

# Ordering Guide

VRX1000 – Vehicle Radio Extender

8A087X01 Revision 3.0

February 8, 2019



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## Revision History

<b>REVISION</b>	<b>DATE</b>	<b>NOTES</b>
R1.0	2014-NOV-07	Initial release
R2.0	2015-FEB-20	Updated Order Codes
R2.1	2015-APR-13	Reorganized sections for clarity
R2.2	2015-AUG-21	Removed reference that VHF and UHF VRX1000 would be released in Q3 2015. Changed APX Mobile Radios require firmware version R13.00.00 or later. To R14.00.00 or later.
R2.3	2016-JAN-06	Updated description on technical & programming support
R2.4	2017-JUNE-07	Removed DDN2054, changed description for P25 Option and P25 Enhanced Trunking Features. Added APX8500 - TT06279AA,
R.2.5	2017-JUNE-20	Pg. 5 - Added notes regarding APX8500 In-Band Operation with Single Antenna and requirement for Multiplexers, Pg. 27 Added Diagrams Using APX8500 with Single Antenna and Multiple Antennas
R 2.6	2017-October-12	Pg 9. Revised Descriptions for TT05951AA P25 Operation & TT05952AA P25 AES/DES Encryption. Pg. 4 - Added Link to subscribe to newsletter sign-up
R.2.7	2018-April-20	Pg 14 – Updated the VHF/UHF In-Band Frequency Parameters to allow for 2 MHz Separation between the VRX1000 VHF/UHF Frequency and the VHF/UHF Mobile, Pg 20 Removed TT05978AA Double Y-Control Cable
R.2.8	2018-NOV-12	Pg 6 - Added new section 1 regarding compatible mobile radios. Pg 6 Added APX8500 kits Removed pictures of mounting configuration in notes section
R 2.9	2018-Dec-19	Pg 24 – Updated Training Description
R 3.0	2019-Feb-08	Pg 6 – Added Relay Kit DDN2808, Removed DDN2656

## Ordering Instructions – PLEASE READ CAREFULLY

If only ordering spares or kits, proceed to step 7. If only ordering services, proceed to step 8.

1. Selection mobile radio type (Section 1).
2. Select base transceiver type (Section 2). NOTE: base transceiver provides analog only operation. Select appropriate option in Section 3 if P25 operation is required.
3. Select transceiver functional options as applicable to your intended operation (Section 3).
4. If in-band frequency operation is required, select the appropriate In-band option (Section 4). NOTE the frequency requirements in Section 3 to ensure your frequency plan meets the operating requirements.
5. If an in-band frequency option was selected in Step 4, note the default is flat mount configuration. If required, select the option in-band mounting option in Step 5.
6. If applicable, select additional hardware options (Section 5).
7. Select required antennas (Section 6).
8. Select spares or kits as required (Section 7).
9. Select optional services as required (section 8).

## Important Notes

1. Only the frequency bands shown in Section 3 are available as standard configurations. For custom filtering, please contact Futurecom: [sales@futurecom.com](mailto:sales@futurecom.com)
2. In-Band Models – VRX1000 Frequencies must be specified when placing an order since the filters are custom tuned and cannot be re-tuned in the field. The in-band filters placed on the APX Radio antenna port have 50 Watts maximum transmit power rating. The APX Mobile radio Tx power must not exceed 50 Watts!
3. Standard VRX1000 delivery time is 10-12 weeks from the time the order is placed and the frequency information is provided. Frequency information must be accurate and in accordance with the frequency plan requirements described in this document in order to avoid delays.
4. The Motorola Mobile radios and Motorola accessories are NOT included with the VRX1000.
5. VRX1000 models include standard 3ft long interconnecting cable (Mobile radio to VRX1000). Longer cables (up to 25 ft.) are available.
6. The Motorola Mobile radios may require firmware upgrades in order to operate with the VRX1000. Motorola Radio Firmware Upgrades are to be purchased directly from Motorola. **Please note that to ensure full compatibility and make use of the latest available feature set, it is recommended that the APX Mobile radio and VRX1000 Firmware are updated to the latest Motorola certified firmware versions.** APX Mobile Radios operating as the host mobile for the VRX1000 require subscriber option **GA00631** for operation.
7. APX Portable Radios operating through a VRX1000, utilizing VRX1000 P25 Enhanced feature set require subscriber option **QA00631**. No special option is required for XTS Portable Radios.
8. For all sales inquiries, please contact Futurecom sales at [sales@futurecom.com](mailto:sales@futurecom.com).



