United States District Court,
D. Arizona.

COMTECH EF DATA CORPORATION,
Plaintiff.
v.
RADYNE CORPORATION,
Defendant.

No. CV-06-1132-PHX-MHM

Oct. 12, 2007.

James Robert Farmer, Van Cott Bagley Cornwall & McCarthy, Salt Lake City, UT, Rick Neeley Bryson, Michelle Gail Breit, Sanders & Parks PC, Phoenix, AZ, for Plaintiff.

Sid Leach, Monica Anne Limon-Wynn, Wendy Sue Neal, Snell & Wilmer LLP, Phoenix, AZ, for Defendant.

Court-Filed Expert Resumes

REPORT AND RECOMMENDATION OF SPECIAL MASTER REGARDING CLAIM CONSTRUCTION

ROBERT L. HARMON, Special Master.

Plaintiff Comtech contends that defendant Radyne infringes U.S. Patent No. 5,666,646 (the '646 patent), which claims a radio frequency (RF) converter system for transmission of communication signals. Radyne denies infringement and interposes various affirmative defenses.

In an Order dated October 12, 2006, the Court appointed the undersigned as Special Master (SM) pursuant to Rule 53, FRCP, referring "all pretrial matters involving interpretation of asserted claims" of the '646 patent. The specific purpose of the reference was to have the SM provide a recommended construction of the asserted claims of the '646 patent-a so-called Markman FN1 proceeding. Under the express terms of the Order, the SM "is empowered to accept motions, hear evidence, conduct hearings, and take any necessary and appropriate action for the efficient and just performance of the assigned duties of special master in accordance with Rule 53(c) and (d) of the Federal Rules of Civil Procedure."

FN1. See Markman v. Westview Instr., Inc., 517 U.S. 370, 38 USPQ2d 1461 (1996).

On September 15, 2006, the parties had filed a Joint Submission Re Special Master Candidates and Proposed Schedule Regarding Markman Hearing. In that submission, the parties agreed that the Local Patent

Rules of the Northern District of California "will provide an efficient framework within which to proceed to the Markman hearing in this matter. They also proposed a schedule for claim construction that referred to the Local Patent Rules by rule number. In the Order of October 12, 2006, the Court approved that schedule. Although the Court did not expressly adopt the Local Patent Rules, the parties have generally complied with them. Thus, pursuant to Rule 3-1, on October 30, 2006, Comtech served its "Disclosure of Asserted Claims and Preliminary Infringement Contentions" in which it identified claims 1, 3-16, 18 and 19 of the '646 patent as those it contends are infringed by various products of Radyne. On December 22, 2006, the parties exchanged "Proposed Claim Terms and Claim Elements for Construction" (Rule 4-1). On January 22, 2007, they exchanged "Preliminary Claim Construction and Extrinsic Evidence" (Rule 4-2) submissions. FN2

FN2. Comtech has since confirmed that it is now asserting only claims 1, 3-5, and 7. (Email Breit to SM, 1/26/07, 5:38 pm EST.)

Shortly following the Rule 4-2 submissions, the parties indicated to the SM that a dispute had arisen over identification of "means-plus-function" elements of the asserted claims, and they requested an initial determination by the SM (Email Leach to SM, 1/25/07, 5:08 pm EST; Email Breit to SM, 1/25/07, 6:32 pm EST). The SM responded by email on January 26, 2007 with "Special Master Order # 1 Regarding Claim Construction," (Order # 1) in which he suggested that he make a tentative determination of which elements should enjoy "means-plus-function" treatment. This proved acceptable to the parties (Email Leach to SM, 1/26/07, 3:39 pm EST; Email Bryson to SM, 1/26/07, 3:05 pm EST), and on January 28 the SM circulated, by email, the "Special Master's Tentative Identification of Means-Plus-Function Elements" (Tentative Identification Report).FN3

FN3. The SM is not attaching the emails, Order # 1, and the Tentative Identification Report to the present report, inasmuch as they are significant here only as background information. When and if the parties seek review, by the Court, of the recommendations set forth in the present report, they should attend to filing those documents as well.

On February 21, 2007, the parties submitted a "Joint Claim Construction and Prehearing Statement," (Rule 4-3) which reflected agreement on only a single claim element: "power supply means for supplying power." On March 29, 2007, Comtech submitted its "Claim Construction Brief" (CB). Radyne responded on April 18(RB) and Comtech replied on April 25(CRB). On April 30 the SM circulated a draft of the present report, so that the parties could more efficiently prepare for the *Markman* hearing. That hearing was held in Phoenix on May 3, with a court reporter present.

Upon full consideration of all matters raised during those proceedings, this report is respectfully submitted in response to the Court's directive to recommend a construction of the claims of the patent in suit.

GOVERNING LEGAL PRINCIPLES

The Legal Framework for Claim Construction

Proper claim construction necessarily precedes a determination of whether the claims read on the accused devices or methods for infringement purposes. FN4 Indeed, claim construction will normally control the remainder of the decisional process,FN5 for it is axiomatic that the claims must be construed in the same way for infringement that they are for determining validity.FN6

FN4. E.g., Fonar Corp. v. Johnson & Johnson, 821 F.2d 627, 3 USPQ2d 1109, 1112 (Fed.Cir.1987)

FN5. Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1 USPQ2d 1593, 1597 (Fed.Cir.1987).

