	WF_PDSWAT	Wake Forest PD Tact Swat
36080	WF_PDD&V	Wake Forest Drug & Vice

Rolesville

TABLE 12

Talk Group ID #	Alpha Tag	Description
36096	RV_PD1	Rolesville PD 1
36112	RV_PD2	Rolesville PD 2

Holly Springs

TABLE 13

Talk Group ID #	Alpha Tag	Description
37760	HS_PDDISP	Holly Springs PD Disp
37776	HS_FDDISP	Holly Springs FD Disp
37792	HS_OPS1	Holly Springs PD Ops 1
37808	HS_OPS2	Holly Springs PD Ops 2

Apex

TABLE 14

Talk Group ID #	Alpha Tag	Description
27248	AP FDEMS	Apex DS & EMS Disp

Programming equipment

Uniden American Corporation BC296D and BC 296D

Programming Type 2/Digital 800 MHz Systems

To program a Type 2/Digital 800 MHz system, you need to know the frequencies that the system uses. Please refer to the frequency list in this guideline.

1. Select the trunk-programming mode.
   2:SCAN OPTION → 2:TRUNK
2. Use the scroll bar to select the bank you want to program, then press **E**.
   1:TRUNK TYPE → 1:ON
3. Select one of the following trunk types for Motorola Type 2 or digital Systems:
   1:TYPE2/P25 800

Motorola Type 2 or Digital systems in the 800 MHz band

4. Select the channel to store the information into.
   2:TRUNK CHANNEL

Use the scroll bar to select a channel within the bank to store a system frequency, then press **E**.

5. Store the channel information
   1:FREQUENCY

Enter the frequency for the channel, then enter an Alpha Tag for the channel.
Repeat Steps 4 and 5 to store the rest of the frequencies for the system.

Programming Talkgroups

For many of the trunk scanning features to operate, you need to program the scanner with the talkgroup ID's. Each bank can store up to 100 talkgroups in 10 ID groups of 10 talkgroups each. Group similar talkgroups together in the same ID group. When scanning, you can turn ID groups on and off with a quick keypress.

Storing Known Talkgroups

Follow these steps to store talkgroups that are listed in this guidline.

2:SCAN OPTION → 2:TRUNK → Select the bank→ 3:TALK GROUP

1. Use the scroll bar to select the talkgroup to program, then press **E**.
2. Select 1:ID and press **E**.
3. Enter the up to 5-digit talkgroup ID, then press **E**.

Note: If you replace an existing ID, the alpha tag is also deleted.

4. Select
   2:ALPHA TAG and press **E**.
5. Enter the alpha tag for the talkgroup.

Note: The alpha tag defaults to the numeric talkgroup ID.

6. If you want the scanner to beep three times to alert you when the talkgroup is active, select
   3:BEEP ALERT and press **E**; then, select 1:ON.
7. Press **MENU/BACK**.

Repeat this procedure for each talkgroup in the system.

Radio Shack Corporation PRO-96

Programming Motorola analog, digital, and APCO-25 trunking systems

1. Press PGM and FUNC then ▲ or ▼ to select the desired channel storage bank to program.
2. Press TRUNK to access the ID list and set the correct trunking bank type. If the bank has never been programmed with a trunking system, the scanner will display 'Not trunked!' Press mode.
3. Press MODE until MOT (Motorola) appears in the display. This sets the channel storage bank for Motorola operation.
4. Press PGM to return to the channel storage bank.
5. Select a channel to begin programming trunking system frequencies. Used direct channel entry or the ▲ or ▼ keys. Please refer to the frequency list in this guideline.
6. Enter the trunking frequency and press ENTER. If necessary, press MODE to change the receiving mode to MOT.
7. Repeat Steps 5 and 6 to enter the other trunking system control channel frequencies for the system you wish to monitor.

Programming Talkgroups

Each channel storage bank has an associated talkgroup ID list, for a total of 10 talkgroup ID lists. Each ID list has 5 sub-banks. Each sub-bank has 30 ID locations. You can program up to 150 talkgroup IDs in each bank, so you can program up to 1500 talkgroup IDs in 10 banks.

1. Navigate to a channel in the desired trunking bank using MAN or the ▲ or ▼ keys
2. Press PGM.
3. Press TRUNK.
4. Select the ID memory you wish to edit using any of the methods described above.
5. Enter the up to 5-digit talkgroup ID and press ENTER.
6. If you want to tag the ID, press TEXT, enter the desired text tag for the ID. Then press ENTER.
7. To store the next ID memory in sequence, press p and repeat Step 5.
8. Press SCAN to start scanning.