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## 1. Mobile Radio Type

The VRX1000 is compatible with the following Motorola Mobile Radios:

- Remote Mount **APX™ 4500** or **APX™ 2500** with O2 Control Head, single band - Select Option TT05715AA
- Remote Mount **APX™ 5500** with any Control Head, single band - Select Option TT05715AA
- Remote Mount **APX™ 6500** with any Control Head, single band - Select Option TT05715AA
- Remote Mount **APX™ 7500** with any Control Head, single band - Select Option TT05715AA
- Remote Mount **APX™ 7500** with any Control Head, dual band - Select Option TT05716AA
- Remote Mount **APX™ 8500** with any Control Head, all band - Select Option TT06279AA

Depending on the isolation available between the APX™ 8500 mobile and VRX1000 antennas, one of the following kits may be required.

Dual Triplexer Kit	- Select Option DDN2657
Single Triplexer Relay Kit	- Select Option DDN2658
Dual Triplexer Relay Kit	- Select Option DDN2659
Relay Kit	- Select Option DDN2808

## 2.VRX1000 Base Transceiver Frequency Options

### VRX1000 136-174 MHz

<u>ORDER CODE</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>TT2792A</b>	<b>Base Order Code</b>  <b>VHF Cross Band VRX1000 - Analog</b>	DDN1963A – mounting bracket  DDN1966A – 18 ft. power cable  DDN1969A – 3 ft. standard control cable	Mobile radio option GA00631	APX Mobile Radio operation with VRX1000 Enabled is limited to UHF and/or 700/800 unless In-band option is also ordered; see section 3 for In-band options  <b>Analog only</b> ; see section 2 for P25 operation and other options

**VRX1000 380-430 MHz / 450-512 MHz**

<u>ORDER CODE</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>TT2793A</b>	<b>Base Order Code</b>  <b>UHF Cross Band VRX1000 - Analog</b>	DDN1963A – mounting bracket  DDN1966A – 18 ft. power cable  DDN1969A – 3 ft. standard control cable	Mobile radio option GA00631	APX Mobile Radio operation with VRX1000 Enabled is limited to VHF and/or 700/800 unless In-band option is also ordered; see section 3 for In-band options  <b>Analog only</b> ; see section 2 for P25 operation and other options



**VRX1000 769-775 MHz / 851-869 MHz**

<u>ORDER CODE</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>TT2794A</b>	<b>Base Order Code</b>  <b>700 &amp; 800 MHz</b> <b>Cross Band</b> <b>VRX1000 - Analog</b>	DDN1963A – mounting bracket  DDN1966A – 18 ft. power cable  DDN1969A – 3 ft. standard control cable	Mobile radio option GA00631	APX Mobile Radio operation with VRX1000 Enabled is limited to UHF and/or VHF unless In-band option is also ordered; see section 3 for In-band options  <b>Analog only</b> ; see section 2 for P25 operation and other options

### 3. VRX1000 Transceiver Functional Options

<u>ORDER CODE</u>	<u>ITEM</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>TT05951AA</b>	<b>P25 Operation</b>	TT2792A  Or  TT2793A  Or  TT2794A  Requires that the APX mobile interfaced to the VRX1000 is on a P25 FDMA or P25 conventional channel	Includes ADP encryption pass-through. Refer to Futurecom functional description for further information.  Required for FDMA Conventional Operation  Prerequisite for FDMA or TDMA Trunking
<b>TT05952AA</b>	<b>P25 AES/DES Encryption</b>	TT05951AA	Enables the transparent pass through of P25 AES/DES encrypted calls between the P25 infrastructure, system subscriber units, the mobile radio, portable radios on the VRX1000 channel.  P25 OTAR is supported via the VRX1000 on P25 Trunked FNE; P25 OTAR is NOT supported on conventional P25 FNE.
<b>TT05953AA</b>	<b>P25 Enhanced Trunking Features</b>	TT05951AA	Allows the use of "DVR / VRX Enabled" portable radios (such as APX with QA00631) and provides

