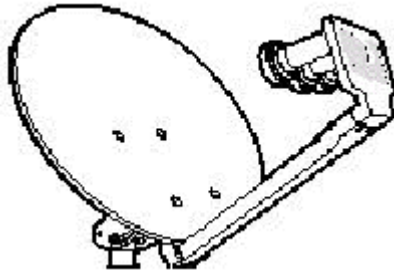
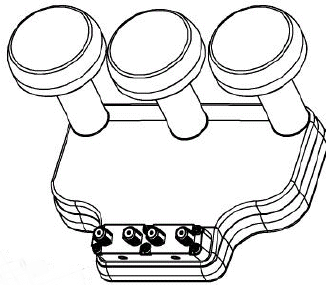


Solutions for Expanding the DIRECTV Integrated ODU Systems



This tech note covers solutions for expanding the four output limitation of the newer second and third generation ODU systems only. Also covered in this document are simple solutions for integrating with terrestrial off air signals for NTSC and ATSC reception. The second and third generation DIRECTV ODU systems can be identified by the all in one integrated multi-switch/LNB unit located on the end of the dishes LNB support arm. The first generation ODU incorporated a separate multi-switch mounted on the rear of the dish, and three independent LNB's on the support arm.



Expanding the fixed four outputs to six or more is not difficult to do, and allows the use of off the shelf four input, X output (X = desired number of outputs) multi-switches. Since the multi-switch is built into the LNB, there is a need for a path for the 22kHz tone from the IRD to the integrated multi-switch/LNB on the dish, as most multi-switches block the 22kHz switching tone that the IRD uses to select between the SAT A satellite at 101, and the SAT B and C satellites located at the 119 and 110 locations.

Therefore, the installation of inline, 22kHz tone generators are required between any two of the four outputs from the integrated multi-switch/LNB on the dish, and the two ports on the external multi-switch labeled either SAT B, H/Low H/High, or 22kHz tone inputs. If the tone generator has an on/off switch, make sure it is set to the "ON" position.

DIAGRAM A shows an example for expanding from the fixed four outputs to an eight output, multi-switch with no internal 22 kHz tone generation, using Zinwell inline 22kHz tone generators.

Integrating off air signals into the second and third generation DIRECTV ODU systems can be accomplished using several different techniques. The first approach, DIAGRAM B, uses the configuration from DIAGRAM A, but uses an external multi-switch multi-switch with no internal 22 kHz tone generation, which incorporates an off air input, and is the easiest way to integrate the off air signals to all TV sets.

Solutions for Expanding the DIRECTV Integrated ODU Systems

DIAGRAM C shows the use of a Quad combiner which integrates off air signals into all four of the outputs from the integrated multi-switch/LNB on the dish.

DIAGRAM D show the simplest method of providing off air signals to only the required TV sets. In this example, individual diplexers are used to feed two of the four outputs from the integrated multi-switch. Instead of two separate diplexers, a single dual diplexer would also work in this example.

DIAGRAM E shows how to integrate off air signals with a four input multi-switch with internal 22 kHz tone generation, which does not have a terrestrial input. In this example, two quad combiners are used on an eight output multi-switch, and the antenna input is split to feed the two combiners. Then a diplexer is required at each IRD to recover the VHF/UHF signal. To overcome the signal loss through the 2 way splitter, quad combiner, and diplexers, a 10-12 dB VHF/UHF amplifier is inserted inline from the antenna to the 2 way splitter. For good ATSC reception, a high gain, very low noise amplifier is best, such as the Channel Master 7777 or 7778.

DIAGRAM F shows how to integrate off air signals with a four input multi-switch, with internal 22 kHz tone generation, which does not have a terrestrial input. In this example, diplexers are only added at each end to the lines requiring an off air signal, simplifying the installation and reducing the cost. Since the signal loss is not as much as the configuration in DIAGRAM D, the use of a VHF/UHF amplifier is optional, depending on local signal levels. Instead of two separate diplexers, a single dual diplexer would also work in this example.