FN6. E.g., Intervet America, Inc. v. Kee-Vet Labs., Inc., 887 F.2d 1050, 12 USPQ2d 1474, 1476 (Fed.Cir.1989). It is recommended that the jury be so instructed.

In its *Markman* decision the Supreme Court held that interpretation of patent claims is a question for the court, while application of properly construed claims to determine infringement is a question for the finder of fact, in this case the jury. In discharging its *Markman* responsibility, the court must inevitably decide what the scope of the underlying evidentiary inquiry will be. The Federal Circuit explained this decisional process in Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 39 USPQ2d 1573 (Fed.Cir.1996). Ordinarily, the court should confine itself, if possible, to an examination of the intrinsic patent documents: the patent itself and its prosecution history. In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim element. In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. Only if there is still some genuine ambiguity in the claims, after consideration of all available intrinsic evidence, should the court resort to extrinsic evidence such as expert testimony. And even if the judge decides to hear all possible evidence before construing the claims, expert testimony inconsistent with the intrinsic evidence should be accorded no weight. Extrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. Nor may it contradict the import of other parts of the specification. Nor may the inventor's subjective intent as to claim scope, when unexpressed in the patent documents, have any effect.

In its 2005 en banc decision in *Phillips v. AWH Corp*.,FN7 the Federal Circuit emphatically reaffirmed its adherence to the fundamental principles of *Markman* and *Vitronics*. In so doing, the court summarized and restated the basic guidelines for interpreting a patent claim:

FN7. 415 F.3d 1303, 75 USPQ2d 1321, 1325 (Fed.Cir.2005).

1. The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation. That starting point is based on the well-settled understanding that inventors are typically persons skilled in the field of the invention and that patents are addressed to and intended to be read by others of skill in the pertinent art. Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.FN8

FN8. 75 USPQ2d at 1326.

2. In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the

application of the widely accepted meaning of commonly understood words. In such circumstances, general purpose dictionaries may be helpful. In many cases that give rise to litigation, however, determining the ordinary and customary meaning of the claim requires examination of terms that have a particular meaning in a field of art. Because the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. Those sources include the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.FN9

FN9. 75 USPQ2d at 1327.

3. In light of the statutory directive that the inventor provide a "full" and "exact" description of the claimed invention, the specification necessarily informs the proper construction of the claims. It is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims. Not only does the specification provide a concordance for the claims, but the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs. In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor. In that instance as well, the inventor has dictated the correct claim scope, and the inventor's intention, as expressed in the specification, is regarded as dispositive.FN10

FN10. 75 USPQ2d at 1328-29.

4. Like the specification, the prosecution history provides evidence of how the PTO and the inventor understood the patent. Furthermore, like the specification, the prosecution history was created by the patentee in attempting to explain and obtain the patent. Yet because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes. Nonetheless, the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.FN11

FN11. 75 USPQ2d at 1329.

5. Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises. Extrinsic evidence in general is less reliable than the patent and its prosecution history in determining how to read claim terms, for several reasons. First, extrinsic evidence by definition is not part of the patent and does not have the specification's virtue of being created at the time of patent prosecution for the purpose of explaining the patent's scope and meaning. Second, while claims are construed as they would be understood by a hypothetical person of skill in the art, extrinsic publications may not be written by or for skilled artisans and therefore may not reflect the understanding of a skilled artisan in the field of the patent. Third, extrinsic evidence consisting of expert reports and testimony is generated at the time of and for the purpose of litigation and thus can suffer from

bias that is not present in intrinsic evidence. The effect of that bias can be exacerbated if the expert is not one of skill in the relevant art or if the expert's opinion is offered in a form that is not subject to cross-examination. Fourth, there is a virtually unbounded universe of potential extrinsic evidence of some marginal relevance that could be brought to bear on any claim construction question. In the course of litigation, each party will naturally choose the pieces of extrinsic evidence most favorable to its cause, leaving the court with the considerable task of filtering the useful extrinsic evidence from the fluff. Finally, undue reliance on extrinsic evidence poses the risk that it will be used to change the meaning of claims in derogation of the indisputable public records consisting of the claims, the specification and the prosecution history, thereby undermining the public notice function of patents. In sum, extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence. Nonetheless, because extrinsic evidence can help educate the court regarding the field of the invention and can help the court determine what a person of ordinary skill in the art would understand claim terms to mean, it is permissible for the district court in its sound discretion to admit and use such evidence. In exercising that discretion, and in weighing all the evidence bearing on claim construction, the court should keep in mind the flaws inherent in each type of evidence and assess that evidence accordingly.FN12

FN12. 75 USPQ2d at 1329-30.

These guidelines have conditioned the methodology employed in this proceeding. The parties have submitted extrinsic evidence, and the SM has been willing, within reason, to consider all such evidence. In the end, however, apart from whatever benefit this evidence may have provided in gaining an understanding of the technology at hand, it has not been relied upon in construing the claims, unless expressly so indicated.FN13

FN13. See Mantech Environmental Corp. v. Hudson Environmental Serv. Inc., 152 F.3d 1368, 47 USPQ2d 1732, 1737 (Fed.Cir.1998), where the Federal Circuit held that "the district court was legally correct both in admitting and accepting the testimony of the parties' expert witnesses 'for the purpose of background in the technical area at issue,' * * * and then basing its claim construction solely upon intrinsic evidence. Although this information always may be admitted by the trial court to educate itself about the patent and the relevant technology, the claims and the written description remain the primary and more authoritative sources of claim construction. Thus, they always must be considered and where clear must be followed." See also Key Pharm. Inc. v. Hercon Labs. Corp., 161 F.3d 709, 48 USPQ2d 1911 (Fed.Cir.1998).