<u>ORDER CODE</u>	<u>ITEM</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
		Portable radio option QA00631	<p>the associated trunking features through the VRX1000.</p> <p><b>Note: End to end digital operation on TDMA talkgroups requires this option.</b></p> <p>For information on what portable radios can be "DVRS / VRX Enabled" and operating requirements for end to end Digital on TDMA trunking, please refer to the VRX1000 Functional Description.</p>

## 4. VRX1000 In-Band Standard Frequency Plans

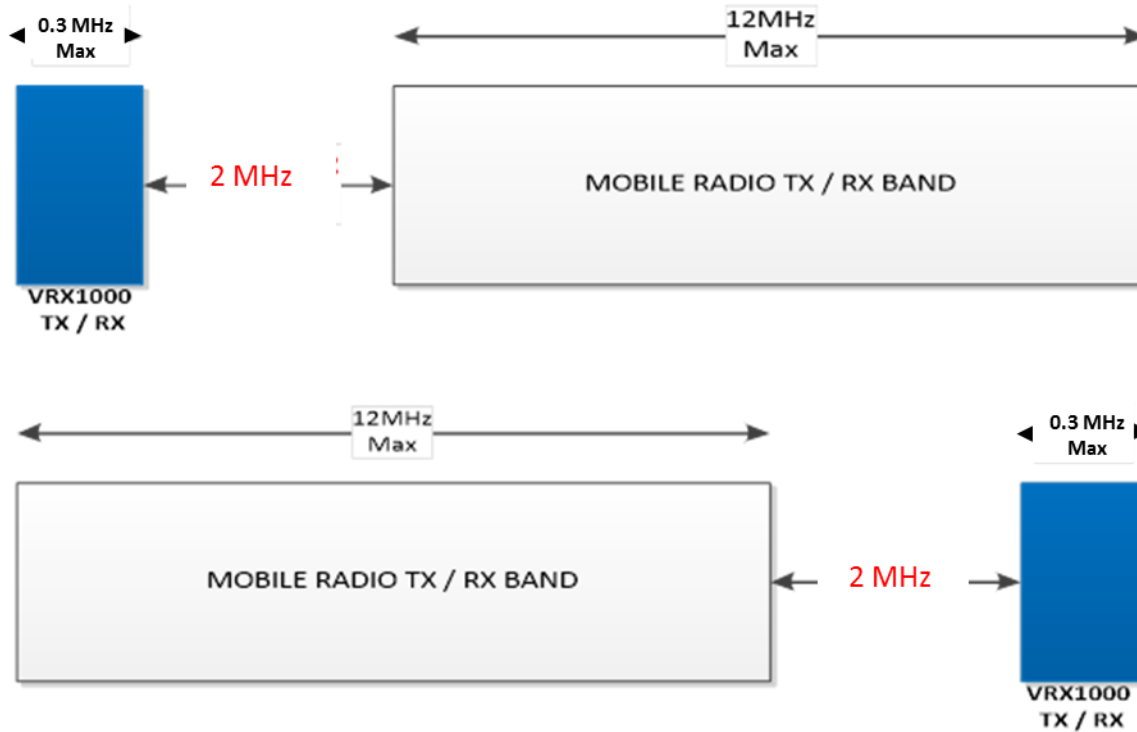
### VRX1000 VHF – In-Band Frequency Options

<u>OPTIONS ORDER CODE</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>Frequency Plan A:</b> <b>TT05945AA</b>  <b>or</b>  <b>Frequency Plan B:</b> <b>TT05946AA</b>	<b>In-Band Filter Kit if Required</b>  Refer to Standard Frequency Plans to choose correct order code.	Standard Flat Mount Configuration  DDN1967A – 2 x 2 ft. RF cable; mini UHF (m) - mini UHF (m), VRX1000 filter to VRX1000 and APX mobile filter to APX mobile	TT2792A – VHF VRX1000 base transceiver	Refer to mounting configurations in Section 4 for alternative mounting options

