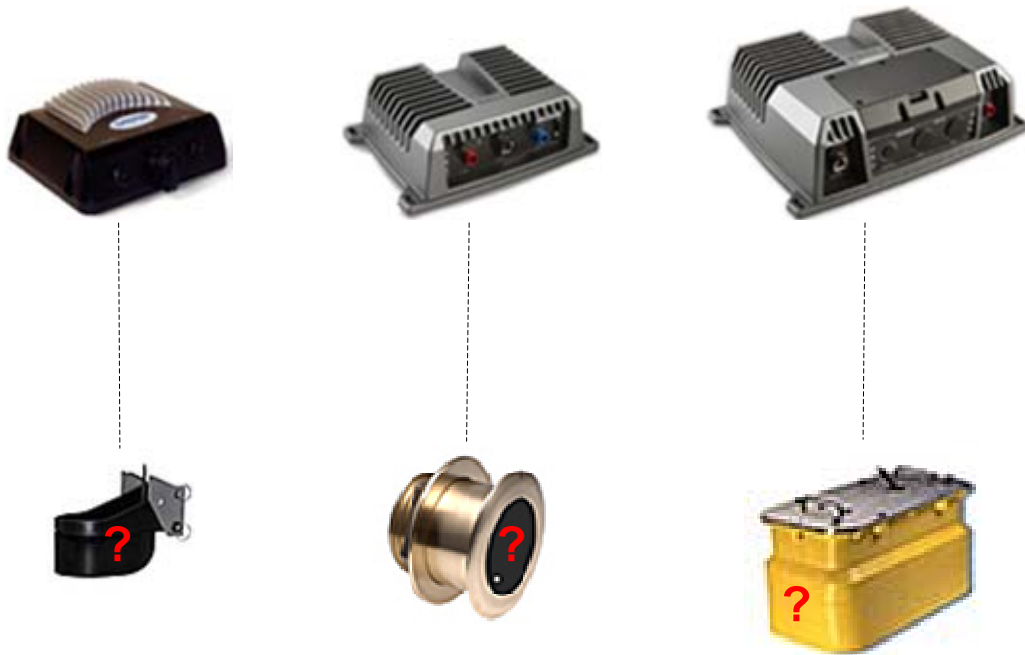


Garmin GSD Transducer Detection Explained



A Garmin Engineering Publication

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Introduction

One of the most important components of any sounder system is the transducer. All transducers are not created equal. Many transducer characteristics will affect the final picture drawn on a sonar screen. These include, but are not limited to: peak power, frequency, beam width (both fore/aft and port/starboard), Q, and figure of merit (FOM). Detecting a connected transducer is one of the first things a Garmin sounder does upon power up. This document will detail how transducer detection works in each of the Garmin GSD22, GSD24, and GSD26 sounders in an effort to aid installation and troubleshooting.

Transducer detection possibilities

A few different possibilities exist for a Garmin GSD sounder to detect a transducer. Not all methods apply to all sounders, as described in the detailed sections below. As a quick overview, the possibilities for transducer detection are:

- **Temperature line** – The GSD22 and GSD24 may use the temperature line to detect a transducer connection. In transducers without an integrated temperature sensor (such as an in-hull transducer), the temperature line is electrically grounded within the transducer connector to identify the transducer connection. A transducer detected via the temperature line does not give any information about the transducer itself, only that a transducer is connected.
- **Garmin ID** – This is a new feature of Garmin 8-pin transducers for use with the GSD24. Garmin ID uses a resistor within the transducer cable to identify the attached transducer. With Garmin ID, the GSD24 knows some basic information about the connected transducer, such as peak power, available frequencies, and a reference impedance value.
- **Transducer ID (XID)** – This is a unique feature developed by Airmar in which an integrated circuit is housed within the transducer, and parameters about the transducer are stored in the circuit's memory and read by the sounder. Transducer ID gives detailed information about the specific transducer it's housed in, such as peak power, optimal transmit/receive frequencies, and measured impedance values for the transducer at each frequency. This is a step above the information detected by the simple Garmin ID resistor, and allows the sounder to optimize its transmit/receive characteristics to best match the attached transducer.
- **Manual Configuration** – Some installations may be void of any of the above detections methods (such as migrating an existing transducer to a new Garmin system from a system of another manufacturer), or possibly a temperature sensor or transducer ID has become damaged. The GSD24 and GSD26 support a manual transducer configuration option for these circumstances. By default, this option not explicitly available. Improper manual configuration can lead to damage of the attached transducer, resulting in a failed system and an expensive repair. For this reason, manual configuration is not normally available to the end user. When facing an installation that requires manual transducer configuration, a Garmin certified dealer/installer or Garmin technical support can aid in proper installation.