The SM is also mindful of the admonition of the Federal Circuit that "claim construction is not an obligatory exercise in redundancy," and that it is unnecessary to repeat or restate every claim term in order to comply with the *Markman* directive that claim construction is a matter for the court. FN14 Such an approach would carry the very real potential of confusing rather than enlightening the jury.FN15 Thus, where terms are expressly defined in the patent specification, it is sufficient simply to refer the jury to that definition; the court can decide at the time of trial whether explanatory technical testimony would be necessary or, indeed, helpful at all. And where a term is not defined or used in a special way in the specification, and is otherwise unambiguous, the jury should be instructed to give the term its ordinary meaning and will presumably require no additional assistance. As will become apparent later in this report, several of the contested claim terms fall into this category and require no special construction.

FN14. United States Surgical Corp. v. Ethicon, Inc., 103 F.3d 1554, 41 USPQ2d 1225, 1236 (Fed.Cir.1997).

FN15. For example, repeatedly instructing a jury that an ordinary English word does not really mean what they think it does, but instead has the meaning of some synonym, can only cause confusion. If they meant not the one but the other, why did the inventors and their attorneys not use the other? This is a question no jury should have to concern itself with.

It is also important to understand that claim construction is an obligation of the court that is independent of the views asserted by the adversary parties. FN16 Among them, the parties have requested consideration and construction of several, but not all, of the terms of the asserted claims of the ' 646 patent. The SM has considered each claim as a whole, and each element of each claim, and has recommended a specific interpretation of those terms and phrases, and only those terms and phrases, that require construction. Accordingly, to the extent various claim terms are not addressed in this report, it may be assumed that the SM is recommending that they be grouped in the category of claim elements that need no construction. Similarly, this report is not to be viewed as reflecting an acceptance or endorsement by the SM of any proposed construction of either party, unless it expressly so states. Once again, if the report is silent as to a particular element, that means only that the SM is suggesting that no construction is necessary, regardless of what a party may have offered as a proposed construction.

FN16. Exxon Chem. Patents Inc. v. Lubrizol Corp., 64 F.3d 1553, 35 USPQ 1801, 1802 (Fed.Cir.1995).

In more than a dozen stints as special master charged with the initial claim construction task, the SM has observed that the most frequently encountered problem is that the parties attempt to force construction of claim terms that, in the end, require no construction. Sometimes this is done for strategic reasons, in the hope that a particular construction will provide an advantage with respect to infringement or validity issues. As often as not, however, the parties simply appear to be uncomfortable with the concept of leaving a claim term unconstrued. They seem to forget that the claims of a patent speak to a person of ordinary skill in the art, not to a layperson, and that technical experts at trial will explain to the jury that such persons would have no difficulty-at least with respect to well known structures-in recognizing that a particular element is found in an accused infringing device or in the prior art. This case is no exception, as will be seen.

The Timing of the Inquiry

In *Phillips v. AWH,* the Federal Circuit explained that "the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application" FN17 (in the present case, April 10, 1995). At first glance, this approach may seem inconsistent with the undoubted principle that the prosecution history is an important source of intrinsic evidence in interpreting claims because it is a contemporaneous exchange between the applicant and the Examiner. The public has the right to rely on an applicant's remarks made in seeking allowance of claims.FN18 These transactions always take place after-sometimes long after-the effective filing date of the patent application. But the prosecution history of the patent can be given full play by simply viewing it as would a hypothetical person of ordinary skill in the art who, though reading it later, was basing an understanding of it upon knowledge of the scope and content of the prior art as it existed at the time of invention. The claim construction analysis in this report has been conducted, therefore,

by seeking to understand what the claims would have meant to a person of ordinary skill in the art, having knowledge of the art as it existed as of April 1995.

FN17. Phillips v. AWH Corp., 415 F.3d 1303, 75 USPQ2d 1321, 1326 (Fed.Cir.2005).

FN18. Desper Prods. Inc. v. Qsound Labs. Inc., 157 F.3d 1325, 48 USPQ2d 1088, 1096-97 (Fed.Cir.1998).

Expert Witness Opinions and Attorney Argument

The parties undertook, pursuant to Rule 4-3 of the Local Patent Rules of the Northern District of California, to complete and file a Joint Claim Construction and Prehearing Statement, which requires, among other things,

an identification of any extrinsic evidence known to the party on which it intends to rely either to support its proposed construction of the claim or to oppose any other party's proposed construction of the claim, including, but not limited to, as permitted by law, dictionary definitions, citations to learned treatises and prior art, and testimony of percipient and expert witnesses * * * [and an indication of] [w]hether any party proposes to call one or more witnesses, including experts, at the Claim Construction Hearing, the identity of each such witness, and for each expert, a summary of each opinion to be offered in sufficient detail to permit a meaningful deposition of that expert * * *.