Solutions for Expanding the DIRECTV Integrated ODU Systems

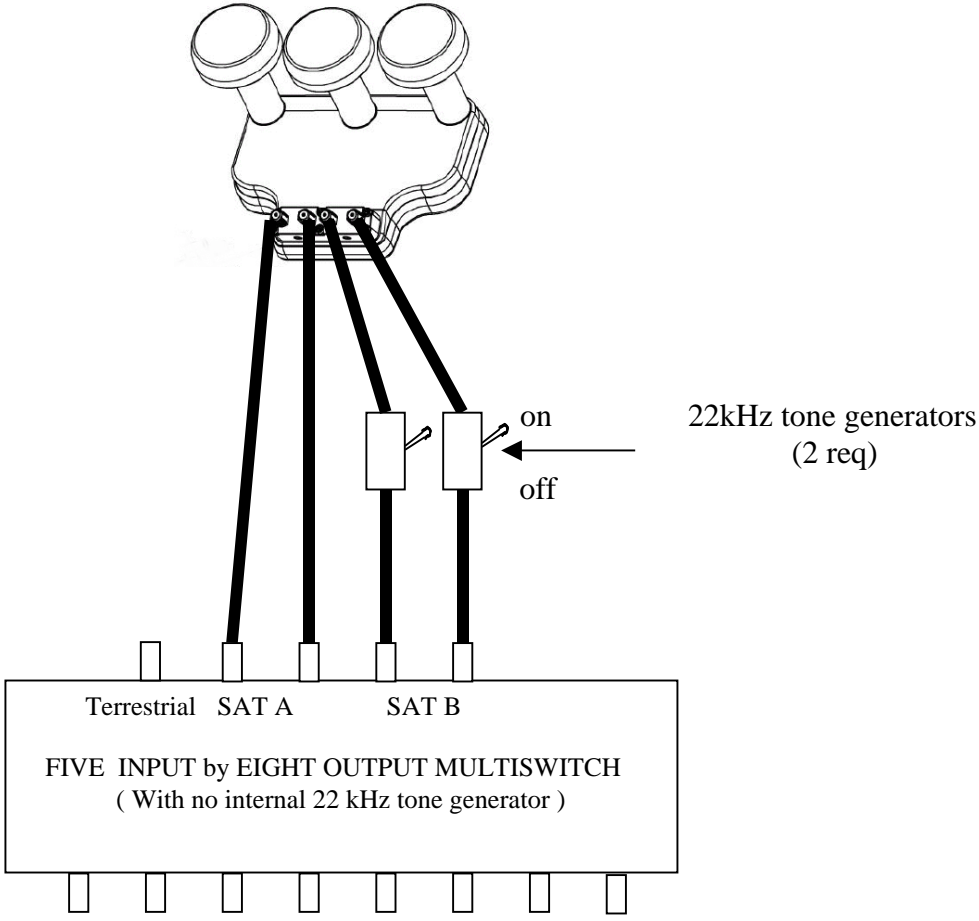


DIAGRAM A

Solutions for Expanding