GSD22

The GSD22 has the following possible transducer detection methods:

- Transducer ID (XID)
- Temperature Line



Upon startup, the GSD22 will attempt to read Airmar Transducer ID and will **also** check for a temperature sensor or grounded temperature line. If **either** is detected, the GSD22 is allowed to transmit. If a valid XID is read, the GSD22 will adjust its transmit characteristics according to the peak powers and impedances of each transducer element. For example, an Airmar B260 will report 1kW peak power for both 50kHz and 200kHz, along with a specific impedance at each frequency. The GSD22 will transmit at up to 1kW at each frequency. If no XID exists, but a transducer is detected via the temperature line, the transmit power will be limited to 500W max according to a reference impedance value. The GSD22 does not support manual transducer configuration, so transmit powers above 500W are limited to transducers with XID. In all instances, the GSD22 transmit power is adjusted with depth, up to the detected maximum value. This means that maximum power is not transmitted at all depths (i.e. the sounder does not output 1kW at a 5ft range).

FAQ

- *What happens if the transducer is disconnected while the sounder is running?*

First, connecting or disconnecting a transducer while the sounder is running is not advised! Doing so may damage the sounder, as the transducer 'load' seen by the sounder dramatically changes which the transducer connection is changed.

Upon power up, if XID was found *without* temperature line detection, the GSD22 will continue to transmit if the transducer is removed during normal operation. This is because the XID is only read at power up, and the sounder received no indication when the transducer is disconnected.

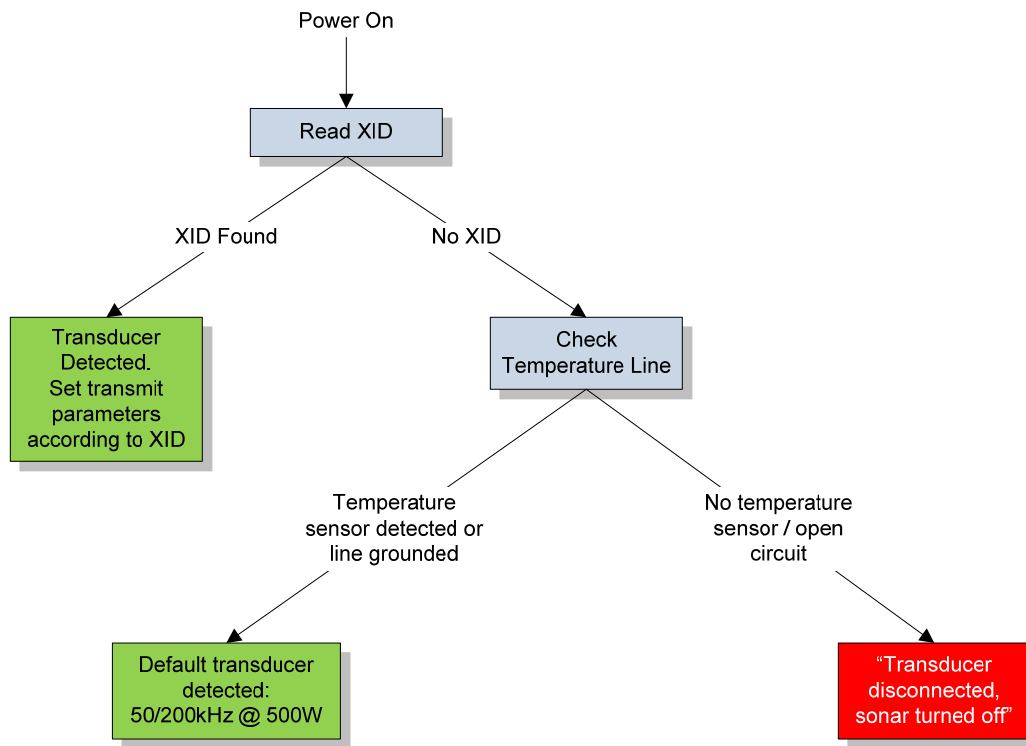
If a temperature sensor or grounded temperature line *was* detected (independent of XID), the GSD22 will *stop* transmitting if the transducer is disconnected. **Although not advised**, if the transducer is reconnected, the GSD22 will detect the reconnection through the temperature line, and will also checking the XID again assuming that a *different* transducer *could* have been connected.