## VRX1000 UHF – In-Band Frequency Options

<u>OPTIONS ORDER CODES</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>Frequency Plan A:</b> <b>TT05947AA</b>  <b>or</b>  <b>Frequency Plan B:</b> <b>TT05948AA</b>	<b>In-Band Filter Kit if Required</b>  Refer to Standard Frequency Plans to choose correct order code.	Standard Flat Mount Configuration  DDN1967A – 2 x 2 ft. RF cable; mini UHF (m) - mini UHF (m), VRX1000 filter to VRX1000 and APX mobile filter to APX mobile	TT2793A – UHF VRX1000 base transceiver	Refer to mounting configurations in Section 4 for alternative mounting options

## VHF / UHF In-Band Standard Frequency Plans



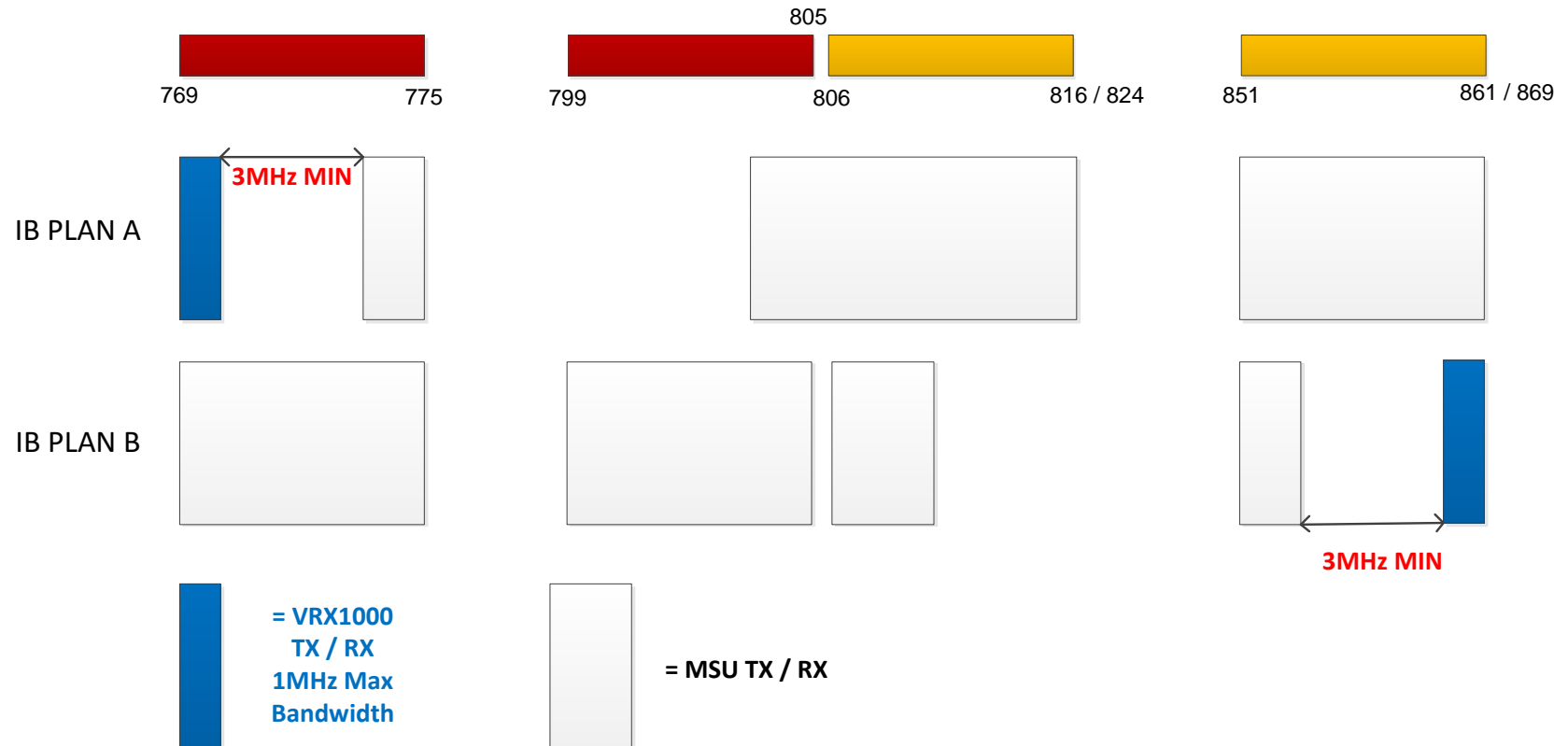
**PLAN A - VRX1000 Frequency Below Mobile Frequency Range**

