

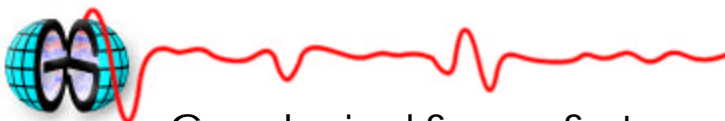
Model 4108F Horn Antenna

System Settings and User Notes



We Provide Complete Survey Solutions

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FCC NOTICES:

This device complies with part 15 of the FCC Rules:

Operation is subject to the following conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Operation of this device is restricted to law enforcement, fire and rescue officials, scientific research institutes, commercial mining companies, and construction companies. Operation by any other party is a violation of 47 U.S.C. § 301 and could subject the operator to serious legal penalties.

Coordination Requirements.

(a) UWB imaging systems require coordination through the FCC before the equipment may be used. The operator shall comply with any constraints on equipment usage resulting from this coordination.

(b) The users of UWB imaging devices shall supply detailed operational areas to the FCC Office of Engineering and Technology who shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area of operation, and the FCC ID number and other nomenclature of the UWB device. This material shall be submitted to the following address:

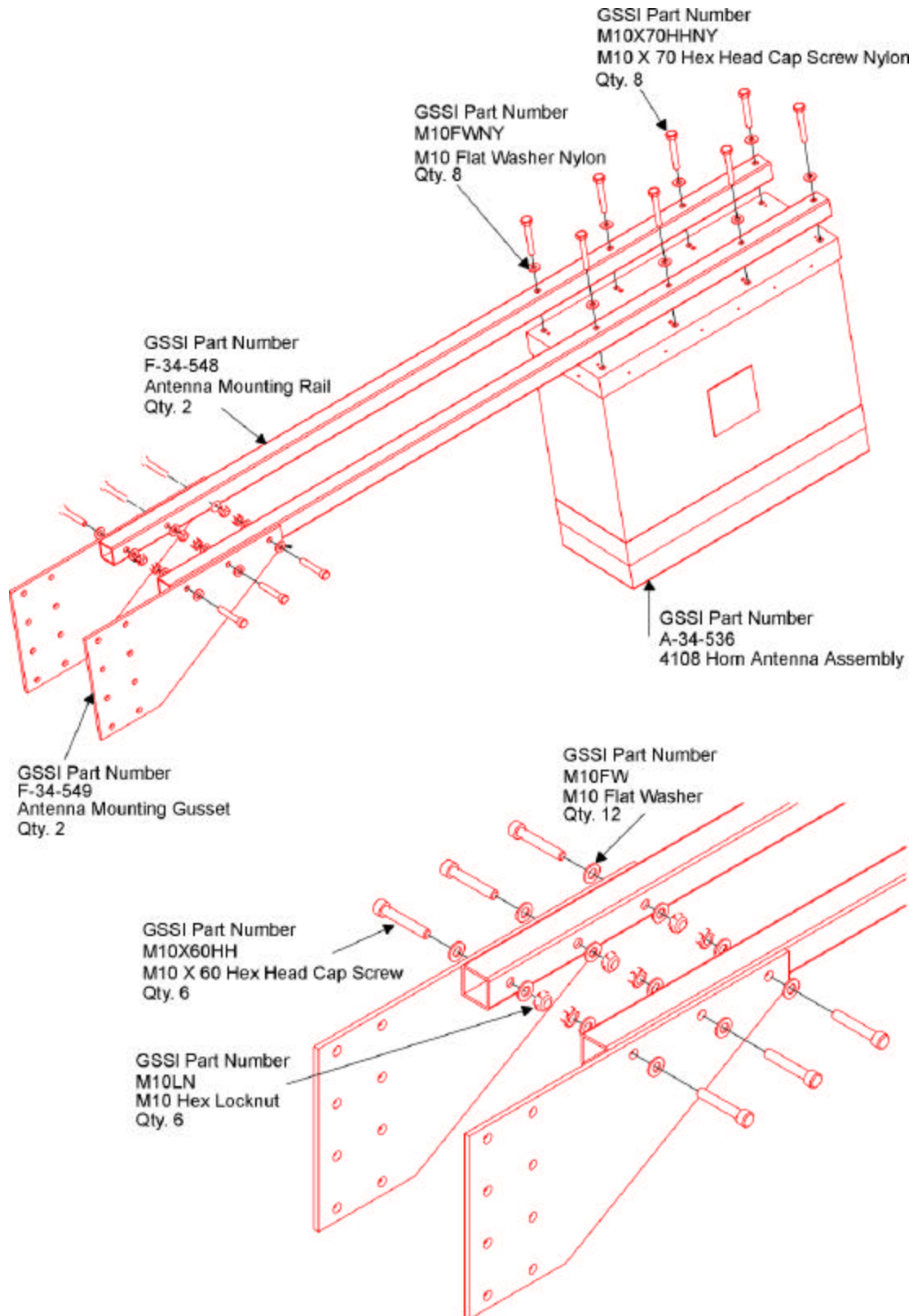
Frequency Coordination Branch., OET
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554
ATTN: UWB Coordination