In their joint Rule 4-3 submission, the parties identified their expert witnesses and intrinsic and extrinsic evidence by reference to an attached Exhibit 1. Each identified specific passages from the '646 patent, and transactions from its prosecution history as the intrinsic evidence upon which it would rely, and each identified certain dictionaries, treatises, and U.S. patents as extrinsic evidence. Comtech proposed that its expert, Dr. Stephen B. Heppe, would offer opinion testimony on a variety of issues, as outlined in Exhibit 1. Radyne proposed that its technical expert, Dr. Bertan Bakkaloglu, would testify as to the meaning, to those skilled in the art at the time the invention was made, of the term "high speed bus ." Surprisingly, Radyne switched horses in this respect: it submitted, as Exhibit B to its claim construction brief, the declaration of Mr. Roderick Kronschnable, who opines on both "high speed bus means" and "converter means." Comtech vigorously objects to this last-minute addition, and has moved to strike Kronschnable's declaration, or at least limit it to no more than Dr. Bakkaloglu's proposed testimony. Comtech has also submitted, with its reply brief, a second Heppe declaration (Heppe II).

In both its Rule 4-2 submission and the joint Rule 4-3 submission, Radyne identified Dr. Bakkaloglu and gave a summary of his opinion testimony, as it was required to do in order to permit meaningful expert discovery. But on the day it filed its claim construction brief, Radyne notified Comtech that it would be substituting Mr. Kronschnable for Dr. Bakkaloglu, due to other time commitments on the latter's part. To the extent that Mr. Kronschnable's declaration goes beyond the testimony outlined for Dr. Bakkaloglu in Exhibit 1, it would appear to violate the letter and spirit of Rule 4-3, which the parties have used for a template in this proceeding. But Comtech is not without fault in this connection either. The SM has compared Dr. Heppe's first declaration against the outline of his testimony in Exhibit 1, and has found instances where he, too, went beyond Exhibit 1.

Under the circumstances, neither party has been prejudiced by these departures from Exhibit 1. Radyne had

every opportunity to offer rebuttal to Dr. Heppe's opinions when it submitted Mr. Kronschnable's declaration. By the same token, Comtech had the opportunity to rebut Mr. Kronschnable's opinions when it submitted Dr. Heppe's second declaration. Neither expert testified in person at the May 3 hearing, so their opinions are of course strictly limited to the statements in their respective declarations. ***Accordingly, the SM recommends that Comtech's motion be denied.***

Thus, the SM has considered all three expert declarations and has accorded the opinions expressed therein whatever relevance and weight they are entitled to, as expressly detailed in this report. In this connection, the SM has carefully reviewed the education and experience of both experts, and has concluded that they are both well qualified to provide such opinion testimony.

Comtech also filed, with its reply brief, a "Motion to Strike Unsupported Attorney Argument Regarding Technical Matters." The basic thrust of this motion is that Radyne, in its brief, argues the existence of certain technical facts without any supporting intrinsic or extrinsic evidence. This motion need not have been filed. The SM is well aware that "[t]he truth of a disputed material fact can not be established on attorney statement alone." FN19 The SM is also capable of distinguishing factual conclusions based on evidence from unsupported attorney argument, and has done so throughout the discussion that follows. The SM has not *stricken* such arguments. Rather, he has relegated them to their proper status as ineffectual against contrary evidence (including expert testimony). ***Accordingly, it is recommended that this motion be denied.***

FN19. Vivid Tech. Inc. v. American Sci. & Eng'g Inc., 200 F.3d 795, 53 USPQ2d 1289, 1301 (Fed.Cir.1999). See also Invitrogen Corp. v. Clontech Labs Inc., 429 F.3d 1052, 77 USPQ2d 1161, 1172 (Fed.Cir.2005).

Person of Ordinary Skill in the Art

In his declaration (Heppe para. 9), Dr. Heppe opines that "[g]iven the nature of the subject matter, which is generally taught in upper-level undergraduate classes or graduate schools with specialization in RF communications, the ordinary level of skill for the subject matter disclosed in the '646 patent would be at least a Masters' Degree in Engineering specializing in radio communications, or an undergraduate degree in Engineering plus two years working in the field of satellite communications." There does not appear to be any evidence of record that would tend to contradict his opinion in mis regard, and the opinion seems eminently reasonable, based upon his background experience (Heppe para.para. 5-7).

Means-Plus-Function (MPF) Elements under 35 U.S.C. s. 112 para. 6

Pursuant to 35 U.S.C. s. 112 para. 6, "[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." An element of a claim described as a means for performing a function, if read literally, would encompass any means for performing the function. Section 112 para. 6 operates to cut back on the types of means that could literally satisfy the claim language to only the disclosed structure or acts and equivalents thereof.FN20 But unless there is a clear basis for it in the record, it is improper to limit a MPF claim to the particular means set forth in the specification. Patentees are required to disclose in the specification some enabling means for accomplishing the function, but there is no requirement that applicants describe or predict every possible means of accomplishing that function. The

statute was written precisely to avoid a holding that a MPF limitation must be read to cover only the disclosed means . FN21 Accordingly, each MPF limitation will be construed to cover the actual structure or acts shown in the specification for accomplishing the recited function, *and equivalents thereof*.FN22 An equivalent structure or act under s. 112 para. 6 cannot embrace technology developed after the issuance of the patent because the literal meaning of a claim is fixed upon its issuance (in this case September 9, 1997). An "after-arising equivalent" infringes, if at all, under the traditional doctrine of equivalents.FN23

FN20. Johnston v. IVAC Corp., 885 F.2d 1574, 12 USPQ2d 1382, 1386 (Fed.Cir.1989).

