



Futurecom Systems Group, ULC

Suitcase DVRS Installation Guide

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Contents

NOTES.....	1
Contents	2
Foreword.....	4
Terminology Used	4
Computer Software Copyrights.....	5
Document Copyrights	5
Disclaimer	5
Trademarks	5
Commercial Warranty	6
RF Energy Exposure Compliance, Awareness and Control Information and Operational Instructions	7
Introduction	8
Suitcase Mount DVRS Installation	9
Installation Tools Required	9
Installation Guidelines	9
Suitcase Mount DVRS Antenna Requirements.....	15
Appendix 1 – Suitcase Mount DVR Specifications	16
Appendix 2 – Approved Antennas and Maximum output power (W) for combination DVR and APX mobiles for Temporary-Fixed Site.....	17

List of Figures

Figure 1 Suitcase Mount DVRS..... 8
 Figure 2 Suitcase Mount DVRS - As Received, Top Cover Open, and O5/O7 Control head model..... 9
 Figure 3 Suitcase Mount DVRS - As Received, Top Cover Open, and O3 Control head model..... 10
 Figure 4 Suitcase Mount DVRS - As Received, Top Cover Open, and O2 Control head model..... 10
 Figure 5 Mounting the Mobile Speaker - O5/O7 Control Head Model 11
 Figure 6 Mounting the Mobile speaker- O3 Control Head Model 11
 Figure 7 Mounting the Microphone clip- O2 Control Head Model..... 12
 Figure 8 Mounting the Mobile Radio 12
 Figure 9 Fully Assembled Suitcase Mount DVRS O5/O7 Control Head Models 13
 Figure 10 Fully Assembled Suitcase Mount DVRS O3 Control Head Models 13
 Figure 11 Fully Assembled Suitcase Mount DVRS O2 Control Head Models 14
 Figure 12 DVRS labels inside the lid cover..... 14

Related Publications

Publication Number	Description
8A083X30	DVRS User’s Manual, APX Series P25 Interface
8A083X21	Tactical DVR User’s Manual
8M083X02	Tactical DVR Installation and Programming Guide
8F083X03	DVRS - Product & RF Safety Booklet
8F083X14	Indoor Fixed Mount DVRS – Installation Guide, APX Interface
8F083X15	Outdoor Fixed Mount DVRS – Installation Guide, APX Interface
8F083X04	Flash Loader and Tweaker Programmer Installation Guide

Foreword

This manual provides Installation guidelines for the Futurecom Mobexcom P25 DVR that is interfaced to a remote mount APX6500 or APX7500 Mobile radio with O2, O3, O5 or O7 control head and installed in a Suitcase Mount suitcase.

O9 Control head is not compatible with the Suitcase Mount Suitcase DVRS models.

Terminology Used

Abbreviation	Description
Suitcase Mount DVRS	Complete DVR and Mobile Radio System, packaged in a Suitcase Mount Suitcase
DVR	Digital Vehicular Repeater
MSU	Mobile Subscriber Unit
CH	Mobile Radio Control Head – O2,O3, O5 or O7
TG	Mobile Radio Talk Group

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- (iii) Defects or damage due to alterations, modifications or adjustments carried out by the Buyer without Futurecom's explicit approval.
- (iv) Defects or damage from misuse, accident, water or neglect.
- (v) Freight costs to the repair depot.
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RF Energy Exposure Compliance, Awareness and Control Information and Operational Instructions

This radio equipment is intended for use in occupational / controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer or any other use.

ATTENTION!

Changes or modifications not expressly approved by Futurecom Systems Group, ULC. could void the User's authority to operate the equipment.

Temporary-Fixed Site

Futurecom requires the P25 Suitcase Mount DVRS operator to ensure FCC/IC Requirements for Radio Frequency Exposure are met. It is the responsibility of the Licensee to ensure that the appropriate separation distances between the antennas and bystanders are established and followed to meet the FCC and IC Maximum Permissible Exposure (MPE) Requirements in any particular Temporary-Fixed location. In situations where a site assessment is not practical, it is recommended that the antennas be located at least 9 feet from bystanders. This should ensure MPE compliance in any Temporary-Fixed application and is likely to be a much greater separation distance than is necessary in most cases. Failure to observe the MPE distance exclusion area around the antenna may expose persons within this area to RF energy above the FCC/IC exposure limits for bystanders (general population).