(d) Users of authorized, coordinated UWB systems may transfer them to other qualified users and to different locations upon coordination of change of ownership or location to the FCC and coordination with existing authorized operations.

(e) The NTIA/FCC coordination report shall include any needed constraints that apply to day-to-day operations. Such constraints could specify prohibited areas of operations or areas located near authorized radio stations for which additional coordination is required before operation of the UWB equipment. If additional local coordination is required, a local coordination contact will be provided.

(f) The coordination of routine UWB operations shall not take longer than 15 business days from the receipt of the coordination request by NTIA. Special temporary operations may be handled with an expedited turn-around time when circumstances warrant. The operation of UWB systems in emergency situations involving the safety of life or property may occur without coordination provided a notification procedure, similar to that contained in CFR47 Section 2.405(a)-(e), is followed by the UWB equipment user.

Antenna Mounting Assembly



Mounting and Data Collection Recommendations

Mounting Specifications:

The Model 4108F antenna mounting hardware includes 2 square fiberglass tubes and 2 gusset plates. Figure 1 shows a typical 4108 setup on the back of GSSI's van.

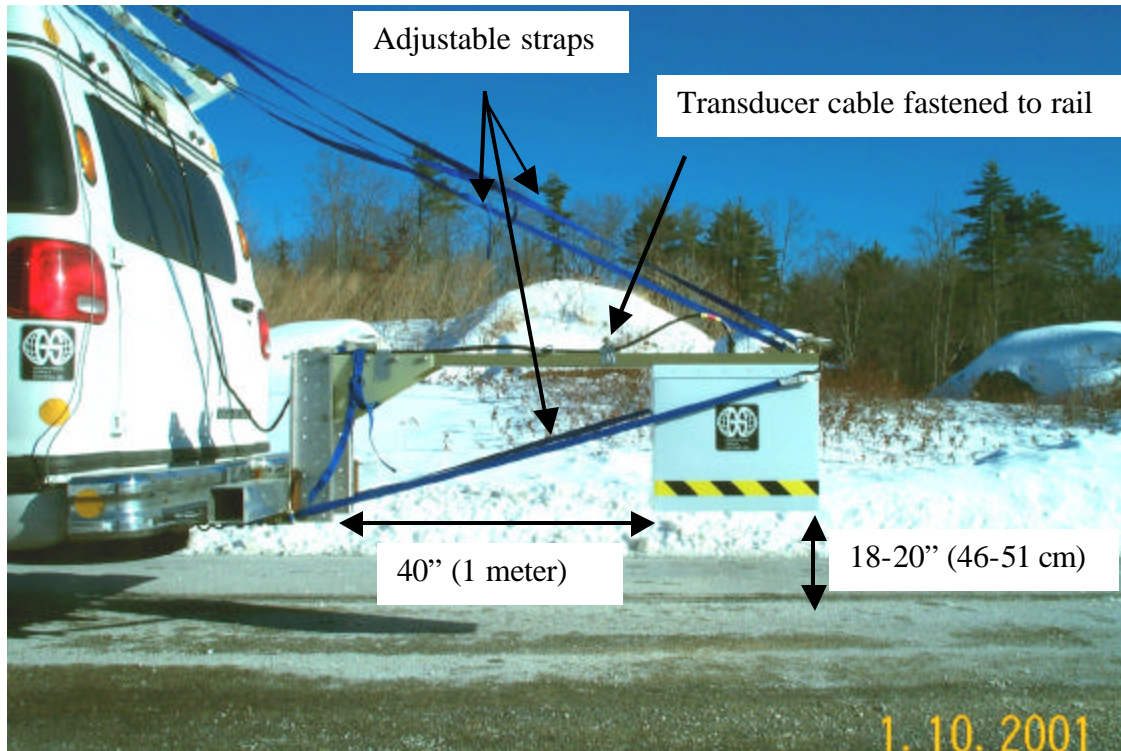


Figure 1: Typical Model 4108F setup showing fiberglass rods and gusset plates. The vertical metal pieces attached to the gusset plates are sold separately.

