APPLIED INSTRUMENTS, INC.

TELECOMMUNICATIONS INSTRUMENTATION

Application Note
DISH Network Hopper Node System Testing
(Hopper 1 & Hopper 2)
Using Super Buddy
Satellite Meter

Document Filename	XipTesting.odt
Revision	2
Date	03/14/2019
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1 Introduction

The XIP Hopper system can be installed and tested with the Super Buddy satellite meter, but there are some limitations. This document describes what can be done and what cannot be done.

1.1 Current Limiting

The ability of the Super Buddy to provide power imposes some limitations to testing. The existing Super Buddy meters come in two varieties: older units with an RS-232 serial port but no USB port and later units with a USB port. The current capability of these two varieties differ:

Serial units: 625 mAmps
USB units: 750 mAmps

Note: The limit is lower when meter is connected to AC power:
Serial units: 250 mAmps
USB units: 500 mAmps

1.2 Power Requirements

The possible components of an XIP Hopper system require different amounts of power. Based on testing of a limited sample of these components we found the following:

Node	Current Draw
Solo	250 mAmps
Duo	310 mAmps

Note: the nodes require less power when not connected to an LNB. The figures above are for nodes connected and active.

LNB Model	Current Draw	Description
Dish 1000	570 mAmps	
Dish 1000.2	490 mAmps	
Dish 1000.4	275 mAmps	
Dish 1000.2 EA	410 mAmps	Eastern Arc DPP Twin

Also, the power requirements of a given LNB model may vary depending on the manufacturers vintage. The figures above are based on testing of one or two samples of each listed model.

1.3 Alternate Power

When the power requirements of the node and dish exceed the capacity of the meter, there are still two options available:

1.   Use a power inserter such as the Model DPP44 Power Inserter.
2.   For a duo node, connect the Hopper to one host port while testing the other.

1.4   Frequency Bands

The Xip Hopper system supports 3 tuners on each host line by stacking the transponders into 3 frequency bands.

Band 1 = 950 to 1450 MHz
Band 2 = 1650 to 2150 MHz
Band 3 = 2500 to 3000 MHz

The Super Buddy, by itself, can tune to Bands 1 and 2, but not Band 3.
Applied Instruments' newer meter, the model XR-3 Modular Test Instrument, with the Turbo S2 module with optional high band tuning capability (part number XR-TS2-02), can tune to bands 1, 2, and 3.

2   <u>Test Points</u>

2.1   Testing at the Dish

The dish should be pointed and tested by connecting the meter's Signal In port to an LNB output port and selecting the appropriate dish LNB model. Do not use the Xip Hopper menu selections at this   point.

All models can be tested at this point with either type of Super Buddy.

2.2   Testing at the Node

1. Check the input
When installing the node, it is a good idea to test the input to the node using the same settings as used when pointing the dish. This is just to verify there are no issues in the cables coming from the dish to the node.

2. Connect the node to the dish

3. Test the output from the node
The possibilities for testing the output from the node depend on the combination of node, LNB model, meter type, and whether the down-converter (DnCvt) is being used.

The following table shows the combinations that will work and those that won't.

Node	Dish LNB Model	Combined Current Draw	Serial Super (625)	USB Super (750)	Any, with power inserter
Solo	1000	820	No	No	YES
	1000.2	740 T	No	YES	YES
	1000.4	470 T	YES	YES	YES
	1000.2 EA	475 T	YES	YES	YES
Duo	1000	880	No	No	YES
	1000.2	820 T	No	No	YES
	1000.4	660 T	No	YES	YES
	1000.2 EA	720 T	No	YES	YES

(A "T" in the current draw column indicates this combination was tested, not calculated.)

Or, another way to view this same data, the following shows what is needed to test the node output under the various combinations:

Node	Dish LNB	Band 1 & 2
Solo	1000	PI
	1000.2	USB or PI
	1000.4	USB or serial
	1000.2 EA	USB or serial
Duo	1000	PI
	1000.2	PI
	1000.4	USB or PI
	1000.2 EA	USB or PI

Where:
 "PI" indicates a power inserter or attached powered Hopper is needed
"USB" means a USB Super Buddy will work.
"Serial" means an RS232 serial port type Super Buddy will work,

2.3   Rule of Thumb

For an even easier rule of thumb:

1. If you have USB Super Buddy, you will need a power inserter or Hopper for the Dish 1000 (either node) or Dish 1000.2 (Duo node).

2. If you have RS-232 serial type Super Buddy, you will need a power inserter or Hopper for everything but the Solo node with a Dish 1000.4 or 1000.2 EA.

Note: the Applied Instruments models AI Turbo S2 and XR-3 have the same current capability as the USB type Super Buddy but their batteries' run time per charge is much longer.

2.4   Testing at the Hopper

Testing the signal at the final connection to the Hopper can be performed in the same fashion, and with the same restrictions, as at the node output.

3 MoCA Testing

The Super Buddy is not capable of testing the MoCA network signal.

The model AI Turbo S2, and the newer model XR-3 instrument with the model Turbo S2 satellite meter modules (part numbers XR-TS2-01 & XR-TS2-02), are capable of displaying a spectrum graph showing the MoCA signal. These meters are able to tune   to the 750 to 850 MHz frequency range used by the MoCA signal and have a special peak-hold   method needed to view the bursted MoCA signal.

To obtain this MoCA spectrum on either of these models of meters:
    Connect the meter's ODU/LNB port to a client or host port of the node,
    Press MENU soft-key to get to the Main Menu
    Select 'Spectrum'
    Select 'MORE'
    Select 'MoCA view'

The network must be active, so a Hopper should be connected during this test.

Due to the sometimes-on, sometimes-off nature of the MoCA signal, you will have to wait for several scans before a representative level will be shown.