Vehicular Use

If the Suitcase Mount DVRS is set up in an vehicle, Users should refer to the separation distances specified in the "RF Safety" Book 8F083X03 (shipped with the DVRS) to determine the separation distances to be used and the antennas approved for such vehicular use. Failure to observe the MPE distance exclusion area around the antenna may expose persons within this area to RF energy above the FCC/IC exposure limits for bystanders (general population). It is the responsibility of the repeater operator to ensure MPE limits are observed at all times during transmissions.

ATTENTION!

Approved antennas and associated output powers for use with Suitcase Mount (suitcase) DVRS and APX Mobile radios are listed in Appendix 2 of this document. Refer to Product Safety and RF Energy Exposure Booklet 8F083X03 (shipped with DVRS) for basic fixed site installation guidance, and for use in a vehicular application.

Introduction

The Digital Vehicular Repeater System (DVRS) is typically mounted inside the trunk of a car and powered from the car's battery. Some applications other than vehicular use require added flexibility, which can be achieved with the use of a Suitcase Mount DVRS.

Note: - Product Safety and RF Energy Exposure Booklet 8F083X03 includes approved antennas and associated output powers for DVRS vehicular installation.

The Suitcase Mount DVRS is a complete DVRS and power supply packaged in a compact suitcase as shown on Figure 1 below.

The Suitcase Mount DVRS can be powered up either by connecting it directly to 117V AC or by using a battery pack (ordered separately). As an option, the unit can be configured for 220V AC Operation.

The battery is packaged in a similar suitcase and provides up to 3 hrs of backup (50/50% duty cycle). The operation of the battery pack and charger are described in document 8M077X02.



Dimensions: 23" x 16" x 10"

Figure 1 Suitcase Mount DVRS

Suitcase Mount DVRS Installation

Installation Tools Required

Description	Needed for:
#2 Philips	Tightening of screws.
3/16" Flat Screwdriver	Tightening of connector screws.

Installation Guidelines

STEP 1 Open the Suitcase Mount DVRS cover and note the location of the mounting screws for the MSU speaker bracket and microphone clip as shown on Figure 2 and Figure 3. For the O2 model there is no speaker but note the microphone clip location in Figure 4.