- *Will the transducer be detected correctly when connected using a transducer extension cable?*

All Garmin transducer extension cables pass through the temperature sensor line, so any transducer should be detected through this line at a minimum. Extension cables manufactured before 2005 did *not* pass through the transducer ID line. If using one of these legacy cables with an XID transducer, the XID will not be read, and the transducer should default to detection through the temperature sensor line and be limited to 500W peak power.



GSD22 Transducer Detection Flow



GSD24

The GSD24 has four possible transducer detection methods:

- Transducer ID (XID)
- Garmin ID (GID)
- Temperature Line
- Manual Transducer Configuration



Just like the GSD22, the GSD24 will look for Airmar Transducer ID upon startup. It will **also** check for Garmin ID and check the temperature line. If **any** of these are valid, the sounder will transmit. If *either* XID or GID are valid, the transducer's power, frequency, and impedance characteristics are known to the sounder and manual transducer configuration is not available.

Again like the GSD22, if the transducer is detected through the temperature line only, no information is known about the transducer, and peak power is limited to 500W. In this instance manual configuration can be accessed if needed. For example, a legacy (before approximately 2007) B260 transducer may not have transducer ID, but would be detected through the temperature line. In this case, manual configuration can be used to allow 1kW output power instead of the default 500W limit.

FAQ

- *When installing a GSD24 with an existing transducer using the included adapter terminal box, which of the above detections best describes my case?*

It is possible that XID, temperature, or manual configuration may apply. In installations with Airmar transducers installed in the last 5 years, XID should be available. Wire the XID line to the appropriate terminal in the terminal box adapter, and the transducer will be detected normally.

What if there is no XID?

With no XID, the transducer will be detected through the temperature line, but limited to 500W. If the transducer is rated for more than 500W, manual configuration may be used to set the correct output.

What if there is no temperature sensor in the transducer?

In this instance, a wire jumper can be installed between the temperature terminal and the temperature-ground terminal, or manual configuration can be used. If a wire jumper is installed, the transducer will be detected automatically, but will be limited to 500W, as previously discussed. Manual configuration may still be used to set the correct output.

Why is there no terminal for GID in the adapter box so a simple resistor can be used instead of dealing with manual transducer configuration?

This is a very good question. It may seem cumbersome to require customer support simply to change the transducer output power if the transducer is detected, but only operating at 500W. If a resistor could be installed in the adapter box to correctly identify the transducer, why not allow it?

The answer is that not all transducers are equal, even if they are the same model. An Airmar B260 is B260 is a B260, right? Wrong. Just as with any manufacturer making any product, products can change or improve over time, even while retaining the same model number. For instance, searching for 'B260' on Airmar's transducer cross-reference webpage (<http://www.airmartechology.com/XRef/>) gives 19 different part numbers. Many of these are simply manufacturer-specific connector/wiring combinations, but some are inherently different. For example, legacy Garmin B260s (for the GSD20 and GSD21 sounders) have higher impedance than the current model B260 (for the GSD22/24/26). Using Garmin ID to identify the transducer is a B260 does not tell the sounder *which* B260 it is, and the output power cannot be set accurately. The same may be true when retrofitting a Garmin sounder in place of another manufacturer's sounder while retaining the existing transducer.

The temperature line can be used for simple detection to get up and running, but a Garmin dealer/installer or customer support is required to set the transducer configuration manually since entering the wrong parameters can drive the transducer incorrectly and potentially damage the sounder or the transducer. For manual transducer configuration, it is important to note both the Airmar model number (B260, M260, R99, etc) and the Airmar part number (41-xxx-x-01 or similar) listed on the label attached to the transducer cable.

- *What happens after manual configuration is used?*

The manual configuration parameters are stored with the GSD24, and are retained across power cycles. However, each time the GSD24 powers up, it will again check for XID and GID. If either XID or GID is present, the manual configuration will be ignored and no longer accessible, and the sounder will transmit according to the XID or GID characteristics.

- *Can manual configuration be changed?*

Yes! It is certainly Garmin's expectation that many things about an installation may change. A mistake may be made in the configuration entry, a new or different transducer may be connected on the same boat, or the sounder itself may be moved to a new or different boat. Manual configuration can be adjusted at any time (in the absence of XID or GID) in the same way it was first adjusted. Changes are written to the sounder and stored across power cycles.

- *Can I use XYZ transducer with the GSD24?*

It depends. The GSD24 can drive transducers with impedances between 75 and 560 ohms at up to 2kW max and 50kHz and 200kHz.