It is recommended that the user follow the following specifications for mounting the 4108F antennas:

- (1) Recommended antenna bottom height above pavement with vehicle stationary: 18-20" (46 – 51 cm)
- (2) Recommended closest distance between antenna and significant metal (vertical metal rods or the vehicle's bumper) should be at least 40" (1 m).
- (3) Black transducer cable should be fastened to one of fiberglass rails to prevent cable movement.
- (4) Excessive antenna bouncing should be minimized. The GSSI van setup includes 4 adjustable straps that minimize vertical and horizontal antenna movement, especially on bumpy roads.

Data Collection Recommendations:

The following software settings are recommended for general Model 4108F data collection. See the SIR-20 manual for instructions on how to make setting modifications.

Table 1. Recommended data collection settings for Model 4108 antenna.

| | SIR-20 |
|---------------------------|---------------|
| Transmit Rate | 100 KHz |
| Samples/Scan | 512 |
| Scans/Sec: | 160 |
| Time Range | 20 ns |
| Bits/Sample | 16 |
| Vertical Filter Settings: | |
| IIR High Pass | 1 MHz |
| FIR High Pass | 250 MHz |
| FIR Low Pass | 3000 MHz |

Position: Signal position should be adjusted so that the latest arriving wavelet of the direct-coupling is near the top of the scan. This wavelet should always be visible in the data. GSSI's post-processing software requires the presence of this wavelet in the data. Figure 2 shows a typical scan of data with the signal properly positioned.