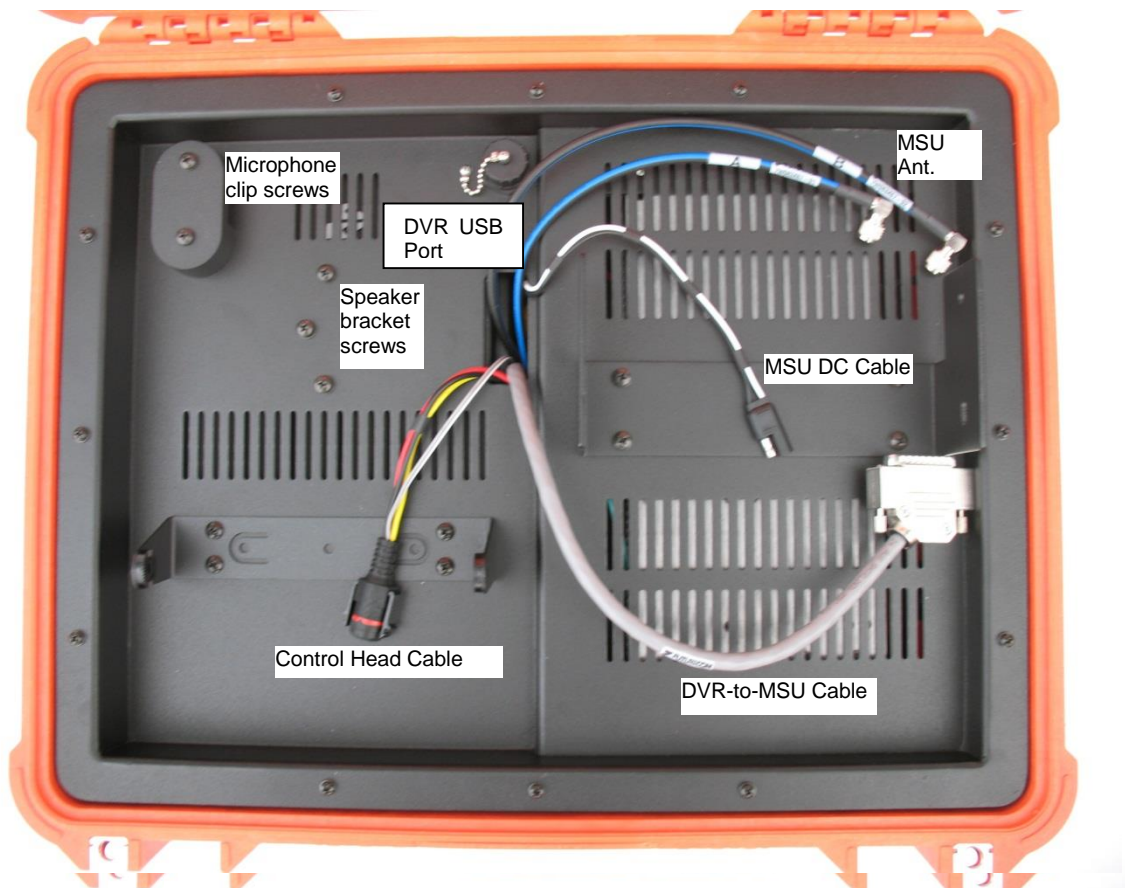


Figure 2 Suitcase Mount DVRS - As Received, Top Cover Open, and O5/O7 Control head model

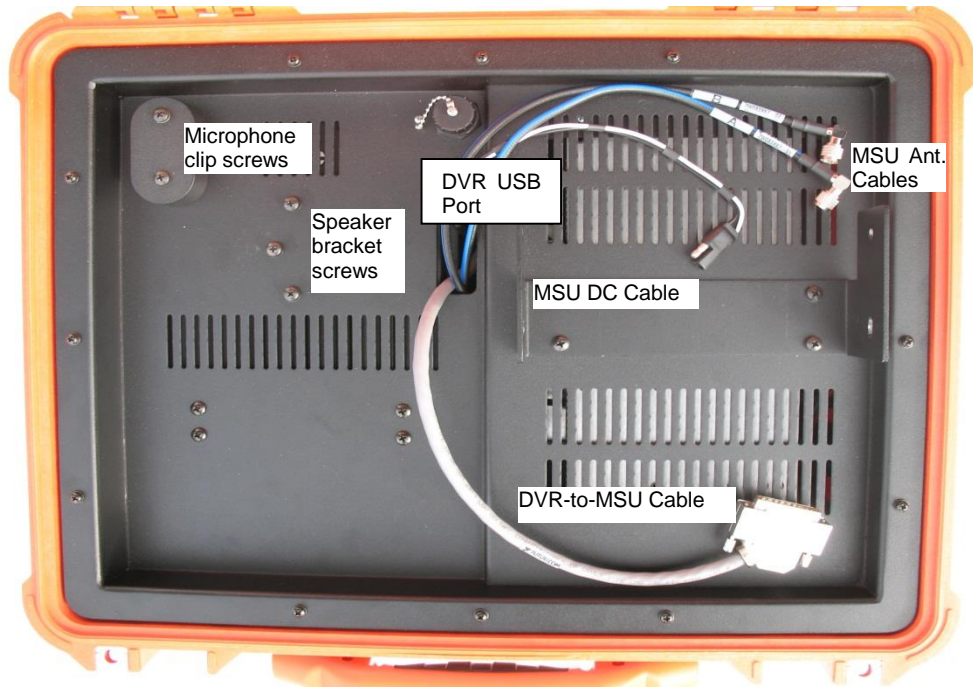


Figure 3 Suitcase Mount DVRS - As Received, Top Cover Open, and O3 Control head model