- *Will the transducer be detected correctly when connected using a transducer extension cable?*

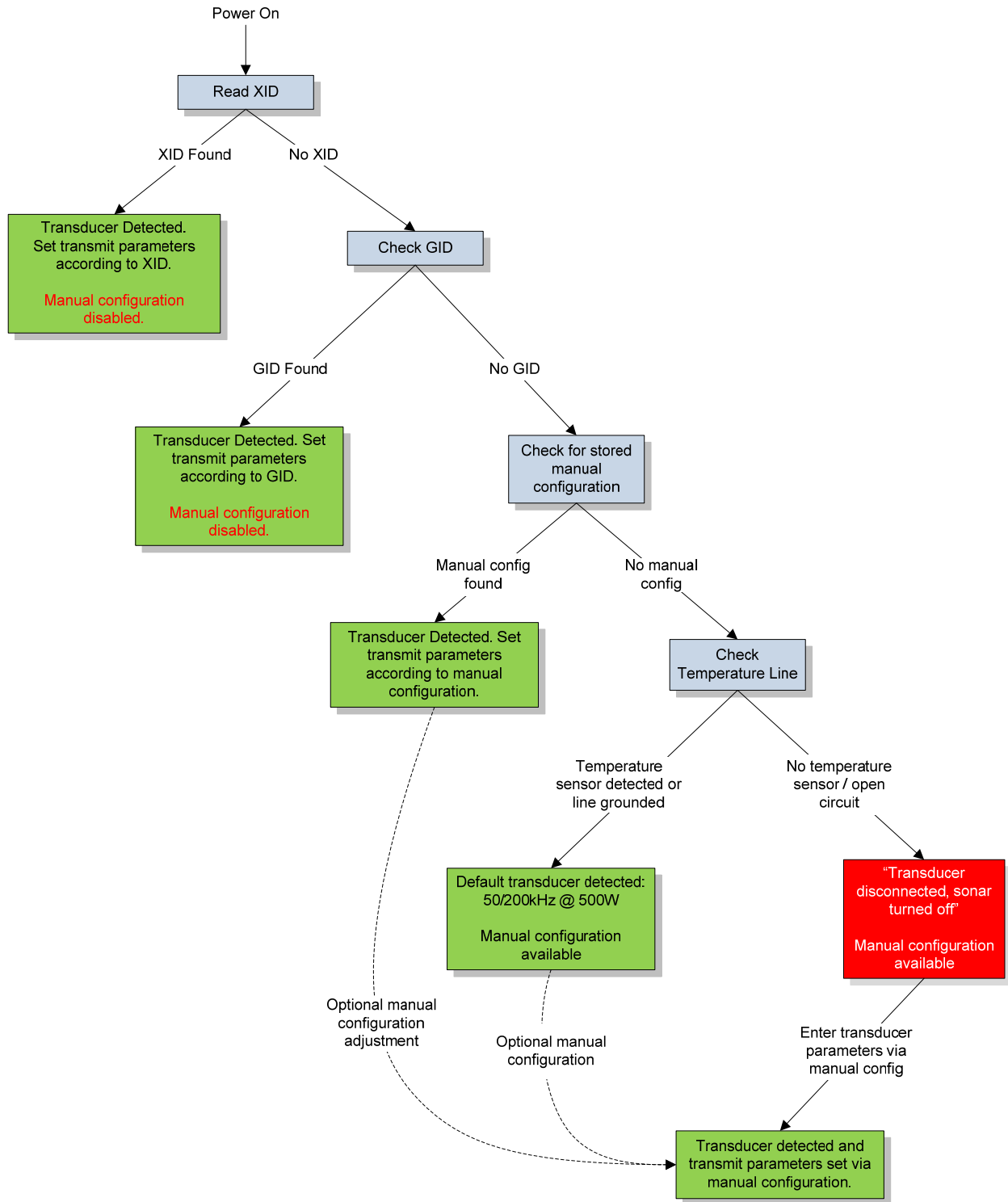
All 8-pin Garmin transducer extension cables pass through all lines within the cable, so transducer detection with an 8-pin transducer is unaffected by an 8-pin extension cable. 6-pin extension cables manufactured before 2005 did *not* pass through the transducer ID line. If using a 6-pin extension prior to the 8-pin terminal adapter box, XID may not be passed through properly depending on the manufacture date of the 6-pin extension cable. With a legacy extension cable, the XID will not be read, but the transducer should default to detection through the temperature sensor line and be limited to 500W peak power. Manual configuration will be available to correct the peak power in this case if necessary.

