LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

LIGO-T000111-00-C *LIGO* 10/05/00

ISC Frequency Distribution System Installation Guide

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Distribution of this document:
LIGO Science Collaboration

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INSTALLATION OF THE RF FREQUENCY DISTRIBUTION SYSTEM

SYSTEM COMPONENTS

The frequency distribution system consists of the following components:

3 RF AM Stabilizers

3 ASC Frequency Distribution assemblies

2 LSC Frequency Distribution assemblies

Each assembly has as assigned frequency, which is indicated on the front panel. The installation procedure for each frequency will be slightly different. Use the table below to determine which procedure to use.

Associated Sideband	LHO 2K Frequency	LHO 4K Frequency	LLO 4K Frequency	Procedure to use
Resonant	29.508 MHz	24.495 MHz	24.495 MHz	1
Non-resonant	68.800 MHz	61.232 MHz	61.232 MHz	2
Mode cleaner	26.717 MHz	33.289 MHz	33.289 MHz	3

CAUTION: The frequency distribution system uses power levels that may damage some test equipment. When using a spectrum analyzer or power meter during the installation, use attenuators as necessary to protect the equipment.

PROCEDURE 1

Resonant side band frequency distribution

1. Install the RF AM Stabilizer, ASC Frequency Distribution, and LSC frequency Distribution assemblies in the appropriate rack locations. Provide power to the RF AM Stabilizer and ASC Frequency Distribution assemblies and turn them on.

2. Install the cable from the IFR 2023A signal generator output to the RF AM Stabilizer **RF Input**. Set the signal generator for an output power of +10 dBm.

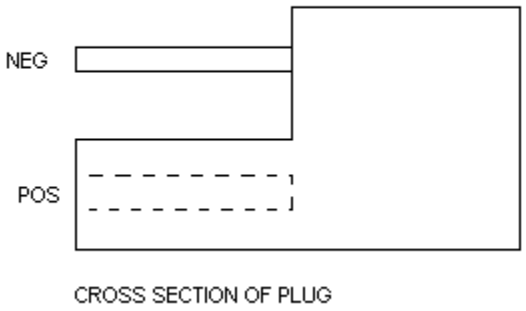
3. Monitor the **ASC OUT** output of the RF AM Stabilizer with a spectrum analyzer or power meter, and adjust the **ASC OUT ATTN** switch for an output power of +27 dBm.

4. Install the cable from the RF AM Stabilizer **ASC OUT** jack to the ASC Frequency Distribution **RF INPUT** jack.

5. Monitor the **LSC OUT** jack of the ASC Frequency Distribution assembly with a spectrum analyzer or power meter, and adjust the **LSC OUT ATTN** switch for an output power of +27 dBm.

6. Install the cable from the ASC Frequency Distribution **LSC OUT** jack to the LSC Frequency Distribution **RF INPUT** jack. The gain of the LSC Frequency Distribution assemblies is fixed, and is set for an output of +10 dBm with an input of +27 dBm. If a different output power is desired, use the **LSC OUT ATTN** switch on the ASC Frequency Distribution assembly to adjust it.

7. Install the cable from the 4116 card to the **MOD CONT IN** jack on the RF AM Stabilizer. The plug should be wired such that the pin is (-) and the socket is (+):



CROSS SECTION OF PLUG

PROCEDURE 2

Non-resonant side band frequency distribution

1. Install the RF AM Stabilizer and ASC Frequency Distribution assemblies in the appropriate rack locations. Provide power to both assemblies and turn them on.

2. Install the cable from the IFR 2023A signal generator output to the RF AM Stabilizer **RF Input**. Set the signal generator for an output power of +10 dBm.

3. Monitor the **ASC OUT** output of the RF AM Stabilizer with a spectrum analyzer or power meter, and adjust the **ASC OUT ATTN** switch for an output power of +27 dBm.

4. Install the cable from the RF AM Stabilizer **ASC OUT** jack to the ASC Frequency Distribution **RF INPUT** jack.

5. Install the cable from the 4116 card to the **MOD CONT IN** jack on the RF AM Stabilizer. The plug should be wired such that the pin is (-) and the socket is (+), as shown above.

PROCEDURE 3

Mode Cleaner side band frequency distribution

1. Install the RF AM Stabilizer, ASC Frequency Distribution, LSC frequency Distribution, and the RF splitter in the appropriate rack locations. Provide power to the RF AM Stabilizer and ASC Frequency Distribution assemblies and turn them on.

2. Install the cable from the IFR 2023A signal generator output to the RF AM Stabilizer **RF Input**. Set the signal generator for an output power of +10 dBm.

3. Monitor the **ASC OUT** output of the RF AM Stabilizer with a spectrum analyzer or power meter, and adjust the **ASC OUT ATTN** switch for an output power of +27 dBm.

4. Install the cable from the RF AM Stabilizer **ASC OUT** jack to the RF splitter ‘sum’ connection.

5. Install the cable from either of the output connections on the RF splitter to the ASC Frequency Distribution **RF Input** jack.

6. Install the cable from the remaining output connection on the RF splitter to the **RF Input** of the LSC Frequency Distribution assembly.

7. Install the cable from the 4116 card to the **MOD CONT IN** jack on the RF AM Stabilizer. The plug should be wired such that the pin is (-) and the socket is (+), as shown above.