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# **WN-009**

**Web Note**

## **QUESTIONS & ANSWERS: SELECTING THE RIGHT DF RECEIVER/PROCESSER**

This Web Note discusses issues associated with the selection of an appropriate DF receiver/processor in easy-to-read Question & Answer format. It is especially intended for users who are new to the field, and specifically addresses frequently asked questions.

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In keeping with RDF Products' business philosophy that the best customer is well informed, RDF Products publishes Application Notes from time to time in an effort to illuminate various aspects of DF technology, provide important insights how to interpret manufacturers' product specifications, and how to avoid "specsmanship" traps. In general, these Application Notes are written for the benefit of the more technical user.

RDF Products also publishes Web Notes, which are short papers covering topics of general interest to DF users. These Web Notes are written in an easy-to-read format for users more focused on the practical (rather than theoretical) aspects of radio direction finding technology. Where more technical discussion is required, it is presented in plain language with an absolute minimum of supporting mathematics. Web Notes and Application Notes are distributed on the RDF Products Publications CD and can also be conveniently downloaded from the RDF Products website at [www.rdfproducts.com](http://www.rdfproducts.com).

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**Question:** I notice that you supply the DFP-1000B, DFR-1000B, and the DFR-1200B as DF receivers/bearing processors. I'm having a little trouble sorting this all out and need some guidelines and recommendations.

**Answer:** Our basic DF processor product is the DFP-1000B DF processor/display. As per this product's literature, the DFP-1000B works with a host receiver and mobile or fixed-site DF antenna to provide DF system capability. The "DFR-1000B" and "DFR-1200B" are actually combo systems combining a standard DFP-1000B with a particular consumer-market communications receiver (the AOR AR8600 Mk2 for the DFR-1000B and the AOR AR5000A for the DFR-1200B).

**Q:** So if I procure the DFP-1000B, does that mean that I would also have to procure my own receiver?

**A:** Yes.

**Q:** Is procuring my own receiver the right way to go? It would seem that this would be the most economical approach since I'm sure you have to mark-up the price on the AR8600 Mk2 and AR5000A.



**Figure 1** - DFP-1000B DF Bearing Processor/Display

**A:** You're right - of course we have to mark-up whatever receiver we supply, and yes, buying your own receiver can be the most economical approach. This approach is especially attractive for users who already have receivers for which they would like to add DF capability. It is less attractive, however, for applications where the receiver would have to be modified for DF capability. It is also less attractive for users whose purchasing people require a single vendor for the entire system (as is often the case for government procurement organizations).

**Q:** Do the AR8600 Mk2 and AR5000A receivers you use for your DFR combo systems require modifications?

**A:** The AR8600 Mk2 requires extensive modifications. (Although it has the requisite 10.7 MHz IF output converter necessary for driving the DFP-1000B DF processor, this converter is of such marginal quality that we have to replace it with a high-performance converter of our own design that we manufacture specifically for this receiver.)

**Q: Could I do these modifications on my own?**

**A:** Most users would be reluctant to buy this receiver and attempt this modification on their own.

**Q: Would I get reasonable performance just using an unmodified AR8600 Mk2 and accepting the performance compromises? Also, what performance compromises would I have to accept?**

**A:** The problem with the unmodified AR8600 Mk2 10.7 MHz IF output is that it has far too much gain and marginal signal handling capability. The excess gain issue can be accommodated by installing a 20-dB in-line attenuator between the AR8600 Mk2 10.7 MHz IF output port and the DFP-1000B signal input jack. (On current model DFP-1000Bs, this gain reduction can be more conveniently accomplished using its rear-panel 10.7 MHz IF attenuator control.) The reduced signal handling capability problem can be partially mitigated by switching in the AR8600 Mk2 front-end attenuator for very strong signals.

**Q: What about the AR5000A?**

**A:** The AR5000A requires no modifications.

**Q: So does that mean that I could buy the DFP-1000B from RDF Products, buy the AR5000A direct, and effectively obtain a DFR-1200B combo system at a substantial savings?**

**A:** Yes, you could do just that, and we actually recommend this approach to users who don't mind spending a little time and effort configuring the DFP-1000B and AR5000A together. When you buy the DFR-1200B combo, however, we pre-configure the AR5000A receiver, include a custom interface cable harness, and conduct an overall system test.



**Figure 2 - DFR-1000B Wideband VHF/UHF DF Receiver**

**Q: So in effect, if I buy a DFR-1200B, RDF Products guarantees that everything works together as a system?**

**A:** Yes, that's correct. What it really comes down to is that paying the extra money to procure the DFR-1200B combo system from us buys the customer a certain peace of



mind, whereas if the customer buys the receiver separately, our warranty applies only to the DFP-1000B.

**Q:** I noticed that the AR5000A seems to be available with various options. Which is the best one?

**A:** For DF purposes, the lowest-cost base-model is the most appropriate. In most instances, there is no need to purchase the narrow CW filter, PLL AM detector, high-stability time base, or other extra-cost options.