- *If I cut off the transducer connector for use with the 8-pin terminal adapter box, is it ok to shorten the transducer cable length if the transducer is mounted near the sounder?*

Yes, shortening the cable is fine from an operational point of view and will not negatively affect sounder perform



GSD24 Transducer Detection Flow



GSD26

The GSD26 has two possible transducer detection methods:

- Transducer ID (XID)
- Manual Transducer Configuration



The GSD26 supports both standard and CHIRP transducers from Airmar. Because CHIRP requires more information about the transducer for proper operation, Transducer ID or manual configuration is required. The GSD26 has two simultaneous, independently operating sounders in one device, capable of driving a single transducer with multiple frequency elements, or two separate transducers. A single transducer with one or more frequency elements has only a single XID that describes all frequency elements within the transducer. For dual transducer installations, each transducer has its own XID, thus two XID inputs on the GSD26.

Upon turn on, the GSD26 will attempt to read XID on both sounder channels. If a valid XID is detected, manual configuration options are disabled, unless only one frequency element is specified. In this case, manual configuration is available for whichever channel does not have XID information. In the absence of XID, manual transducer configuration may be used to configure the sounder. For manual configuration, a certified Garmin dealer/installer or Garmin customer support can help with proper installation.

FAQ

- *What happens after manual configuration is used?*

The manual configuration parameters are stored with the 26, and are retained across power cycles. However, each time the GSD26 powers up, it will again check for XID. If XID is present, the manual configuration will be ignored and no longer accessible, and the sounder will transmit according to the XID characteristics. Each sonar channel on the GSD26 is treated independently, so presence of XID for only one channel will not disable manual configuration for the other channel.

- *Can manual configuration be changed?*

Yes! It is certainly Garmin's expectation that many things about an installation may change. A mistake may be made in the configuration entry, a new or different transducer may be connected on the same boat, or the sounder itself may be moved to a new or different boat. Manual configuration can be adjusted at any time (in the absence of XID) in the same way it was first adjusted. Changes are written to the sounder and stored across power cycles.

- *Can I use a Garmin or Airmar non-chirp transducer with the GSD26?*

Yes, but with some restrictions. Standard 50/200kHz transducers can be used with the GSD26 through manual configuration. Since non-chirp transducers only have one wire shared between 50 and 200kHz,

only one channel of the GSD26 can be used. It is possible to configure the GSD26 to allow both 50kHz and 200kHz on a single channel, but the GSD26 does not support traditional dual frequency mode on a single sonar channel.

- *How can I use both 50kHz and 200kHz on a single sonar channel?*

Through manual configuration, the transducer must be configured as a chirp transducer even though it is a standard 50/200. Set the transducer peak power accordingly, set the nominal frequency to either 50kHz or 200kHz, enable chirp support, and set the lower 3dB frequency to 50kHz and the upper 3dB frequency to 200kHz. Set the transducer impedance to the lower of the two impedances of the 50/200kHz elements to ensure the higher impedance element isn't overdriven, since only one impedance is used for both frequencies in this configuration. Through the normal sonar screen, add 50 and/or 200kHz via the 'Manage Frequencies' dialog. Chirp frequency selections will exist in the frequency selection menu and cannot be removed, but these should not be used in this configuration.

- *Can I use XYZ transducer with the GSD26?*

It depends. The GSD26 can drive transducers with impedances between 75 and 560 ohms at up to 3kW max on the low frequency channel and up to 2kW max on the high frequency channel.

- *Can I use two transducers with the same or similar frequencies on both sonar channels?*

Yes, with the following caveats. The high frequency channel will be limited to 2kW peak output power regardless of the connected transducer. Transducers operating at the same or nearby frequencies may interfere with each other and show undesired noise on the sonar picture. Through advanced interference reject algorithms, the GSD24/26 can virtually eliminate all interference from the transmit of a nearby sounder, regardless of the transmit frequency. However, fish and bottom echoes resulting from different transmits of the same frequency are not easily eliminated, and may appear as noise or 'ghost' echoes on the sonar picture if the two sounder transmits are pseudo-synchronized in time.

- *Since there is no connector on the transducer cable for the GSD26, can I shorten the transducer cable length if the transducer is mounted near the sounder?*

Yes, shortening the cable is fine from an operational point of view and will not negatively affect sounder performance.



GSD26 Transducer Detection Flow

