The Best Just Got Better
Uniden's BCD396XT

By Larry Van Horn, N5FPW

Bob Grove said the BCD396T handheld, "is the most advanced scanner ever designed." And when you looked at all the scanning capability built into that small package, no truer words were ever spoken. Now Uniden has released an updated version of the venerable 396 and it made a great scanner into a super scanner.

❖ Case, Controls and the Antenna

The BCD396XT is a direct descendant of the popular BC396T handheld scanner. Many of the primary features found in the earlier unit apply to this new handheld.

The 396 case measures 2.40 (W) x 1.22 (D) x 5.35 (H) inches and weighs in at 9.6 ounces with batteries, and about four ounces without.

There is a multi-color backlight system for the 1-5/16 by 13/16-inch liquid crystal display.

There are four user-selectable menu options for display backlighting: backlight on for 10 or 30 seconds (push button selectable), squelch (backlight illuminates when the squelch opens and stays on for five seconds), keypress (backlight turns on when any key is pressed then stays on for 10 seconds), and infinite (backlight turns on when you press the multi-function power on/off key, then stays on until you press it again).

The screen backlight can be tied to a channel alert, so even though dark blue might not be good for normal viewing, it is useful to indicate a channel alert (the display briefly changes to the alert color, then reverts to the normal selected blacklight color after the alert). Available LCD backlight colors include red, blue, magenta, green, white, yellow and cyan.

The keyboard backlight is not tied to the LCD backlight color selection; it is always white.

There is only one knob (scroll type) on the top of the unit that controls a variety of the scanner's functions depending on other controls being depressed. The multi-function scroll knob is used to set volume and squelch levels, adjust menu settings, enter text, change channels in the hold mode, resume scanning, and change display screens.

There are two push buttons on the side of the 396XT that perform the same operations as the buttons on the side of the 396T – function and menu selections. These controls are the heart of the scanner's menu, display, and additional control functions in conjunction with keys on the front of the scanner.

The 396XT uses a flexible antenna with an SMA connector. They have included a BNC to SMA adapter for additional antenna connection options. Antenna jack impedance is 50 ohms.

❖ It's what is under the hood that counts.

Given all of the recent concern over rebanding in the 800 MHz band, you won't have a problem with the 396XT. The memory unit can be re-flashed via your computer so it can handle any rebanding situation you might encounter.

Looking inside the radio, I found a world of scanning capability. Here are some of the features that BC396XT owners will be familiar with.

MT RATING: 4 3/4 STARS

APCO25 Digital audio decoding
Adaptive digital threshold that automatically sets the digital decode threshold for APCO 25 systems. Our field test indicates that this unit is a substantial improvement in this regard over the 396T.
TrunkTracker IV trunk tracker technology with control-channel only scanning and I-Call monitoring.
Close call signal capture
Supports step sizes of 5, 6.25, 7.5, 8.33, 10, 12.5, 15, 20, 25, 50 or 100 kHz
Fire tone out alert
Motorola control channel only trunking
DCS/CTCSS/NAC rapid decode
Scan and (selected) service searches. You won't have to select just one or the other.
A frequency/ID auto store function that automatically stores frequencies from a service or limit search into a conventional system or store talk group IDs into a trunked system,
16 character text tagging for each system, group, channel, talkgroup, search range, and SAME group
Compatible with the Uniden BC-RH96 remote head accessory.
Analog and digital AGC functions.
Quick search; 12 service searches (Public safety, news, ham radio, marine, railroad, air (military and civilian), CB radio, FRS/GMRS, racing, FM broadcast, and special itinerant; and custom search that lets you program up to 10 search ranges.
SAME weather alert and weather priority
Priority scan with priority plus.
Signal strength display, battery level display on the LCD.
LCD and keypad backlight
Adjustable (0 to 5 seconds) scan delay
Adjustable Hold (scan duration 0 to 255 seconds) per system, custom or service search
Strong signal attenuation
Upgradeable firmware
Channel alert
Independent alert tone volume lets you set the volume level of the following tones: Key Beep, Emergency Alert, Channel Alert, and Close Call Alert
Repeater reverse
Broadcast signal ignore while searching (TV and radio station frequencies, pagers, etc)
Duplicate channel alert
Key Lock
PC Programming and control
Wired cloning (will only clone to another BCD396XT)
A battery saver mode