the DIRECTV Integrated ODU Systems

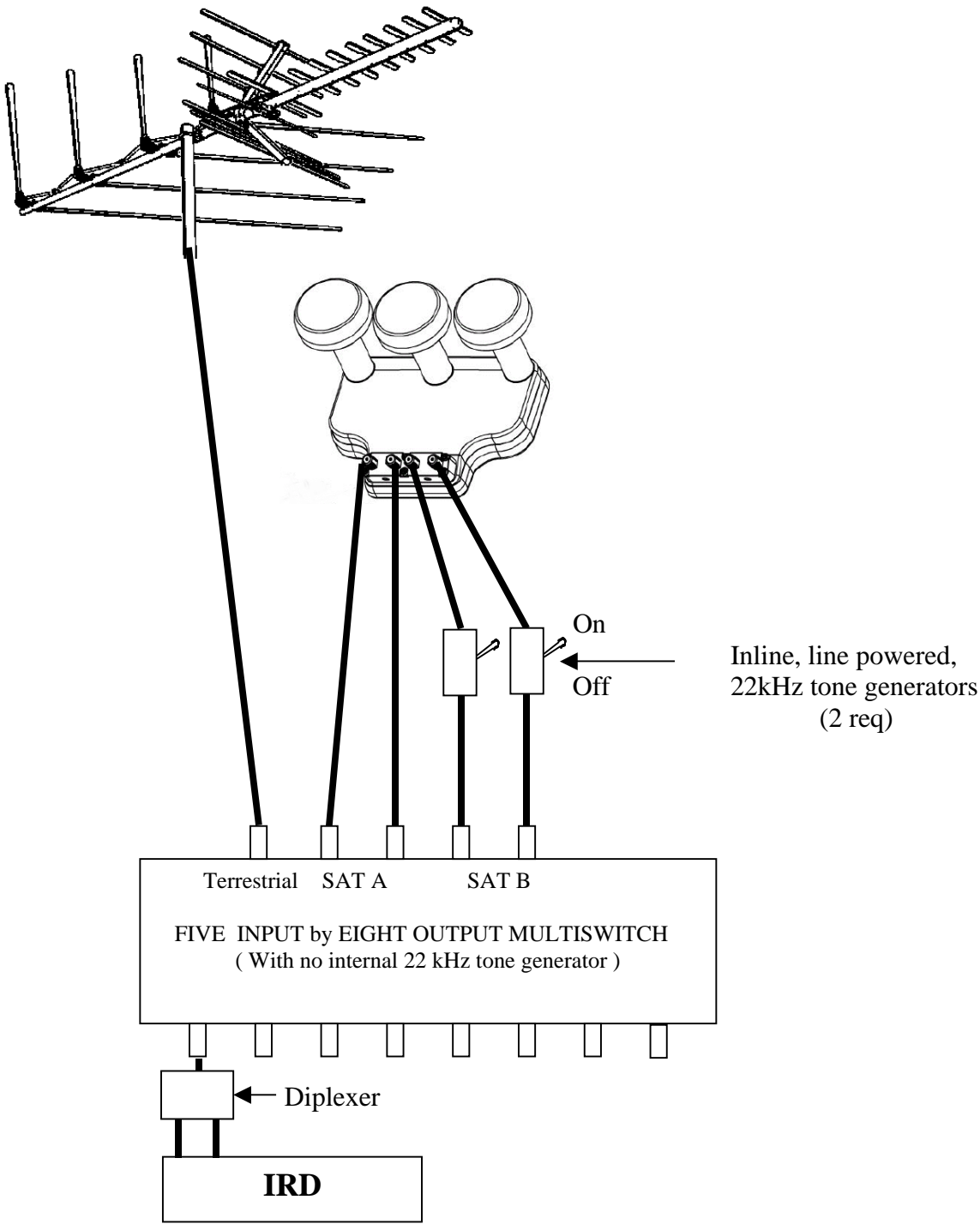


DIAGRAM B

Solutions for Expanding the DIRECTV Integrated ODU Systems