FN21. D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 225 USPQ 236, 238 (Fed.Cir.1985).

FN22. The determination of equivalency under s. 112 para. 6 is not part of the claim construction exercise; rather, it is a question of fact. E.g., Carroll Touch, Inc. v. Electro Mech. Sys., Inc., 15 F.3d 1573, 27 USPQ2d 1836, 1840 (Fed.Cir.1993). See also IMS Tech. Inc. v. Haas Automation Inc., 206 F.3d 1422, 54 USPQ2d 1129, 1134 (Fed .Cir.2000).

FN23. *Al-* Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161, 1168 (Fed.Cir.1999).

Whether or not particular language in a claim defines, as a matter of law, a MPF element is not always easy to tell. If the word "means" appears in a claim element in association with a function, the court presumes that s. 112 para. 6 applies. This presumption collapses, however, if the claim itself recites sufficient structure, material, or acts to perform the claimed function. Without the term "means," a claim element is presumed to fall outside MPF strictures. Once again, however, that presumption can collapse when an element lacking the term "means" nonetheless relies on functional terms rather than structure or material to describe performance of the claimed function. FN24 The task of determining whether the limitation in question should be regarded as a MPF limitation, like all claim construction issues, is a question of law for the court, even though it is a question on which evidence from experts may be relevant.FN25

FN24. E.g., Micro Chem. Inc. v. Great Plains Chem. Co., 194 F.3d 1258, 52 USPQ2d 1258 (Fed.Cir.1999).

FN25. Lighting World Inc. v. Birchwood Lighting Inc., 382 F.3d 1354, 72 USPQ2d 1344, 1348 (Fed.Cir.2004).

Once a court establishes that a MPF limitation is at issue, it must construe that limitation, thereby determining what the claimed function is and what structures disclosed in the written description correspond to the "means" for performing that function.FN26 Corresponding structure need not include all things necessary to enable the claimed invention to work, but it must include all structure that actually performs the recited function.FN27 A structure disclosed in the specification is deemed to be "corresponding structure" only if the specification clearly links or associates that structure to the function recited in the claim. The duty to link or associate structure in the specification with the function is the quid pro quo for the convenience of employing s. 112 para. 6.FN28 Unless structures are clearly associated with the claimed

function, they cannot be corresponding structures for purposes of s. 112 para. 6. Although expert testimony and declarations are useful to confirm that the construed meaning is consistent with the denotation ascribed by those in the field of the art, such extrinsic evidence cannot be used to clearly link the claimed function with allegedly corresponding structure. FN29

FN26. Kemco Sales Inc. v. Control Papers Co., 208 F.3d 1352, 54 USPQ2d 1308, 1312 (Fed.Cir.2000).

FN27. Cardiac Pacemakers Inc. v. St. Jude Med. Inc., 296 F.3d 1106, 63 USPQ2d 1725, 1734 (Fed.Cir.2002).

FN28. Kahn v. General Motors Corp., 135 F.3d 1472, 45 USPQ2d 1608, 1611 (Fed.Cir.1998).

FN29. Omega Eng'g Inc. v. Raytek Corp., 334 F.3d 1314, 67 USPQ2d 1321, 1334 (Fed.Cir.2003).

As will become apparent, MPF issues are central to interpreting the asserted claims of the '646 patent, because the claim elements are all couched in presumptive MPF language.

THE PATENT IN SUIT

The '646 patent in suit issued September 9, 1997 on an application filed April 10, 1995. In general, it discloses and claims a radio frequency (RF) converter system of the type used, for example, in satellite communication ground stations. These systems are commonly characterized as up converters (used to transmit communication signals) and down converters (used to receive communication signals from a satellite). Such a system in the prior art typically includes a plurality of RF converter modules that are connected to a centralized switching unit. In the event of a fault in a particular RF converter module, the switching unit can switch in a backup RF converter module, in order to avoid communication disruptions. Apparently these prior art arrangements work well to provide reliable backup protection. According to the '646 patent, however, they do have disadvantages. For one thing, the centralized switch needs to be directly coupled to each RF converter module, thus necessitating long runs of cable. This adds to the expense of the system and adds undesirable complexity.

The '646 patent proposes to overcome such disadvantages by providing "distributed" switching, i.e., by providing a switch module for each RF converter module. Thus independent claim 1 calls for a transmission system that includes an RF converter means, a backup RF converter means, and a high speed bus means that provides an interface between the two RF units. Independent claim 7 calls for receiving system having those elements. Independent claim 3 is similar to claim 1, but specifies a plurality of RF converter means.