❖ New Trunk Tracking Capability

The BCD396XT is a Trunk Tracker IV© model scanner. This lets the user follow unencrypted conversations on the following trunk radio systems: Motorola Type I; Motorola Type II; Motorola Type IIi Hybrid; Motorola Type II Smartnet; Motorola Type II Smartzone; Motorola Type II Smartzone Omnilink; Motorola Type II VOC; EDACS Standard (Wide); EDACS Standard Networked; EDACS Narrowband (Narrow); EDACS Narrowband Networked; EDACS SCAT; EDACS ESK (will not decode ProVoice); LTR Standard; and Project 25 Standard.

The 396XT will receive the following voice systems: Analog; Analog and APCO-25 Common Air Interface (P16); and APCO-25 Common Air Interface Exclusive (P25).

Trunk systems in VHF, UHF, the new 700 MHz public safety band, 800 MHz, and 900 MHz bands can be programmed. This includes trunk systems now being installed by the Department of Defense in the new 380-399.9 MHz LMR sub-band. The scanner can also scan both conventional and trunked systems at the same time.

In addition, the 396XT can monitor certain trunk systems using control channel trunking. If the scanner is set to scan trunk frequencies, the user can track the trunk system using only control channel data. You do not have to program all of the system's voice channel frequencies into memory in this mode as long as *all* possible control channels have been programmed into the scanner.

❖ So What Has Been Added?

So is it worth upgrading from your BCD396T to a new BCD396XT? With the new feature set listed below, the answer to that question is a resounding "Yes!" There are a lot of new features incorporated into the 396XT, a lot of them based on feedback from owners of the 396T scanner.

The ability to manually select a specific programmed channel in the older Uniden dynamic allocation memory scanners was one of the biggest complaints by the old channel and bank scanner crowd. With this new system/channel number tagging feature in the 396XT, you now have rapid access to a specific system or channel. More information is available on this at **http://info.uniden.com/twiki/bin/view/UnidenMan4/NumberTags**

Intermediate Frequency Exchange changes the IF used for a selected scanner frequency to help avoid image and other mixer-product interference on that frequency.

A new band scope provides a graphic representation of signal activity on the display. You can get more information on this feature at **http://info.uniden.com/twiki/bin/view/UnidenMan4/BandScopeMode**

Quick-Access Search Keys – This scanner has three search keys that you can assign to a special search range. More information is available at **http://info.uniden.com/twiki/bin/view/UnidenMan4/SearchKeys**

This new scanner has support for P25 conventional channel monitoring that includes NAC and talk group ID user differentiation (P25 One-Frequency Trunk).

Another new feature is Control Channel Data Output that permits the analysis of control channel data without the need to perform invasive modifications to the scanner. You can now use software programs such as Unitrunker and Pro96Com to analyze or monitor trunk radio systems.

Private Systems lets you flag a system so that it cannot be read out of the scanner or modified. There is also a Key Safe mode that, once set, lets you hand the scanner to a novice user without fear that they will modify the programming in the unit.

Other new features include:

NAC decoding of all P25 signals
Ability to flag a channel as digital, analog or all
Multi-site system support like its 996T cousin
Close call temporary store (last 10 hits)
GPS support for location-based scanning, location alerts, and crows-flight navigation. (Note: The GPS unit is not provided and must be purchased separately)
Independent GPS control of sites and channel groups
Fire tone out search has a built-in frequency counter to display the received tones
A temporary lockout feature
Startup configurations. You can learn more about this feature at http://info.uniden.com/twiki/bin/view/UnidenMan4/StartupKeys
Individual channel volume offset
Priority ID scan on trunked radio systems
Preemptive priority on Motorola analog systems
Negative channel dropout delay (forced resume)
P25 Low-Pass Filter – On some systems you can hear a tone that is an artifact of the 4.096 kHz sampling rate. Turning on this filter effectively filters out the tone

❖ What's in the box?

In addition to the BCD396T scanner, accessories included in the box include a PC interface cable, three "AA" 2250 mAH rechargeable batteries, wrist strap, AC adapter/charger, swivel belt clip, rubber duck antenna, BNC/SMA adapter, and an owners manual on CD.