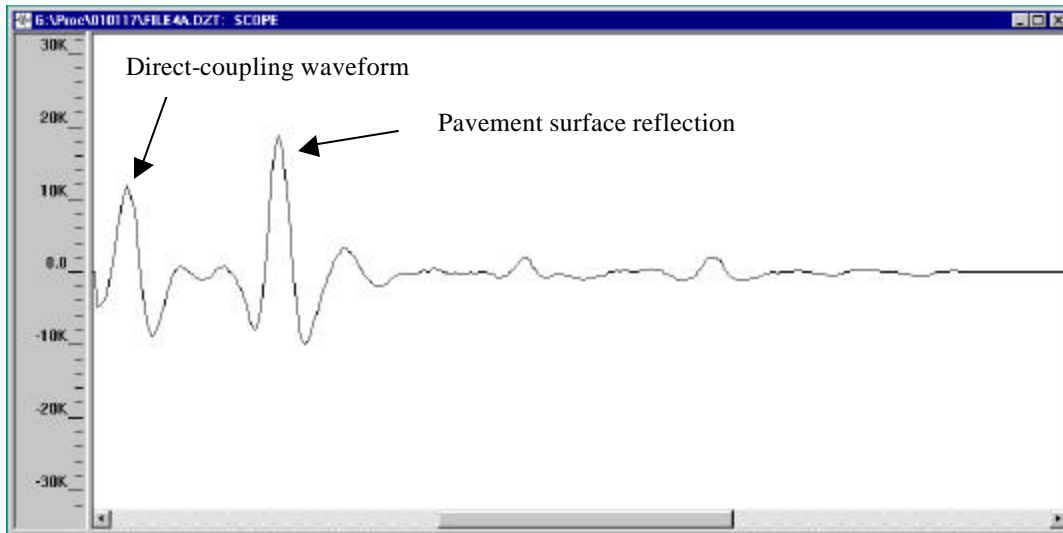


Figure 2: Typical data scan obtained with Model 4108F and recommended software settings.

Gain: Data collection gain for the 4108F antenna should be adjusted so that the peak amplitude of the pavement surface reflection is approximately 2/3 of the total screen width. For example, in Figure 2 the pavement surface reflection has an amplitude of approximately 20000 and the full screen width is 32000. Using the filter settings described in Table 1, a gain of 13-14 dB is typical for most pavement surfaces. However, for more highly reflective surfaces, such as concrete, the user may have to decrease the gain value. **It is very important that the pavement surface reflection amplitude (and metal plate reflection when performing calibration) never reach its maximum.** Figure 3 shows an improperly gained signal.



Figure 3: Example of Model 4108F data scan collected with too much gain.

Quick Setup Procedure SIR-20

1. Connect the transducer cable from the SIR-20 (Channel 1) to the Model 4108F antenna.
2. Connect the power supply to the SIR-20.
3. Connect the Model 10F marker cable to the marker connector on the SIR-20, shown in Figure 4. The SIR-20 will not operate with a horn antenna without this cable attached.

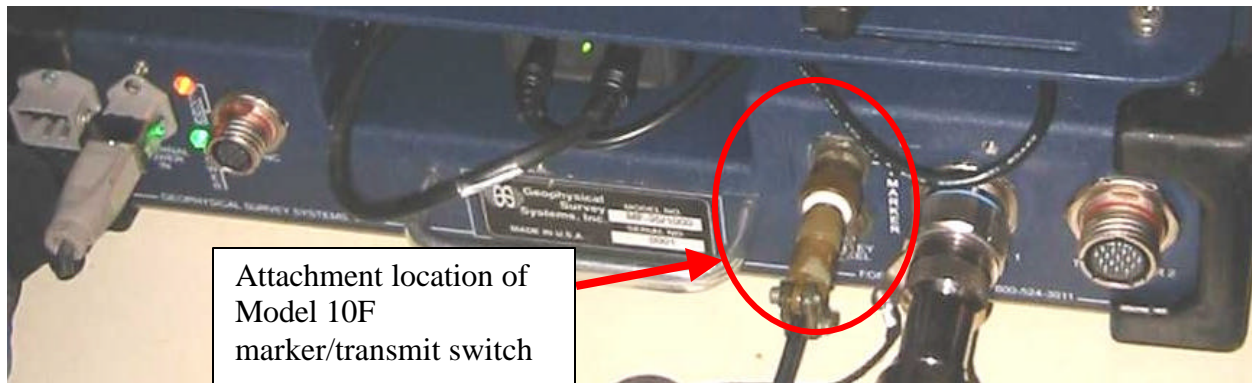




Figure 3. Location of attachment of Model 10F marker/transmit switch cable.