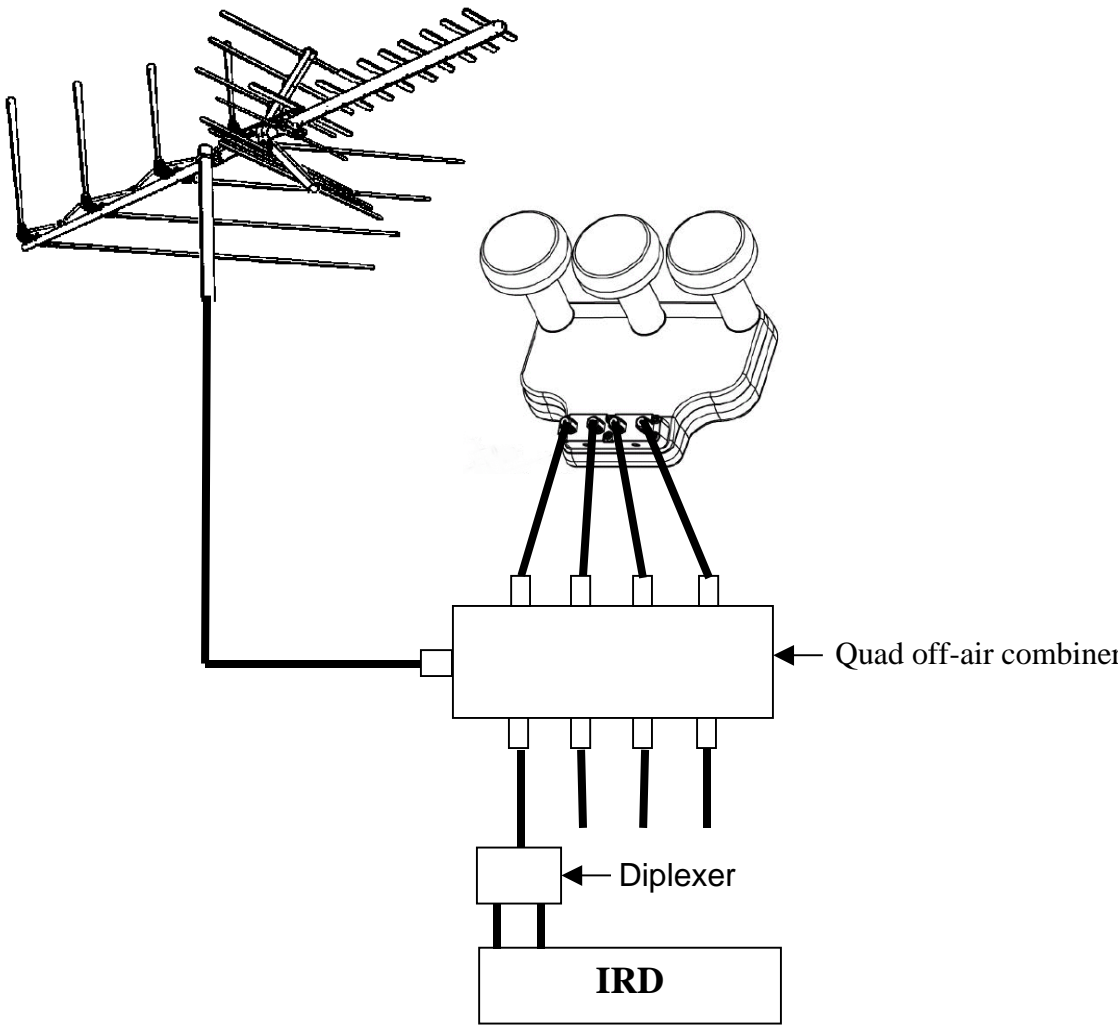


DIAGRAM C

Solutions for Expanding the DIRECTV Integrated ODU Systems