**Q:** I also noticed that the AR5000A (and other models as well) are available in “blocked” and “unblocked” versions. What is this all about?

**A:** Back in the ‘90s, a law was passed here in the USA that prohibited consumer-market receivers from having the capability to receive cellular phone frequencies. Receivers in compliance with this law are referred to as “blocked”. “Unblocked” versions are also available, but only for export, government customers, research applications, and some other specialized categories.

**Q:** Are there receivers other than the AR5000A that do not require modification?

**A:** The earlier AOR AR5000 (the precedent of the AR5000A) requires no modifications. Also, the ICOM R8500 requires no modifications, as do the earlier R7100 and R7000 that preceded the R8500. We believe that the later ICOM R9000 and R9500 receivers likewise require no modifications although we have not verified this firsthand.

**Q:** What about the high-end surveillance receivers?

**A:** Since most surveillance receivers have 21.4 (rather than 10.7) MHz IF outputs, they cannot be used “as-is”. We can, however, supply a customized version of the DFP-1000A than can accept a 21.4 MHz IF input.



**Figure 3 - DFR-1200B Wideband HF/VHF/UHF DF Receiver**

**Q: If I decide to go with one of the two combo systems, how do I decide between the DFR-1000B and DFR-1200B?**

**A:** This best choice depends largely on your application, but also on personal preferences to a certain extent. Both systems are highly capable DF receiver/processors that outperform all competing products in their price range.

**Q: What is your recommendation?**

**A:** Based on sales history and customer feedback, we recommend the less-expensive DFR-1000B for most DF applications (and particularly for mobile DF applications). In addition to being the less expensive of the two systems, the DFR-1000B is more compact, lighter in weight, and its AR8600 Mk2 receiver component has fewer buttons and knobs than the AR5000A receiver employed in the DFR-1200B (thus making it easier to operate for a non-technical operator).

**Q: So would it be fair to say that the DFR-1000B easier to operate than the DFR-1200B?**

**A:** As a practical matter, this is probably the case. Unless the user needs to use the AR8600 Mk2 receiver component of the DFR-1000B for scanning, its only function in the system is to serve as a front-end tuner for the DFP-1000B (which then handles all other receiver functions). For most applications, the only AR8600 Mk2 controls the user needs to exercise are those required for frequency setting.

**Q: What applications would favor the DFR-1200B?**

**A:** Again based on sales history and customer feedback, the DFR-1200B would be the better choice in applications where the user intends to put together a full-up “signal intercept” system with DF capability. In these applications, users will likely want the benefit of the full-featured AR5000A receiver, particularly with regard to its impressive scanning capabilities and its compatibility with its companion SD5600 spectrum display unit (also manufactured by AOR).

**Q: What would be the best choice for fixed-site or shipboard applications?**

**A:** The previously discussed considerations still mostly apply. One constraint that can be relaxed for fixed-site, shipboard, or other applications where the system will be permanently or semi-permanently installed is that compactness and light weight (qualities that favor the DFR-1000B) become less of an issue.

**Q: If I buy a DFR-1000B or DFR-1200B but then later decide that I want to use a different host receiver, will I be able to do this?**

**A:** Absolutely. The DFP-1000B supplied with the DFR-1000B or DFR-1200B is a

standard unmodified unit. It can easily be disconnected from the DFR-1000B/DFR-1200B and used with any other qualified host receiver.

**Q: What is the main difference between the DFP-1000B and DFP-1010B?**

**A:** The DFP-1010B is essentially a DFP-1000B with the operational controls and display removed. It is intended for applications where the unit will be used exclusively in computer-controlled applications via its bi-directional RS-232 link (and where the controls and display will be implemented in software on a host computer).

**Q: In what applications are DFP-1010Bs typically used?**

**A:** We recommend the DFP-1010B for most non-mobile applications where a computer is available and intended to be part of the system. This would normally include fixed-site DF systems and unmanned remote sites.

**Q: What about mobile DF applications?**

**A:** The DFP-1010B is best suited for mobile DF applications where the unit is embedded with a larger computer-operated signal intercept system. For stand-alone mobile DF applications, however, most customers seem to prefer the DFP-1000B since it requires less peripheral equipment, fewer interconnect cables, and is easier and more direct to operate.

**Q: Can I use a DFP-1000B in place of a DFP-1010B?**

**A:** Yes, you can. The advantage of the DFP-1010B, however, is that it is about 10% less expensive than a DFP-1000B.

**Q: Does the DFP-1000B require different operating software than the DFP-1010B?**

**A:** No. Both units employ the same RS-232 protocol. When the DFP-1000B is set to its "Remote" mode, it functions identically to a DFP-1010B.

**Q: Do you provide operating software for these units?**

**A:** Yes, we supply our Windows operating software package DefCon2b. DefCon2b is a "virtual DF receiver" program that simultaneously operates the DFP plus a selected host receiver (the AR5000A, AR8600 Mk2, or the R8500). This software is supplied with the DFP at no extra charge. <>