DR-1X SCOM 7330 CAT WX-250 Wiring Diagram

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For more information, visit: <u>http://www.wa8kim.com/repeater.html</u>

The document assumes that you have Justin Reed NV8Q's <u>Digital/Analog Interfacing Technique</u> setup up and running on your repeater. This document provides instructions on how to add the CAT Controller's WX-250 Weather Alert unit to your SCOM 7330 and Yaesu DR-1X repeater setup.

Features:

- Forces the DR-1X to FIXED Analog whenever the WX-250 activates.
- Adds a CTCSS tone whenever the WX-250 activates.
- Prevents the DR-1X from locking into TX mode whenever the WX-250 activates.
- Whenever the WX-250 indicates a severe weather **watch**, it activates the SCOM's Logic Input 1. I programmed the SCOM to add a short weather alert buzz before the courtesy beep. This informs everyone that there's an active weather watch with each transmission. It also changes the SCOM's Initial and Normal ID to announce a "Severe weather watch". When the watch is over, the repeater returns to normal operation.
- Whenever the WX-250 indicates a severe weather warning, it activates the SCOM's Logic Input
 I programmed the SCOM to add a different short weather alert buzz before the courtesy beep. This informs everyone that there's an active weather warning with each transmission. It also changes the SCOM's Initial and Normal ID to announce a "Severe weather warning". "When the warning is over, the repeater returns to normal operation.

A Little History Of Why I Made The Three Separate Wiring Harnesses (Instead Of One Big One)

This document provides instructions on how to make two harnesses. The third wiring harness is included in NV8Q's instructions.

- Rather than make one large harness to link the SCOM 7330, WX-250, and the DR-1X, I made three harnesses, primarily because my setup originally had a Kenwood TKR-851 repeater instead of a DR-1X.
- I also wanted to allow for future hardware upgrades without having to build all new harnesses.

Why Do I Need These Wiring Harnesses?

- <u>Wiring Harness #1</u>: This is the main wiring harness to connect the WX-250 to the SCOM and DR-1X.
- <u>Wiring Harness #2</u>: The purpose of this harness (jumper) is to inject a CTCSS signal to the repeater and to set the DR-1X repeater into analog mode whenever the WX-250 transmits. The WX-250 does not have a CTCSS encoder. Without this setup, no CTCSS tone is generated and therefore all radios with receive CTCSS squelch enabled will never hear the weather alert.
- <u>WX-250 Transmit Sense Wire Tap</u>: When the WX-250 transmits while using NV8Q's modification, the DR-1X Repeater (firmware v1.00b) will quit transmitting and essentially lock up. This modification prevents that. When the SCOM 7330 senses the WX-250 is transmitting (Logic Input 3), it will force the repeater into FIXED analog mode and activate the PTT. (*Note: We want a wire to go to ground whenever the WX-250 is active, but it must be isolated from the actual repeater's PTT connection. Therefore we are tapping into the WX-250's PTT relay circuit. The diode is connected to the PTT relay... the diode's just an easier place to solder the wire tap)*

This Setup Requires The Following Hardware:

- 1. <u>Communications Specialists SS-64</u> CTCSS tone encoder.
- 2. (1) DE15HD (VGA) Male connector, terminals, housing.
- 3. (1) DE15HD (VGA) Female connector, terminals, housing.
- 4. (1) DB9 Male connector, terminals, housing.
- 5. (1) DB9 Female connector, terminals, housing.
- 6. (1) DB15 Male connector, terminals, housing. (Supplied with the WX-250)
- 7. (1) DB25 Male connector, terminals, housing. (Supplied with the SCOM 7330)
- 8. Minimum 7 conductor cable or 7 wires

This setup was running and tested on the Yaesu DR-1X firmware v1.00b.