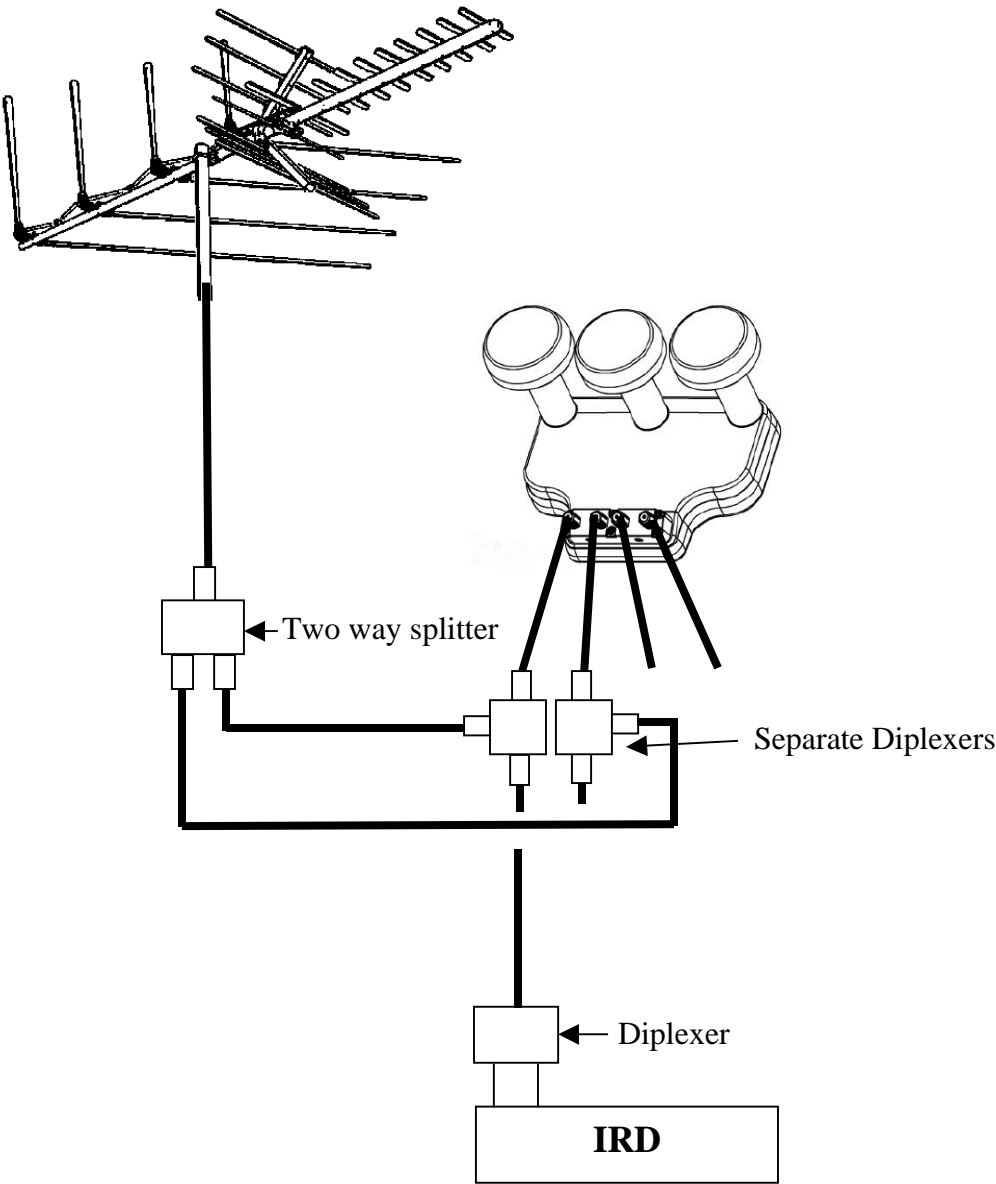


DIAGRAM D

Solutions for Expanding the DIRECTV Integrated ODU Systems

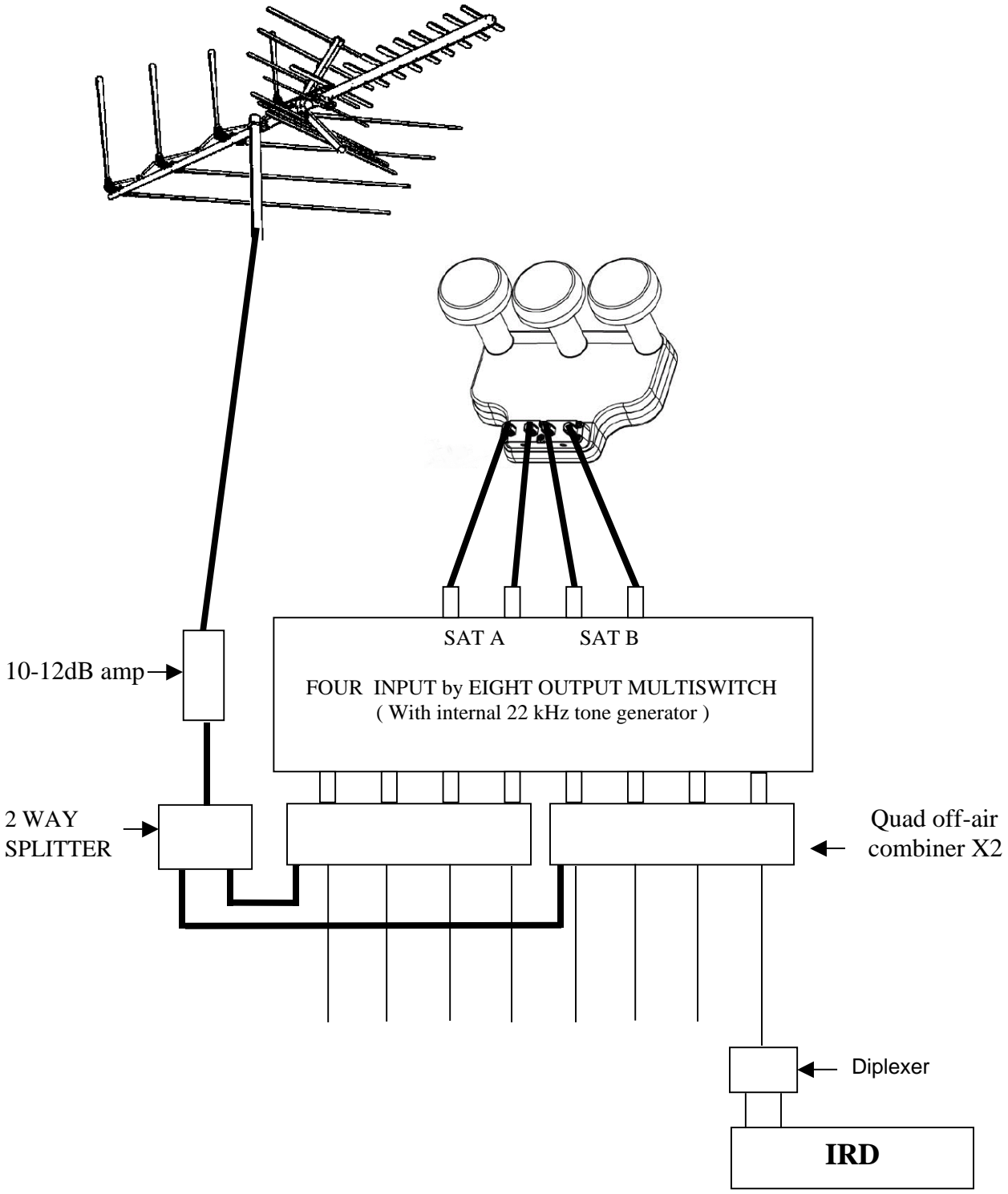