DISCUSSION

A. *Preliminary Identification of MPF Elements*

In his Tentative Identification Report, the SM made it clear that:

this preliminary classification of claim elements is tentative only, and is being undertaken principally in the

hope of avoiding needless effort and expense. The SM's intention is to provide the parties with some guidance that will enable them more efficiently to prepare their joint Rule 4-3 submission, undertake and complete claim construction discovery, and brief the claim construction issues. Accordingly, it is understood that this tentative identification may not, in every instance, survive a plenary *Markman* hearing unscathed. The Federal Circuit has expressly approved what it calls a "rolling claim construction," in which a court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves.FN30

FN30. Conoco Inc. v. Energy & Environ. Int'l LC, 460 F.3d 1349, 79 USPQ2d 1801,1808 (Fed.Cir.2006). See also SanDisk Corp. v. Memorex Prod. Inc., 415 F.3d 1278, 75 USPQ2d 1475, 1486 (Fed.Cir.2005); Oakley Inc. v. Sunglass Hut Int'l, 316 F.3d 1331, 65 USPQ2d 1321, 1329 n. 3 (Fed.Cir.2003).

Despite this observation, the SM is largely adhering to his tentative identification. However, with respect to two of the claim elements, the SM has, upon consideration of the parties' briefing, departed from the tentative identification. As will be seen, the SM has concluded that "high speed bus means" and "converter means" (like "RF Converter means") are not subject to s. 112 para. 6 treatment.

B. ***Introduction***

The person that drafted the '646 patent was, as the Federal Circuit put it in *Cole v. Kimberly-Clark Corp.*,FN31 "clearly enamored of the word 'means'." Asserted claim 1 is illustrative (first occurrence of "means" elements in bold underscored):

FN31. 102 F.3d 524, 41 USPQ2d 1001, 1006 (Fed.Cir.1996).

1. A radio frequency (RF) converter system for transmission of communication signals and which provides reliable backup protection through a distributed protection switching scheme that prevents disruption in communication due to an RF converter failure comprising, in combination:
first ***RF converter means*** for modulating an inputted intermediate frequency (IF) and outputting a desired RF, wherein said first RF converter means has ***means for monitoring and controlling modulation of said inputted IF and for providing communication interface with a backup RF converter;***

backup RF converter means looped to said first RF converter means for performing fault detection and for assuming a frequency and an attenuation of said first RF converter means when a fault is detected on said first RF converter means, said backup RF converter means having ***means for performing fault detection, self reconfiguration, and logical switching functions;*** and

high speed bus means looped to said backup RF converter means and said first RF converter means for providing an interface between said first RF converter means and said backup RF converter means so said backup RF converter means can monitor configuration changes in said first RF converter means;

wherein each of said first RF converter means and said backup converter means individually comprises:

switching means for switching said inputted IF and said desired RF from said first RF converter means to said backup RF converter means when said fault is detected on said first RF converter means and from said backup RF converter means back to said first RF converter means when said first RF converter means is

cleared of said fault;

input/output module means for looping said inputted IF and said desired RF between said first RF converter means and said backup RF converter means;

power supply means for supplying power;

monitor/control means coupled to said power supply means for controlling modulation of said inputted IF and for providing communication interface;

converter means coupled to said switching means for receiving and modulating said inputted IF to said desired RF;

synthesizer means coupled to said converter means for providing a frequency to modulate said inputted IF to said desired outputted RF; and

reference oscillator means coupled to said converter means and said synthesizer means for stabilizing said converter means and said synthesizer means.

Actually, the fuller quotation from *Cole v. Kimberly-Clark* is as follows:
The drafter of claim 1 in the '239 patent was clearly enamored of the word "means": six of seven elements in that claim include the word "means," which occurs in the claim fourteen times. We find, however, no reason to construe any of the claim language in claim 1 as reciting means-plus-function elements within the meaning of Section 112, Para. 6. For example, the "perforation means ... for tearing" element of Cole's claim fails to satisfy the statute because it describes the structure supporting the tearing function (i.e., perforations). The claim describes not only the structure that supports the tearing function, but also its location (extending from the leg band to the waist band) and extent (extending through the outer impermeable layer). An element with such a detailed recitation of its structure, as opposed to its function, cannot meet the requirements of the statute. Here, the claim drafter's perfunctory addition of the word "means" did nothing to diminish the precise structural character of this element. It definitely did not somehow magically transform this element into a Section 112, Para. 6, "means-plus-function" element.

Claim 1 of the '646 patent trumps claim 1 in that case, for sure: *all twelve* of the separately recited claim elements include the word "means," which occurs in the claim no less than *forty* times.
This claim drafting technique, while unfortunately not rare, is nonetheless uncommon. In such cases, the presumption is created that the claim drafter intended to limit each and every element of the claim to the corresponding structure disclosed in the patent specification or an equivalent structure. But this does not make much sense, given the fact that it is routine, particularly in complex electronic patents like the '646, for the drafter to identify well known structures simply as a classical "black box." FN32 Consider, for example, the claim element "power supply means." The only reference to a power supply in the specification of the ' 646 patent is to a black box or block 22 so labeled in Figs. 1 and 2; similarly, there is a block 52 labeled as a power supply in Figs. 4 and 5. Neither of these blocks is described or even mentioned in the text of the specification. Thus, it would be illogical to assume that the drafter of the ' 646 patent intended "power supply means" to be construed as a MPF element. That would result in the claim being interpreted to cover an equivalent of a black box for which no specific structure is identified. The only rational conclusion is that the drafter was relying on the highly likely proposition that, in the context of the claimed invention, a person of ordinary skill in the art would recognize that "power supply" connotes a well understood class of

structures that are known and used in RF converting systems. Indeed, if this were not so, the drafter would be running an extreme risk that the claim would be invalid for indefiniteness pursuant to 35 U.S.C. s. 112 para. 2. FN33