4. Turn on the SIR-20 and wait until it is booted-up.
5. Double-click on the SIR-20 Desktop shortcut.
6. Press  to recall a saved project for the Model 4108F antenna.
 - First time users may want to select the “1GHz Horn Free Run” project from the folder “Fixed SIR-20 Setups.”
7. Press  to run the project. Be sure to keep the red “trigger” pressed on the handle of the model 10F marker/transmit switch cable as shown in Figure 4. If the red trigger is released at any time during data collection, data collection will be paused after 2 seconds and the data file will be closed after 10 seconds.

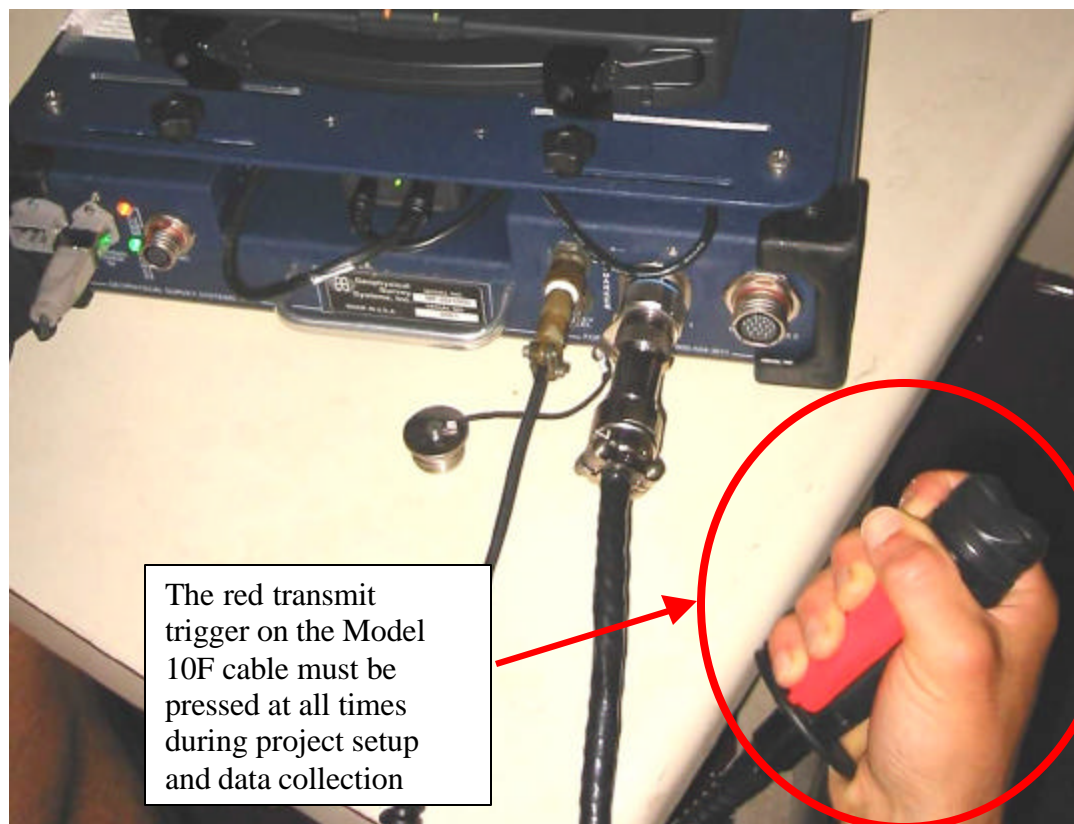


Figure 4. The red trigger on the Model 10F handle must be pressed at all times during project setup and data collection using a horn antenna.

8. The position of the signal may be shifted and the data collection settings may be slightly different than those currently recommended. Change the signal position if necessary so that it is similar to the signal position shown in Figure 1.
 - Compare all of the settings listed in Table 1 to those on the SIR-20 and make any necessary adjustments prior to collecting data.
 - Also check the gain of the signal to make sure it is not clipping. Save any changes made to the signal position and signal gain to a new macro prior to collecting data.