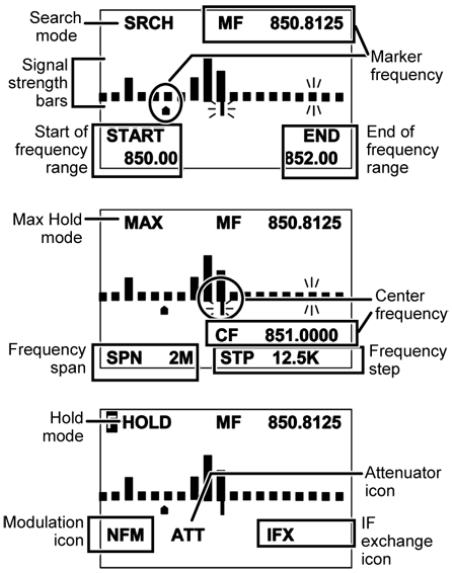
❖ Overall Rating and Final Thoughts

There is a lot to like about this handheld scanner. Even though the audio amplifier system supplies 90 mW less audio, Uniden has done some re-engineering and the audio is definitely an improvement over the 396T. The 396T had a hissy and muddled sound, but I did not note that in the side by side test I conducted.

APCO25 digital audio was also a major complaint and Uniden seems to have put those problems behind them as well. The unit performed well on the four trunk/conventional systems on which I tested the unit. I did not hear any motorboating, and when compared with the 396T, I did note a definite reduction in watery audio. I also saw better rates and fewer drop outs on the 396XT.

MT FIRST LOOK RATING (0-10 SCALE)

Audio Quality	9
Audio Levels	10
Backlight/Display	7
Battery Life	8
Ease of Use	8
(programming is much easier with computer software)	
Feature Set	9
Keyboard/Button/Control Layout	9
Overall Construction	9
Overall Reception	9
Owners Manual	
media on which it is presented...	5
content	8
Sensitivity	8
Selectivity	7



The multi-colored backlight of the display is a neat feature, but, when using lower contrast settings, on most of the colors the display is hard to read. I would dump that lousy blue color in favor of a bright orange color as used on the BC-330 or BC-246.

There is no UASD programming software as of presstime, and without it, programming this scanner can be laborious. Based on our conversations with Uniden, UASD software will be available soon. In the meantime, I have published in our specifications table a couple of software packages that are available right now, including FreeScan. FreeScan works okay with the 396XT I tested, but I did get some timeouts from time to time.

On the VHF High bands and above, the receive sensitivity on our test unit was definitely better than the 396T and 996T units against which it was tested. No major intermodulation issues were noted at our rural location.

But there are a couple of negatives. There is NO printed manual. You do get a CD-ROM with the user manual and additional material on it, but you will have to have a computer in order to use it. There is an up-to-date manual online and changes are made to it as they are discovered by the Uniden team, but that also requires a computer and internet connection in order to use it.

I really think some sort of printed manual with at least the basics required to program the radio is important for users who do not have computer capability or access to one when they need to program the radio. Are you listening in Fort Worth?

As mentioned above, I still don't like the backlight colors. Fortunately there are more options on this unit than the cobalt blue colored screen on the 396T. The white color wasn't too bad, but it was a little hard on the eyes over time.

While not a Uniden problem, I could not get the 396XT to work with Unitrunker, even though that radio is listed as being supported. I understand that others have had the same problem.

Bottom line – Uniden has released yet another new scanner with cutting edge technology. No one in the scanner marketplace right now offers a scanner in handheld or base/mobile model that has the frequency coverage or the listening capability that this unit has.

The new Uniden BCD396XT handheld is truly another marvel of modern scanning technology. The best just got a quantum leap better.

The Uniden BCD396XT (SCN 53) is available from *Grove Enterprises* (1-800-438-8155 or http://www.grove-enterprises.com) for $519.95 plus shipping and handling.