DIAGRAM E

Solutions for Expanding the DIRECTV Integrated ODU Systems

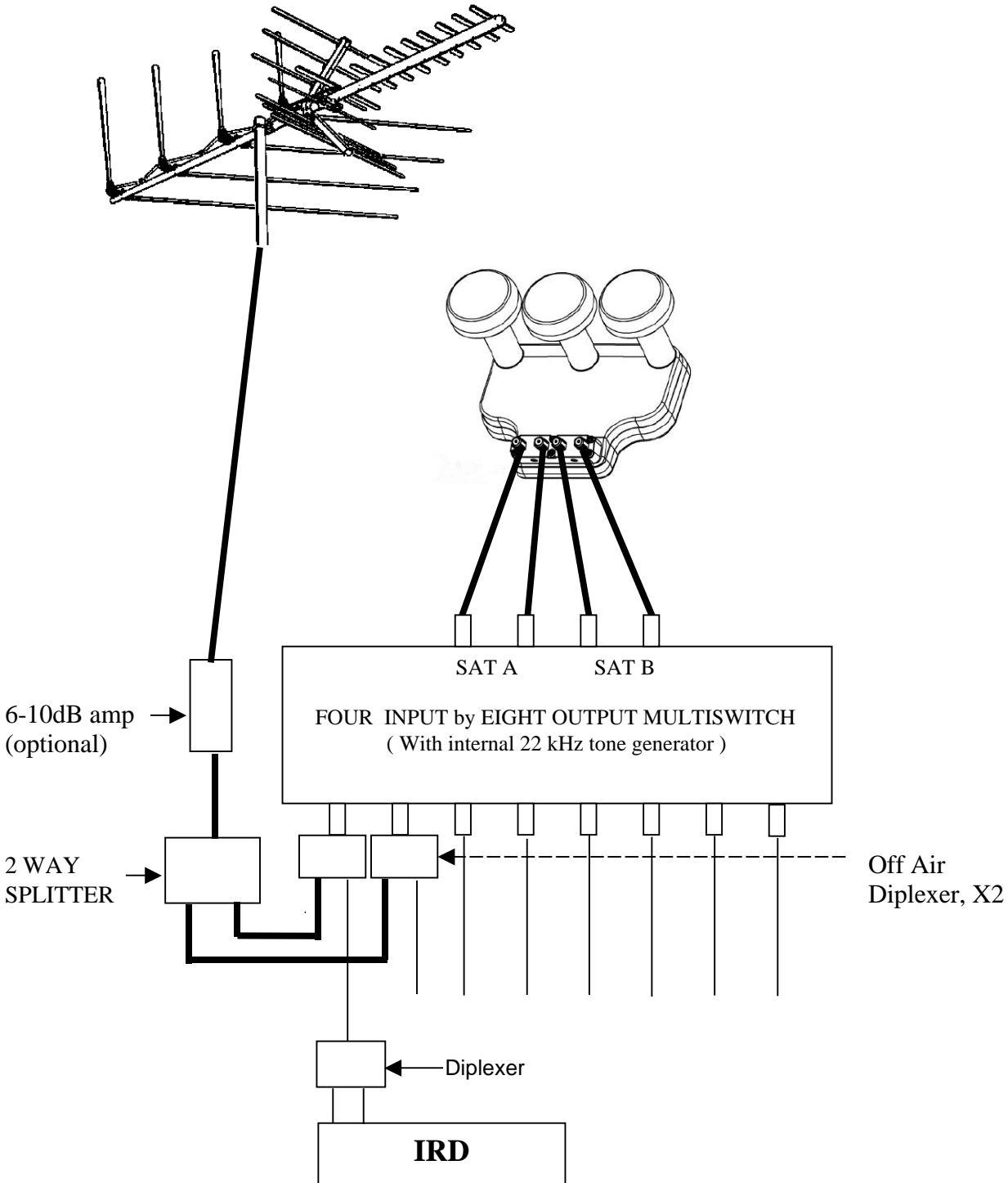


DIAGRAM F