**PLAN B - VRX1000 Frequency Above Mobile Frequency Range**

## VRX1000 700/800 MHz In-Band Frequency Options

<u>OPTIONS</u> <u>ORDER CODES</u>	<u>ITEM</u>	<u>INCLUDES</u>	<u>PREREQUISITES</u>	<u>NOTES</u>
<b>Frequency Plan A:</b> <b>TT05949AA</b>  or  <b>Frequency Plan B:</b> <b>TT05950AA</b>	<b>In-Band Filter Kit if Required</b>  Refer to Standard Frequency Plans to choose correct order code.	Standard Flat Mount Configuration  DDN1967A – 2 x 2 ft. RF cable; mini UHF (m) - mini UHF (m), VRX1000 filter to VRX1000 and APX mobile filter to APX mobile	TT2794A – 700/800 MHz VRX1000 base transceiver	Refer to mounting configurations in Section 4 for alternative mounting options

## 700/800 MHz In-Band Standard Frequency Plans



**PLAN A - VRX1000 Frequency Below Mobile Frequency Range**  
**PLAN B - VRX1000 Frequency Above Mobile Frequency Range**



## 5. VRX1000 Hardware Options

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Connector Type / Cable Length</u>
<b>TT05954AA</b>	VRX1000 Programming Kit (physical media) <ul style="list-style-type: none"> <li>- Includes programming and installation manual, programming software and USB cable (DDN1968A)</li> <li>- <i>NOTE: Manuals and software available online for download to registered users</i></li> </ul>	USB to mini USB Connectors 10 ft.
<b>TT05955AA</b>	VRX1000 In-band Stacked Mount Kit Option <ul style="list-style-type: none"> <li>- Replaces standard Flat Mounting included in In-Band Filtering Kits TT05945AA, TT05946AA, TT05947AA, TT05948AA, TT05949AA, or TT05950AA</li> <li>- See section on In-Band mounting options</li> </ul>	NA
<b>TT05956AA</b>	Delete standard control cable (DDN1969A) from VRX1000 <ul style="list-style-type: none"> <li>- Used when Y cable is required instead of standard cable</li> <li>- <i>NOTE: Replacement Y cable TT05964AA or TT05977AA MUST be ordered.</i></li> </ul>	NA
<b>TT05957AA</b>	Custom Control Cable Length <ul style="list-style-type: none"> <li>- Allows standard 3 ft. control cable length to be customer specified.</li> </ul>	Connectors are cable type dependent 5ft. / 10ft. / 15ft. / 20ft. / 25 ft.

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Connector Type / Cable Length</u>
	<ul style="list-style-type: none"> <li>- This is an add-on to control cable types – DDN1969A, TT05964AA, TT05977AA</li> </ul>	
<b>TT05958AA</b>	Custom RF Cable Length	Mini UHF (m) – Mini UHF (m) 4ft. / 6ft. / 8ft. / 10ft.
<b>TT05964AA</b>	Y - Control Cable / AUX <ul style="list-style-type: none"> <li>- Connects the VRX1000 to the MSU and provides access to the VRX1000 AUX pins (DB15)</li> <li>- Replaces the Standard Control Cable DDN1969A</li> </ul>	DB25 to DB25 & DB15 3 ft.
<b>TT05977AA</b>	Y - Control Cable / Siren <ul style="list-style-type: none"> <li>- connects the VRX1000 to the MSU and provides connection for Motorola Siren (DB25)</li> <li>- Replaces the Standard Control Cable DDN1969A</li> </ul>	DB25 to DB25 & DB25 3 ft.