FN32. An excellent example is found in S3 Inc. v. nVIDIA Corp., 259 F.3d 1364, 59 USPQ2d 1745, 1749-50 (Fed.Cir.2001), where a "converter means" was referred to only as a numbered block in a schematic diagram and its electronic structure and the details of its electronic operation were not described in the specification. But the uncontradicted evidence was that the device is of well known electronic structure and performs a common electronic function, and is readily implemented from the description in the specification. There was evidence that the device is a standard electronic component whose structure is well known in the particular art, and that such standard components are usually represented in the manner shown in the patent. The court observed that "[t]he law is clear that patent documents need not include subject matter that is known in the field of the invention and is in the prior art, for patents are written for persons experienced in the field of the invention. * * * To hold otherwise would require every patent document to include a technical treatise for the unskilled reader. Although an accommodation to the "common experience" of lay persons may be feasible, it is an unnecessary burden for inventors and has long been rejected as a requirement of patent disclosures." See also Personalized Media Comm. LLC v. United States ITC, 161 F.3d 696, 48 USPQ2d 1880, 1887-89 (Fed.Cir.1998).

FN33. See, e.g., Budde v. Harley-Davidson Inc., 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed.Cir.2001).

Fortunately, the Federal Circuit has carefully instructed on how to deal with this kind of situation. As it said in *Lighting World Inc. v. Birchwood Lighting Inc.*,FN34

FN34. 382 F.3d 1354, 72 USPQ2d 1344, 1350 (Fed.Cir.2004).

In considering whether a claim term recites sufficient structure to avoid application of section 112 para. 6, we have not required the claim term to denote a specific structure. Instead, we have held that it is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the term identifies the structures by their function.FN35
FN35. See also, e.g., Personalized Media Comm. LLC v. United States ITC, 161 F.3d 696, 48 USPQ2d 1880, 1886-88 (Fed.Cir.1998); Greenberg v. Ethicon Endo-Surgery Inc., 91 F.3d 1580, 39 USPQ2d 1783, 1786 (Fed.Cir.1996). Indeed, it is appropriate to refer to the accompanying functional language to determine whether the term in question connotes sufficient structure to avoid s. 112 para. 6. Massachusetts Inst. of Tech. v. Abacus Software, 462 F.3d 1344, 80 USPQ2d 1225, 1232-33 (Fed.Cir.2006); Linear Tech. Corp. v. Impala Linear Corp., 379 F.3d 1311, 72 USPQ2d 1065, 1070 (Fed.Cir.2004).

This precisely describes the "power supply means" element of the asserted claims. It does not denote a specific structure, but it is understood by persons of skill in the RF converter system art to designate a broad class of structures that supply power appropriate to the claimed system. As the Federal Circuit said in *Lighting World,* "[w]hat is important is whether the term is one that is understood to describe structure, as opposed to a term that is simply a nonce word or a verbal construct that is not recognized as the name of

structure and is simply a substitute for the term "means for." FN36

FN36. Lighting World Inc. v. Birchwood Lighting Inc., 382 F.3d 1354, 72 USPQ2d 1344, 1350 (Fed.Cir.2004).

The "power supply means" also provides a perfect example of a claim element that needs no construction. In their Rule 4-3 submission, as indicated, the parties were able to agree upon but one claim term: "power supply means." Their agreed construction was "a device that provides a source of electrical energy to electronic circuits with the proper voltages and currents for normal operation." In other words, a device that supplies power appropriate for the claimed circuitry. In other words, a device for supplying power. In other words, etc., etc., ad infinitum. That is a fine definition, but it merely states the obvious. Why bother? More to the point, why run the risk of confusing the jury and further complicating the trial? Any active electronic circuit will have a power supply appropriate to its needs. Unless it is the power supply itself that is the distinguishing feature (or among the distinguishing features) of the claimed invention, the point is moot. The SM would be astonished if either side were to proffer expert testimony to the effect that a particular piece of prior art did not include a power supply, or that the accused systems did not have a power supply.

Moreover, the jointly proposed construction of "power supply means" would, to the extent that there is concern about functional language in the claim, only exacerbate that problem. The parties' agreed definition, as can be seen, adds not a bit of structure; it only elaborates on the function of the device. The jointly proposed construction of "power supply means" is, in truth, an "exercise in redundancy" and has only the potential to confuse, not enlighten, the jury.

This introduction is intended to provide an understanding of the SM's rationale with respect to those claim elements which he has concluded do not fall within the ambit of s. 112 para. 6 and also do not require construction of any kind.

C. *The Special Case of Claim 7*

Claims 1 and 3-5 are directed to a radio frequency (RF) converter system "for transmission of communication signals." In keeping with this functional purpose, the various claimed elements of the system refer to such functions as "modulating an inputted intermediate frequency (IF) and outputting a desired RF." Claim 7, on the other hand, is directed to an RF converter system "for receiving communications signals." Naturally and logically, then, one would expect the functional language to be the reverse of that in claims 1 and 3-5: e.g., "modulating an inputted RF and outputting a desired IF." And so it is, at least for the first part of claim 7. But this concordance does not persist throughout the entire claim. Thus, the "converter means" is said to be for "receiving and modulating said inputted IF to said desired RF" and the "synthesizer means" is for "providing a frequency to modulate said inputted IF to said desired outputted RF," just as both elements are defined in claim 1. Similarly, the "monitor/control means" is for "controlling modulation of said inputted IF."