Use the following keystrokes to navigate through the ID lists:
· Press PGM TRUNK to enter the ID list for the current channel storage bank.
· Press and release the ▲ or ▼ keys to scroll through the ID memories one at a time.
· Press and hold the ▲ or ▼ keys to scroll through the ID memories rapidly.
· Press TRUNK to advance to the next ID sub-bank.
· Press FUNC ▲ or ▼ to advance to the next or previous ID list.

Glossary of Terms

Alphanumeric Display - Allows you to enter a "Title/Name" for each Bank, Talk Group and Channel. When the scanner stops on a Talk Group you will actually see the title of the talk group you are monitoring.

Alpha Tag - This term refers to an alphanumeric text tag that you can enter to describe the individual frequencies that you have programmed. Rather than having to associate a specific frequency to the individuals that are using it, you can enter the actual name of the group. This will eliminate the need for memorizing the group's frequency.

APCO – Association of Public Safety Communications Officials.

APCO Project 25 – A user-driven effort to develop a digital standard for wireless communications users. These standards enable critical communications for the safety and security of communities across North America and the world. In emergency situations, Project 25 users can communicate with other agencies and mutual aid response teams. Project 25 wireless mission critical communications user needs include these key digital standard attributes**:**

Backward compatibility and graceful migration.
Scalable Trunked and Conventional capabilities
Spectral efficiency.
Interoperability

C4FM – Compatible 4 level FM - A modulation process used in Project 25 Phase I digital radio deployment that reduces the channel bandwidth down to 12.5kHz.

Control Channel - This is the frequency within a trunking system that runs the system. On Control Channels (sometimes called Data Channels) you will hear a buzz saw sound. For the most part, it is the sound of the system's central computer directing talkgroups to particular voice (working) frequencies within the system.

CQPSK – Compatible Quadrature Phase Shift Keying - a modulation process used in Project 25 Phase II digital radio deployment that reduces the channel bandwidth down to 6.25kHz.

Scan List - When you designate a bank to be a trunking bank, your scanner sets up Scan Lists, which are simply list of your favorite Talkgroup IDs. These lists are designed to help you organize the trunking system users into categories.

Talkgroup - A group of users within a trunked system that communicates with one another. Since a trunked system shares multiple frequencies, various numbers (trunking ID or talk group ID) are assigned to each department within the system. The number assigned to the department you wish to monitor must be entered into the scanner in order for you to monitor the agency.

Trunked Radio System - Conventional scanning is a simple concept. You enter a radio frequency in your scanner's memory, which is used by someone you want to monitor. For example, the police in your area may broadcast on 460.500 MHz, the fire department on 154.190 MHz, the highway department on 37.900 MHz, etc. So when your scanner stops on a frequency,

you usually know who it is, and more importantly, you can stop on a channel and listen to an entire conversation. This type of scanning is simple and easy to set up and find.

As the demand for public communications has increased, many public radio users don't have enough frequencies. To use a limited amount of radio frequency efficiently, trunking radio systems were developed.

In a trunked radio system, which contains up to 28 different frequencies, radio users are divided into groups, often called talk groups, and these talk groups are assigned specific IDs. When someone in a talk group uses their radio, a brief burst of data is broadcasted before each transmission. The trunking system computer uses this data to temporarily assign each radio in a talk group to an available frequency. If the group using a frequency stops broadcasting or pauses between replies for a few seconds, they are removed from the frequency so another talk group can use it.

Sharing of the available public service frequencies, or trunking, allows cities, counties, or other agencies to accommodate hundreds of users with relatively few frequencies. Following a conversation on a trunked system using a conventional scanner is difficult, if not impossible. When there is a short break during the conversation you are monitoring, it is possible that the talk group will be assigned to a completely different frequency in the trunked system. This type of scanning is more complex. Trunk tracking technology solves this problem and allows you to monitor the entire conversation; no matter how many times the system changes frequencies.

Acknowledgements

Radioreference.com

P25.com

Ifrsys.com

Motorola.com

Uniden American Corporation
- BC796D APCO P-25 Digital Scanner User Manual
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Radio Shack Corporation
- PRO-96 Digital Trunking Handheld Scanner User Manual