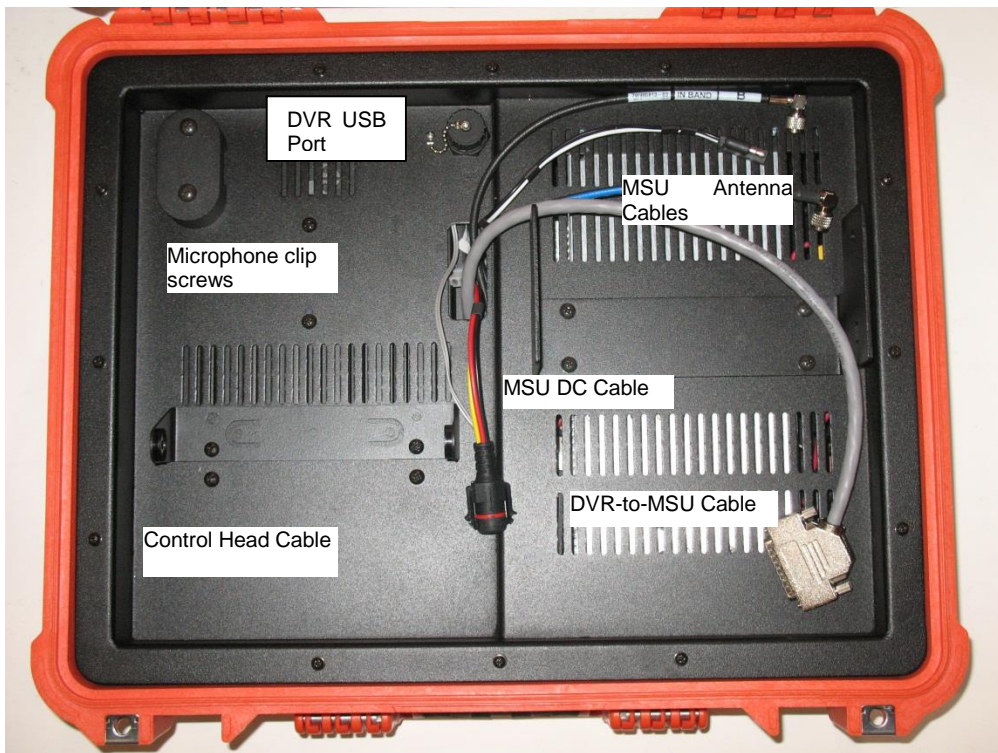


Figure 4 Suitcase Mount DVRS - As Received, Top Cover Open, and O2 Control head model

STEP 2 Install the microphone clip and speaker bracket as shown on Figure 5, Figure 6 and Figure 7 below. Connect the speaker connector to the CH harness.



Figure 5 Mounting the Mobile Speaker - O5/O7 Control Head Model



Figure 6 Mounting the Mobile speaker- O3 Control Head Model

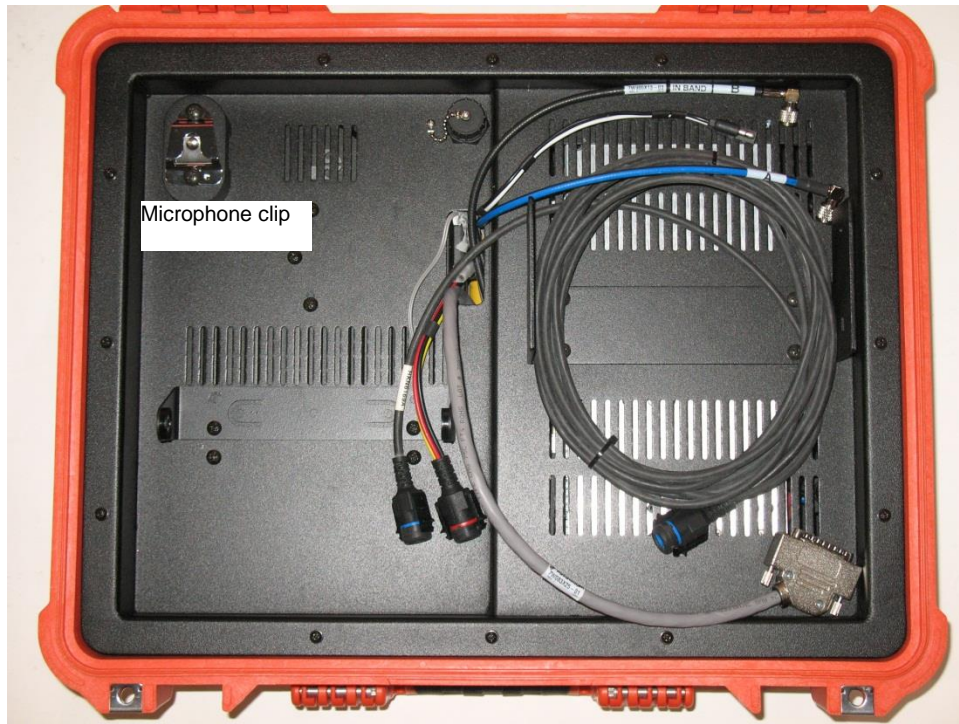


Figure 7 Mounting the Microphone clip- O2 Control Head Model

STEP 3 Install the MSU using the supplied MSU thumb screws (see Figure 8 below).