Table One: BCD396XT Frequency Coverage

Frequency (MHz) Freq Range (MHz)	Default Modulation	Step (kHz)
25.0000 – 27.9950	AM	5
28.0000 – 29.6800	NFM	20
29.7000 – 49.9900	NFM	10
50.0000 – 53.9800	NFM	20
54.0000 – 71.9500	WFM	50
72.0000 – 75.9950	FM	5
76.0000 – 87.9500	WFM	50
88.0000 – 107.9000	WFM	100
108.0000 – 136.9916	AM	8.33
137.0000 – 143.9875	NFM	12.5
144.0000 – 147.9950	NFM	5
148.0000 – 150.7875	NFM	12.5
150.8000 – 161.9950	NFM	5
162.0000 – 173.9875	NFM	12.5
174.0000 – 215.9500	WFM	50
216.0000 – 224.9800	NFM	20
225.0000 – 379.9750	AM	25
380.0000 – 512.0000	NFM	12.5
763.0000 – 805.99375	NFM	6.25
806.0000 – 960.0000	NFM	12.5
1240.0000 – 1300.0000	NFM	25

Note: The scanner's frequency coverage is not continuous and does not include the cellular telephone, UHF TV bands, or the 960-1240 MHz ranges.

Table Two: Scanner Specifications *(Manufacturer Supplied)*

Sensitivity (nominal) 12dB SINAD/Signal Noise Ratio (nominal)

Sensitivity Ratio	*Signal Noise MHz*	*Frequency Range*	*Mode*
0.4 µV	50 db	25 – 27.995	AM
0.3 µV	41 db	28 – 53.98	NFM
0.5 µV	55 db	54 – 71.95	WFM
0.2 µV	47 db	72 – 75.995z	FM
0.4 µV	60 db	76 – 107.9	WFM
0.3 µV	50 db	108 – 136.9916	AM
0.3 µV	41 db	137 – 173.9875	NFM
0.5 µV	55 db	174 – 215.95	WFM
0.3 µV	40 db	216 – 224.98	NFM
0.3 µV	51 db	225 – 379.975	AM
0.3 µV	40 db	380 – 512	NFM
0.3 µV	41 db	763 – 960	NFM
0.5 µV	37 db	1240 – 1300	NFM

Close Call Sensitivity (nominal)

350 µV	VHF Low 1 Band
160 µV	VHF Low 2 Band
70 µV	Air Band
60 µV	VHF High 1 Band
56 µV	VHF High 2 Band
100 µV	UHF Band
200 µV	800 MHz and above

Heterodyne System (triple conversion)

1st Intermediate Frequency:	380.7 to 380.8 MHz/265.5 to 265.6 MHz
2nd Intermediate Frequency:	10.8 MHz
3rd Intermediate Frequency:	450 kHz

System Performance

Attenuation:	20 dB nominal
Audio Output Power:	310 mW nominal into a 24-ohm speaker and 20 mW nominal into a 32 ohm stereo headphone.
Scan Rate:	100 channels per second (conventional mode)
Search Rate:	300 steps per second (using 5 kHz steps)

Dynamic Memory Allocation

Systems:	500 maximum
Groups:	20 per system maximum
Site:	1,000 maximum (all), 256 per system
Channels:	25,000 maximum (40128 memory blocks)
Channels per trunked system:	500 maximum
Talkgroups per trunked system:	500 maximum
Channels per conventional system:	1,000 maximum
System Quick Key range:	0-99
Group Quick Key range:	0-9
Startup Keys:	10
System Number Tagging:	999
Channel Number Tagging:	999

External Jacks

Antenna Jack:	SMA Type
Phone Jack:	3.5 mm (1/8 inch) stereo type
DC Power Jack:	EIAJ type center positive
GPS/Remote interface jack:	Four pin mini type

Miscellaneous Specifications

Internal Speaker:	24-ohm, 0.8 Watts maximum (1.26 inches)
Power Requirements:	Three AA size rechargeable Ni-MH batteries (2250 mAh) included; three AA size alkaline batteries (not included)
AC Adapter:	6 Volts DC, 800 mA regulated (AD-1001)
Operating Temperature	Nominal: -20°C to +60° (-4°F to +140°F)
Close Call:	-10°C to +60°C (+14°F to +140°F)
Size:	2.40 inches(wide) by 1.22 inches (deep) by 5.35 inches (high) without antenna
Weight:	0.37 lbs (without battery and antenna)
Remote Functions:	Direct PC control, database management and wired cloning
Display:	64 by 128 full dot matrix LCD with multi-color back light

Special Functions

Band Scope Function:	Frequency span 0.2 MHz To 500 MHz with 5 kHz to 100 kHz frequency steps
Two-Tone-Sequential:	250.0-3500.0 Hz, 0.1 Hz programmable steps
Weather alert:	1050 Hz tone system with NWR-SAME system (Warning/Watch/Statement alerts)

Supporting Software (at presstime)
Freescan **http://scannow.org/**
ProScan (shareware, 30 day free demo) **www.proscan.org/**

Note: Features, specifications, and availability of optional accessories are all subject to change without notice by the manufacturer. Review presented above was based on the test unit provided by the manufacturer.