## 6. Antennas

<u>ANTENNAS FOR VEHICULAR MOUNT VRX1000 UNITY GAIN (0dBd), ROOF / TRUNK MOUNT</u>	<u>FREQUENCY BAND [MHz]</u>
<b>HAD4006A</b>	136 – 144
<b>HAD4007A</b>	144 – 150.8
<b>HAD4008A</b>	150.8 – 162
<b>HAD4009A</b>	162 – 174
<b>HAE6012A</b>	380 – 433
<b>HAE4003A</b>	450 – 470
<b>HAE4004A</b>	470 – 512
<b>HAF4016A</b>	764 – 870

## 7.VRX1000 Spares / Kits – Ordered Separately from VRX1000

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>NOTES</u>
<b>DDN2073A</b>	VRX1000 VHF In-Band Filters Kit, Plan A, Flat Mount	
<b>DDN2074A</b>	VRX1000 VHF In-Band Filters Kit, Plan B, Flat Mount	
<b>DDN2075A</b>	VRX1000 UHF In-Band Filters Kit, Plan A, Flat Mount	
<b>DDN2076A</b>	VRX1000 UHF In-Band Filters Kit, Plan B, Flat Mount	
<b>DDN2077A</b>	VRX1000 700/800 In-Band Filters Kit, Plan A, Flat Mount	
<b>DDN2078A</b>	VRX1000 700/800 In-Band Filters Kit, Plan B, Flat Mount	
<b>DDN1960A</b>	P25 Digital Conventional Operation	
<b>DDN1961A</b>	P25 Encryption capable	Requires DDN1960A or TT05951AA
<b>DDN1962A</b>	P25 Enhanced Trunking Operation	Requires DDN1960A or TT05951AA
<b>DDN2083A</b>	VRX1000 Custom Control Cable Length	Requires one of : DDN1969A, DDN1970A, DDN2053A or DDN2054A
<b>DDN2084A</b>	VRX1000 Custom RF Cable Length	Requires DDN1967A
<b>DDN1963A</b>	VRX1000 Mounting Bracket Kit - Included with all VRX1000 models - Order as spare if required	
<b>DDN1965A</b>	VRX1000 In-Band Filters Mounting Bracket Kit – STACKED MOUNT - Order as spare if required	

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>CONNECTORS / CABLE LENGTH</u>

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>CONNECTORS / CABLE LENGTH</u>
<b>DDN1966A</b>	VRX1000 DC Power Cable <ul style="list-style-type: none"> <li>- Included with VRX1000 models</li> <li>- Order as spare if required</li> </ul>	M12 Circular connector 18 ft.
<b>DDN1967A</b>	RF Cable for In-Band filter kit <ul style="list-style-type: none"> <li>- Connects VRX1000 to VRX1000 in-band filter OR mobile radio to mobile radio in-band filter</li> <li>- Qty. 2 included in TT05945AA, TT05946AA, TT05947AA, TT05948AA, TT05949AA, or TT05950AA</li> </ul>	Mini UHF (m) to mini UHF (m) 2 ft.
<b>DDN1968A</b>	VRX1000 Programming Cable	USB to mini USB 10 ft.
<b>DDN1969A</b>	VRX1000 Control Cable <ul style="list-style-type: none"> <li>- Included with VRX1000 models</li> <li>- Order as spare if required</li> <li>- connects the VRX1000 to the MSU</li> </ul>	DB25 to DB25 3 ft.
<b>DDN1970A</b>	Y - Control Cable / AUX <ul style="list-style-type: none"> <li>- Connects the VRX1000 to the MSU and provides access to the VRX1000 AUX pins (DB15)</li> <li>- Replaces the Standard Control Cable DDN1969A</li> </ul>	DB25 to DB25 & DB15 3 ft.
<b>DDN2053A</b>	Y - Control Cable / Siren	DB25 to DB25 & DB25 3 ft.