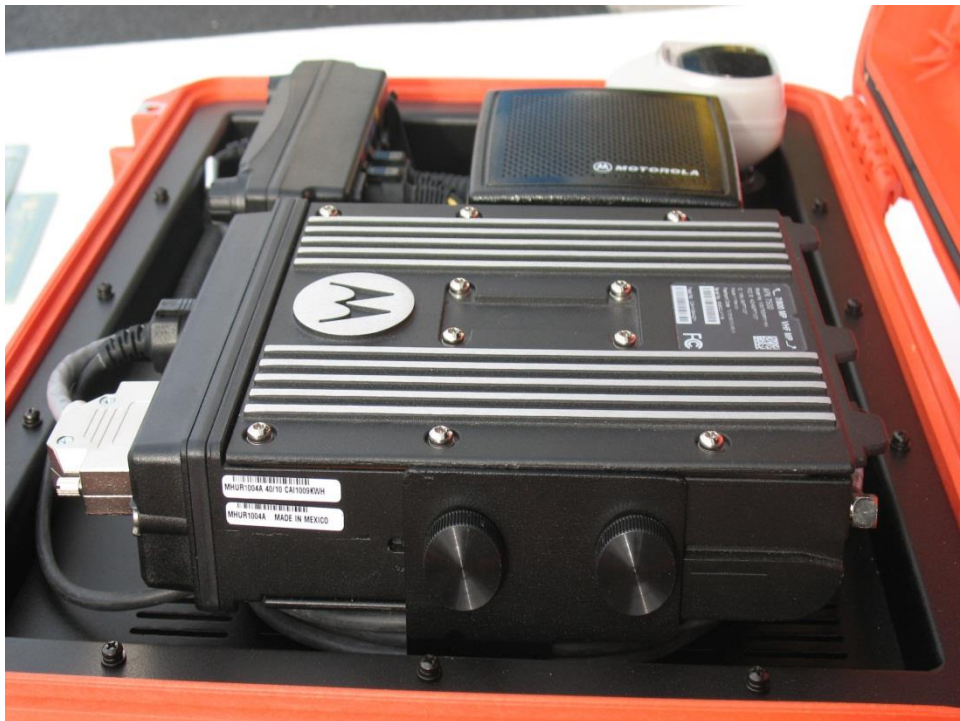


Figure 8 Mounting the Mobile Radio

STEP 4 Connect the MSU DC power cable, antenna cables, control head cable and DVR to Mobile cable. The RF cable marked as “In-Band B” must be connected to the in-band antenna port of the Mobile Radio.

STEP 5 Install the speaker, microphone and Control Head. Connect the CH DC cable, the other end of the MSU-to-CH cable and microphone cable as shown on Figure 9, Figure 10 and Figure 11 below.



Figure 9 Fully Assembled Suitcase Mount DVRS O5/O7 Control Head Models

Figure 10



Figure 10 Fully Assembled Suitcase Mount DVRS O3 Control Head Models



Figure 11 Fully Assembled Suitcase Mount DVRS O2 Control Head Models

STEP 6 Program the MSU, DVR and Portables for DVRS operation. Ensure the templates are fully matched by following the Guidelines provided in the DVRS Programming Guide. To program the DVRS, connect a PC with compatible Tweaker Programming Software to the DVR USB port located under the cap behind the MSU Speaker at the back end of the suitcase.

IMPORTANT! When programming the DVRS Frequencies, please ensure they match the DVRS Filtering frequencies. To check the tuning of the DVRS Duplexer, please refer to the DVRS labels located on the inside lid cover as shown on Figure 12.



Figure 12 DVRS labels inside the lid cover

Suitcase Mount DVRS Antenna Requirements

Any DVRS Model requires the use of two or three antennas – one or two connected to the Mobile Radio and one connected to the DVR.

The antennas are not part of the Suitcase Mount package and need to be provided separately.

Refer to Appendix 2 for a list of approved antennas for Temporary-Fixed Site.

IMPORTANT!