Click the link below to view a short YouTube video of this setup in operation: <u>https://youtu.be/MwoymnLz3pU</u>

Wiring Harness #1: <u>CAT WX-250 to SCOM 7330 Wiring Harness Jumper</u>

(Chart Version – See next page for graphical version of same wiring harness)

CAT WX-250 DB15 Male	SCOM 7330 DB9 Male Port 1	From Repeater DB9 Female ("Radio Port" on NV&Q's Diagram)	SCOM 7330 DB25 Male I/O
	1 RX Audio Center	1 RX Audio Center	
	2 RX COR	2 RX COR	
	3 CTCSS Decode	3 CTCSS Decode	
	6 RX Audio Ground	6 RX Audio Ground	
	7 CTCSS Ground	7 CTCSS Ground	
	8 CTCSS Center	8 CTCSS Center	
1 PTT Ground (Jumper to 15)			
2 PTT Input	4 TX PTT *		
3 PTT Output		4 TX PTT *	
4 wX Disable			4 Logic Output 4
5			
6 WX Alert Stop			
7 WX Alert Start			
8 Ground	9 TX Audio Ground	9 TX Audio Ground	
9 wX Enable			5 Logic Output 5
10 TX Audio In	5 TX Audio		
11 TX Audio Out		5 TX Audio	
12 WX Advisory			
13 wx watch			10 Logic Input 1
14 WX Warning			11 Logic Input 2
15 Ground (Jumper to 15 also)			17 Ground
			12 Logic Input 3 (To WX-250 PTT Tap: See Pg.9)

* 4 TX PTT: I designed my harness to work with any repeater. When used with NV8Q's script on the DR-1X, though, connect these two wires together and DO NOT connect them to the WX-250

(This bypasses the WX-250's internet PTT circuit and allows the SCOM 7330 to fully control the PTT. Without this modification, the repeater locks up in transmit whenever the WX-250 broadcasts)



script on the DR-1X, though, connect these two wires together and DO NOT connect them to the WX-250. (This bypasses the WX-250's internet PTT circuit and allows the SCOM 7330 to fully control the PTT. Without this modification, the repeater locks up in transmit whenever the WX-250 broadcasts)

Wiring Harness #1: CAT WX-250 to SCOM 7330 Wiring Harness Jumper



(Click on image to download full size image)

Wiring Harness #1 is circled.

The harness to the right of the circle was built to add a CAT RLS-1000B Board.

The short harness above the circle is a conversion cable for the RLS-1000B. (My EchoLink was previously connected to the SCOM's Port 3. I made this harness so that I would not have to re-wire the EchoLink's cable)

Wiring Harness #2:

CAT WX-250 to DR-1X Wiring Harness Jumper (Pictures of assembled unit on next page)

From CAT WX-250 DB15 VGA Female	To DR-1X DB15 VGA Male	SS-64 (Supplied Cable)
1 Base (Jumpered 1 & 2) 2 PTT (Jumpered 1 & 2)	1 Base (Jumpered 1 & 2) 2 PTT (Jumpered 1 & 2)	
3 N.C.	3	
4 N.C.	4	
5 Ground for CTCSS Audio	5 Ground for CTCSS Audio	
6 CTCSS Logic Out		Black (Ground)
	6 CTCSS Tone In	Yellow (CTCSS Out)
7 Xmit AF In	7 Xmit AF In	
8 Disc Out	8 Disc Out	
9 N.C.	9	
10 Ground (Jumpered 10 & 11) 11 EXT Port 1 (Jump 10 & 11)	10 Ground (Jumpered 10 & 11) 11 EXT Port 1 (Jump 10 & 11)	
12 EXT Port 2	12 EXT Port 2	
13 N.C.	13	
14 N.C.	14	
15 (+) 13.8 volts	15 (+) 13.8 volts	Red (+12v)

This jumper goes between the WX-250 and the DR-1X repeater. One end attaches to the DR-1X repeater, while the other end attached to NV8Q's harness (at the DR-1X adapter).



BEFORE: The Wiring harness and the SS-64



AFTER: Wires were cable-tied and covered SS-64 with electrical tape.

WX-250 PTT Transmit Sense Wire

WX-250	SCOM 7330
(Blue Wire)	DB-25 I/O Connector
D3 Diode (see below)	12 Logic Input 3

(This wire taps into the WX-250's PTT relay. Whenever the WX-250 broadcasts, this will activate Logic Input #3 on the SCOM 7330 which puts the DR-1X into FIXED analog mode and send the CTCSS signal)





Programming The SCOM 7330

In the SCOM 7330 controller, change Jumper J37 to LOGIC. This enables the 7330 to control the SS-64 encoder.