Digital Digest continued from page 31

N020YN	Scotia, NY
N040CN	Latham, NC
N070EN	Lincoln, NE
N080DN	Bismark, ND
N060MN	Santa Fe, NM
N090VN	Carson City, NV
O050HN	Columbus, OH
O060KN	Oklahoma City, OK
O100RN	Salem, OR
P020RN	San Juan, Puerto Rico
P030AN	Annville, PA
R010IN	Cranston, RI
SO40CN	Columbia, SC
S080DN	Rapid City, SD
T040NN	Nashville, TN
T060XN	Austin, TX
U080TN	Draper, UT
V010TN	Colchester, VT
V020IN	St Croix, US Virgin Islands
V030AN	Fort Pickett, VA
W030VN	Charleston, WV
W050IN	Madison, WI
W080YN	Cheyenne, WY
W100AN	Tacoma, WA

HQ703N National Guard Readiness Center (Arlington, VA)
HQ701N National Guard Bureau HQ (Arlington, VA)

The participants in the network are also known to pass short text messages among each other using the AMD facility of ALE. Here are a few examples exchanges of both types of traffic:

[TO]HQ703N [LQA] MULTIPATH - SINAD 11 BER 02 [THIS IS]T040NN
[TO]T040NN [LQA] MULTIPATH - SINAD 12 BER 00 [THIS IS]HQ703N

[TO]HQ703N [AMD] HOWDY FROM WYOMING PARDNER [THIS IS]W080YN

❖ Is there more than just ALE?

What appears to have been missed by all the previous reports of the state HQ network, is that the ALE often triggers MIL-188-110A high-speed modem activity.

Having logged 110A modem activity from this network in the past, I noted that the initial traffic passed between the stations seemed to have elements in common with the Swiss Diplomatic Service's HF network. Spurred on by some success in unraveling the Swiss MFA traffic (see this column's edition in the *MT* April 2009 issue), I decided to look at this network in more detail.

Just like the Swiss MFA network, the majority of traffic is encrypted. However, there are some leaky parts of the system that reveal the sender and receiver of the high-speed traffic and the email addresses used by the underlying encrypted messaging software.

Here's a typical opening exchange between two stations after the ALE trigger, as viewed in 8 bit synchronous mode using the Hoka Code300-32 software.

DATA RATE 300 SHORT INTERLEAVER
\\\ì;07QH010N8PN3NHA#Á]°v–
[EOM]

DATA RATE 75 LONG INTERLEAVER
\\\ì807QH010V8ÄN3NTAÁ•íÏ
[EOM]

Reading backwards, you can see four letters of the ALE identifiers of the two stations involved: HQ07 and V010 after the opening "\\\".

This same "header" scheme is preserved when the traffic proper starts:

DATA RATE 2400 LONG INTERLEAVER
\\\ì:07QH010V&8∞N3NTA'-m±&ú[»wmtuser@HQ703N.ngb.hf.army.mil≠—=%Fwmtuser@V010TN.ngb.hf.army.milY≠ã•Vkì¢H˝ºF¯Yg$$p2*&¢{¢[_Âc∂7&ìΣ
etc
[EOM]

Here you can clearly see the email addresses used by the stations, in this case the Readiness Center at Arlington and the Vermont HQ. The format of the addresses seems consistent across all stations:

wmtuser@ALEID.ngb.hf.army.mil

Some concentrated monitoring of a number of frequencies has revealed nothing more enlightening with the traffic between stations which, in general, seems fairly light at no more than a few messages between Arlington and outstations each day. Perhaps some more interesting things will appear during the next emergency or training exercise.

If you have a Windows PC, try the free RFSM2400 software (See Resources) and decode some of the high-speed modem traffic yourself.

That's all for this month. See you next time.

RESOURCES

RFSM2400 MIL-188-110A Software
rfsm2400.radioscanner.ru