All DVRS models require 30dB minimum Antenna Isolation between the DVR and Mobile Radio Antennas for interference-free operation. A separation of several feet between the antennas may be needed to achieve this.

In addition to 30dB isolation, ensure RF exposure separation distance is maintained. Refer to the RF Energy Exposure Compliance, Awareness and Control Information and Operational Instructions section of this document.

Appendix 1 – Suitcase Mount DVR Specifications

General Specifications				
Dimensions: Height / Width / Depth	20.6" x 17" x 8.6"			
Approximate Weight	50 lbs			
Channel Spacing	12.5 or 25 kHz programmable			
Number of Channels	Up to 192			
CTCSS/DCS	Programmable per Channel			
Power Supply	13.8V DC +/- 20% 115 V AC (Optional 220V AC)			
Current Drain	115 VAC	13.8 VDC		
	Standby/Receive	0.5A	1.6A	
	Transmit	2.8A	14.5A	
Operating Temperature	-30°C to +60°C			
Antenna Impedance	50 Ohms			
Duty Cycle	Continuous (DVR)			
External Connectors				
Antenna (DVR and Mobile)	N female			
Computer Interface	USB			
Power	AC – MS3102E14-7P; DC – MS3102E16-11P			
Equipment Type Acceptance				
	VHF	UHF	700	800
FCC	LO6-DVRSVHF	LO6-DVRSUHF	LO6-DVRS700	LO6-DVRS800
Industry Canada	2098B-DVRSVHF	2098B-DVRSUHF	2098B-DVRS700	2098B-DVRS800
Transmitter Specification				
	VHF	UHF	700	800
Frequency Band [MHz]	136-174	380-430 450-470 470-512	764-776	851-869
Power Output @ Antenna Port	10W (programmable per channel from 1W to 10W)			
CCT Option	15 sec to 15 min or Disabled			
Max Spurious Output	-20dBm			
Frequency Stability	+/- 1.5ppm			
FM Hum and Noise 12.5 / 25 kHz	37 dB / 43 dB			
Audio Response	+1, -3 dB of 6 dB / octave pre-emphasis characteristic over 300 Hz – 3 kHz			
Audio Distortion	<2%			
Receiver Specification				
	VHF	UHF	700	800
Frequency Band [MHz]	136-174	380-430 450-470 470-512	794-806	806-824
Receiver Sensitivity	-115 dBm			
Frequency Stability	+/- 1.5ppm			
Selectivity 12.5 / 25 kHz	60 dB / 75 dB			
Intermodulation	70 dB			
Deviation 12.5 / 25 kHz	+/-2.5 kHz / +/-5 kHz			
FM Hum and Noise 12.5 / 25 kHz	37 dB / 43 dB			
Audio Output (Repeater Detect Audio)	600 mV RMS nominal, flat response			
Audio Response	+1, -3 dB of 6 dB / octave de-emphasis characteristic over 300 Hz – 3 kHz			
Audio Distortion	<2%			

Appendix 2 – Approved Antennas and Maximum output power (W) for combination DVR and APX mobiles for Temporary-Fixed Site

NOTE:

APX mobile RF conducted antenna power in the tables below denotes up to 50% Tx duty cycle.

DVR RF conducted antenna power in the tables below denotes up to 100% Tx duty cycle.

DVR

Band	Antenna	Power (W)
VHF (136-174MHz)	VAD0003A	6
UHF1 (406-430MHz)	VAE0003A	10
UHF2 (450-470MHz)	VAE0003A	10
UHF3 (470-512MHz)	VAE0003A	10
700 (768-806MHz)	VAF0003A	5
800 (806-869MHz)	VAF0003A	10

APX MSU

Band	Antenna	Power (W)
VHF (136-174MHz)	VAD0003A	60
UHF1 (406-470MHz)	VAE0003A	48
UHF2 (450-520MHz)	VAE0003A	54
700/800 (764-870MHz)	VAF0003A	42

Max Power (W) for combination DVR and APX

		APX MSU			
DVR/APX		VHF	UHFR1	UHFR2	700/800MHz
DVR	VHF	6/60	6/48	6/54	6/42
	UHFR1	10/60	10/48	10/54	10/42
	UHFR2	10/60	10/48	10/54	10/42
	UHFR3	10/60	10/48	10/54	10/42
	700MHz	5/60	5/48	5/54	5/42
	800MHz	10/60	10/48	10/54	10/42



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