An example script is included on the next two pages. It is designed to work with the program Prog7730. *Download link for Prog7330: <u>http://www.siqridco.com/Prog7330.html</u> Prog7330 removes all comments and replaces "MPW" with your actual password.*

The example script includes custom audio to enhance the user experience. To install these improved weather alert courtesy tones and announcements, feel free to download my CustomAudioLib.bin file (and the .raw audio files):

<u>http://www.wa8kim.com/files/WA8KIM%20SCOM%207330%20Custom%20Audio.zip</u> See the SCOM 7330's Owner's Manual for instructions on installing the CustomAudioLib.bin file.

- The WX-250 automatically announces the specific weather alert, such as "Thunderstorm Warning" or "Tornado Watch", but it only tells the SCOM whether there's a watch or warning, but not what type of watch or warning.
- The example script will change the SCOM's courtesy beeps and Initial/Normal ID to indicate a generic "Severe Weather Watch" or "Severe Weather Warning". The following commands allow you to manually assign a specific type of watch of warning. When the watch/warning has ended, the SCOM will automatically revert back to normal operation.

SCOM 7330 Weather Commands Included In The Following Script:

- 29 Listen to Weather Radio Toggle On/Off. (2 minute timer to turn off the weather monitoring).
- A990 End Severe Weather Watch/Warning
- A991 Begin Severe Thunderstorm Watch
- A992 Begin Severe Thunderstorm Warning
- A993 Begin Tornado Watch
- A994 Begin Tornado Warning
- A995 Begin Snow Storm Watch
- A996 Begin Snow Storm Warning
- A550 Weather Monitoring Toggle On/Off
- A551 Turn on Weather Radio Monitoring
- A552 Turn off Weather Radio Monitoring
- A552 Severe Weather Watch: Enable
- A553 Severe Weather Watch/Warning: Disable (return repeater to normal operation)
- A554 Severe Weather Warning: Enable

To view the actual script I use,

 See the "WX-250" section of the <u>WA8KIM's SCOM 7330 Controller Script.txt</u> Download link: <u>http://www.wa8kim.com/files/WA8KIM's SCOM 7730 Controller Script.txt</u>