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>CONNECTORS / CABLE LENGTH</u>
	<ul style="list-style-type: none"><li>- connects the VRX1000 to the MSU and provides connection for Motorola Siren (DB25)</li><li>- Replaces the Standard Control Cable DDN1969A</li></ul>	

## 8. Services

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Notes and Conditions</u>
<b>TT05959AA</b>  <b>DDN2079A</b> <b>when ordered separately</b>	VRX1000 Cross Band 4 Year Extended Warranty	<p>Extends standard 18 month warranty by 4 years. Includes software subscription. Can only be purchased once per unit.</p> <p>Must be purchased prior to expiration of standard warranty.</p>
<b>TT05960AA</b>  <b>DDN2080A</b> <b>when ordered separately</b>	VRX1000 Cross Band 1 Year Extended Warranty	<p>Extends existing warranty by one year. Includes software subscription.</p> <p>Must be purchased prior to expiration of any existing warranty. Standard 18 month warranty can be extended by a maximum of 4 years.</p>
<b>TT05961AA</b>  <b>DDN2081A</b> <b>when ordered separately</b>	VRX1000 In-Band 4 Year Extended Warranty	<p>Extends standard 18 month warranty by 4 years. Includes software subscription. Can only be purchased once per unit.</p> <p>Must be purchased prior to expiration of standard warranty.</p>
<b>TT05962AA</b>	VRX1000 In-Band 1 Year Extended Warranty	<p>Extends existing warranty by one year. Includes software subscription.</p>

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Notes and Conditions</u>
<b>DDN2082A</b> when ordered separately		Must be purchased prior to expiration of any existing warranty. Standard 18 month warranty can be extended by a maximum of 4 years.
<b>TT05963AA</b>  <b>DDN1971A</b> when ordered separately	On-Site technical and Programming Support (BASIC)	Maximum 1 day; see EXTENDED support for additional days.  Minimum 2 weeks advance notice required however subject to resource availability. Applies to North America only.
<b>TT05965AA</b>  <b>DDN1972A</b> when ordered separately	On-Site Technical and Programming Support (EXTENDED)	Must purchase BASIC on-site technical and programming support. All on-site activity must be scheduled as sequential days.
<b>TT05966AA</b>  <b>DDN1973A</b> when ordered separately	Technical and Programming Phone Support	Must be purchased in 1hr increments.
<b>TT05967AA</b>	On-Site Training (BASIC) 2 Courses Available:  1. Training the Trainer/end user	Maximum 1 day; see EXTENDED training for additional days.



<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Notes and Conditions</u>
<p><b>DDN1974A</b> when ordered separately</p>	<p>1 Day (Est 4 hours) end user training gives the end user a general understanding of Futurecom solutions through your agencies particular use case, highlighting best practices through situations commonly seen in the field during deployment situations. Participants will have hands on training with the newly implemented solution for practical operation and control.</p> <p><b><u>OR</u></b></p> <p><b>2. Technical and Programming Training</b></p> <p>1 Day Technical and Programming training gives the radio technician an in depth understanding on how the DVRS/VRX1000/PDR8000 is integrated into the everyday operation of the agency. Highlighting code plug compatibility, Tweaker software functionality and programming for optimal end user experience.</p>	<p>Minimum 2 weeks advance notice required however subject to resource availability. Applies to North America only.</p> <p>Training the trainer requires the newly implemented DVRS/VRX1000/PDR8000 to be tested and in use on the network to get the most out of the Training the Trainer.</p> <p>Standard training package. Includes soft copy of training materials. Customized training available subject to content and price negotiation.</p> <p>Contact Futurecom Systems Group, ULC for a pre-training checklist to insure your solution is ready for Basic On-site Training</p> <p>Technical and Programming Training, Futurecom Systems Group, ULC requires at least two full functioning Portable radios (PSUs) programmed to the current system, at least one installed DVRS/VRX1000/PDR8000. For DVRS and VRX1000 use a Mobile Radio (MSU) radio set is required to conduct this training properly.</p>
<p><b>TT05968AA</b></p>	<p>On-Site Training (EXTENDED)</p>	

<u>ORDER CODE</u>	<u>DESCRIPTION</u>	<u>Notes and Conditions</u>
<b>DDN1975A</b> when ordered separately		Must purchase BASIC on-site training All on-site activity must be scheduled as sequential days.

## **9. Notes**