Example Programming Script

: MPW 21 A905 MPW 20 A905 MPW 15 9993 05 9961 [severe] [thunder] [storm] [watch] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A906 MPW 20 A906 MPW 15 9993 05 9961 [severe] [thunder] [storm] [warning] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A907 MPW 20 A907 MPW 15 9993 05 9961 [tornado] [watch] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A908 MPW 20 A908 MPW 15 9993 05 9961 [tornado] [warning] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A909 MPW 20 A909 MPW 15 9993 05 9961 3023 [storm] [watch] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A910 MPW 20 A910 MPW 15 9993 05 9961 3023 [storm] [warning] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A911 MPW 20 A911 MPW 15 9993 05 9961 [severe] [weather] [watch] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 21 A912 MPW 20 A912 MPW 15 9993 05 9961 [severe] [weather] [warning] [w] [a] [eight] [k] [i] [m] [repeater] 9905 30 9902 "WA8KIM/R" * MPW 49 10 03 1200 * ; Create Timer #01 and set for 120.0 Seconds MPW 49 10 02 A551 * ; Set Timer #01 to run Macro #A551 when time is up MPW 21 0099 * ; Erase Macro MPW 20 0099 A550 * ; Weather Radio Monitoring: Toggle On/Off (Initial Script) MPW 21 A550 * ; Erase Macro MPW 20 A550 MPW 70 05 * ; Enable Weather Radio Monitoring (Logic Output 5) MPW 29 A550 MPW 21 0099 * ; Erase the 0099 Macro ; Create the 0099 Macro to run A551 Macro MPW 29 A550 MPW 20 0099 A551 * MPW 29 A550 MPW 49 10 01 * ; Start Timer #01 MPW 21 A551 * ; Erase Macro ; Disable Weather Radio Monitoring (Logic Output 5) MPW 20 A551 MPW 71 05 * ; Erase the 0099 Macro MPW 29 A551 MPW 21 0099 * MPW 29 A551 MPW 20 0099 A550 * ; Create the 0099 Macro to run A550 Macro MPW 29 A551 MPW 49 10 00 * ; Stop Timer #01 MPW 26 0061 A552 * ; Run A552 Macro (start weather watch announcement) when Logic Input 1 goes LOW MPW 26 0062 A553 * ; Run A553 Macro (end weather watch announcement) when Logic Input 1 goes HIGH MPW 26 0063 A554 * ; Run A554 Macro (start weather warning beep) when Logic Input 2 goes LOW MPW 26 0064 A553 * ; Run A555 Macro (end weather warning beep) when Logic Input 2 goes HIGH MPW 21 A552 * ; Erase Macro MPW 20 A552 MPW 31 0109 9999 A911 * ; Change Initial ID to WATCH alert MPW 29 A552 MPW 31 0110 9999 A911 * ; Change Normal ID to WATCH alert MPW 29 A552 MPW 31 0112 * ; Change Dropout ID to SILENCE MPW 29 A552 MPW 31 0100 9960 3060 9993 01 9910 12 * ; Sets Courtesy Tone for Local Repeater to Custom Weather Alert High, then C4 ; MPW 29 A552 MPW 31 0100 9910 24 12 24 12 24 12 * ; (OPTIONAL) Sets Courtesy Tone for Local Repeater to tones: C5 C4 C5 C4 C5 C4 MPW 29 A552 MPW 31 0101 9960 3060 9993 01 9915 57 0052 0080 05 * ; Sets Courtesy Tone for Port 3 to Custom Weather Alert High, then C4 & G4 MPW 29 A552 MPW 31 0102 9960 3060 9993 01 9915 57 0052 0367 05 *

; Sets Courtesy Tone for Port 2 to Custom Weather Alert High, then C4 & C6

MPW 21 A553 * ; Erase Macro MPW 20 A553 MPW 31 0109 9999 A900 * ; Change Initial ID back to normal MPW 29 A553 MPW 31 0110 9999 A902 * ; Change Normal ID back to normal MPW 29 A553 MPW 31 0112 9999 A901 * ; Change Dropout ID back to normal MPW 29 A553 MPW 31 0100 9910 12 * ; Sets Courtesy Tone for Local Repeater to C4 MPW 29 A553 MPW 31 0101 9915 57 0052 0080 05 * MPW 29 A553 MPW 31 0102 9915 57 0052 0367 05 * ; Sets Courtesy Tone for RLS-1000B to C4 & G4 ; Sets Courtesy Tone for SCOM 7330 Port 2 to C4 & C6 MPW 21 A554 * ; Erase Macro MPW 20 A554 MPW 31 0109 9999 A912 * ; Change Initial ID to WARNING alert MPW 29 A554 MPW 31 0110 9999 A912 * ; Change Normal ID to WARNING alert MPW 29 A554 MPW 31 0112 * ; Change Dropout ID to SILENCE MPW 29 A554 MPW 31 0100 9960 3061 9993 01 9910 12 * ; Sets Courtesy Tone for Local Repeater to Custom Weather Alert Low ; (OPTIONAL) Sets Courtesy Tone for Local Repeater to tones: G4 C4 G4 C4 G4 C4 ; MPW 29 A552 MPW 31 0100 9910 19 12 19 12 19 12 * MPW 29 A554 MPW 31 0101 9960 3061 9993 01 9915 57 0052 0080 05 * ; Sets Courtesy Tone for Port 3 to Custom Weather Alert High, then C4 & G4 MPW 29 A554 MPW 31 0102 9960 3061 9993 01 9915 57 0052 0367 05 * ; Sets Courtesy Tone for Port 2 to Custom Weather Alert High, then C4 & C6

REVISION HISTORY

2015-08-18 Included an example script in the document.

2015-08-15 Added visual wring chart and reorganized for better clarity.

2015-08-13 Made the file more visually appealing. Added WX-250 PTT Modification.

2015-08-11 File created.