It is clear that a mistake was made, and that the claim drafter doubtless intended claim 7 to be functionally consistent throughout, one way or the other. Instead, the claim describes a nonsensical system that would not be operative for "receiving communication signals." Comtech proposes to rectify the mistake by having the Court rewrite the claim, by construction, using the appropriate language. It argues that "[g]iven that claim 7 is directed to a down converter, the error is obvious and not subject to reasonable debate-i.e., one

having ordinary skill in the art would recognize that the phrase should have read 'said inputted RF ...,' which is consistent with the preamble and the other claim limitations where the error does not appear. The Federal Circuit permits the district court to correct errors such as the one appearing in claim 7[citing *Novo v. Micro Molds*FN37]." (CB 17 n. 3) The SM disagrees.

FN37. Novo Indus. L.P. v. Micro Molds Corp., 350 F.3d 1348, 69 USPQ2d 1128 (Fed.Cir.2003).

In *Novo,* the court pointed out that 35 U.S.C. s.s. 254 and 255 provide for corrections of mistakes by the patentee (s. 255) and the PTO (s. 254). Under s. 255, the Director of the PTO can issue a certificate of correction upon a showing that the patentee's mistake occurred in good faith; under s. 254 the Director can correct the patent where the PTO records clearly disclose the mistake as the fault of the PTO. In the nearly ten years since the '646 patent issued, Comtech apparently has made no effort to obtain correction of claim 7 under either provision.

The court in *Novo* extensively examined, in light of these statutory provisions, the power of a district court to correct a patent on its own. It concluded that "[a] district court can correct a patent only if (1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims." It went on to hold that the district court had erred by changing "a" to "and"; such a correction did not fit those criteria. Instead of remanding, it proceeded to hold the claim invalid for indefiniteness pursuant to 35 U.S.C. s. 112 para. 2, on grounds that it was not amenable to construction.FN38

FN38. If a court determines that a claim is not amenable to construction, then the claim is invalid as indefinite under 35 U.S.C. s. 112, para. 2. E.g., Exxon Res. & Eng'g Co. v. United States, 265 F.3d 1371, 60 USPQ2d 1272 (Fed.Cir.2001).

In an earlier case, *Process Control Corp. v. HydReclaim Corp.*,FN39 the Federal Circuit concluded that when an impossible limitation, such as a nonsensical method of operation, is clearly embodied within the claim, the claimed invention must be held invalid as inoperable, pursuant to 35 U.S.C. s. 101 and s. 112. As the court put it, in no uncertain terms:

FN39. 190 F.3d 1350, 52 USPQ2d 1029, 1035 (Fed.Cir.1999).

[I]mportantly, we do not permit courts to redraft claims. Although we construe claims, if possible, so as to sustain their validity, it is well settled that no matter how great the temptations of fairness or policy making, courts do not redraft claims. Nothing in any precedent permits judicial redrafting of claims. At most there are admonitions to construe words in claims narrowly, if possible, so as to sustain their validity. Where, as here, the claim is susceptible to only one reasonable construction, the canons of claim construction cited by HydReclaim are inapposite, and we must construe the claims based on the patentee's version of the claim as he himself drafted it. It would not be appropriate for us now to interpret the claim differently just to cure a drafting error. That would unduly interfere with the function of claims in putting competitors on notice of the scope of the claimed invention. FN40 (Internal citations, quotes, and ellipses omitted.)
FN40. 52 USPQ2d at 1033.

In the view of the SM, the present situation falls squarely within the rationale of *Process Control*. The only reasonable construction of claim 7 is that it contains internal inconsistencies that render it inoperative FN41 and nonsensical. One cannot, by looking at the intrinsic evidence of record, conclude that the correction proposed by Comtech is "not subject to reasonable debate," within the meaning of *Novo*. Clearly, there are at least two possible corrections that would render the claim amenable to construction: the claim could be rewritten to make all references read "inputted RF" or alternatively to make them read "inputted IF." Nor does Comtech point to anything in the prosecution history that compels one such revision over the other. Thus, Comtech cannot meet the limited circumstances outlined in *Novo* that might permit the Court to redraft the claims.

FN41. Operability is a factual question. See, e.g., Newman v. Quigg, 877 F.2d 1575, 11 USPQ2d 1340, 1345 (Fed.Cir.1989). Comtech has identified no factual issue with respect to the inoperability of the invention as claimed.

So where does all this leave us with respect to claim 7? Because it is inoperable as drafted, like the claim in *Process Control,* it should be held invalid for lack of utility pursuant to 35 U.S.C. s. 101. Because it is, as drafted, not amenable to construction, it should be held invalid as indefinite, pursuant to 35 U.S.C. s. 112 para. 2, like the claim in *Novo*. The SM feels that it would be inappropriate to recommend a conclusion of invalidity under s. 101 under the present circumstances. That is a matter outside the confines of strict claim construction and is better addressed in the context of a motion for summary judgment. But whether a claim meets the requirements of s. 112 para. 2 is indeed a matter of construction of the claims.FN42 A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims.FN43 The definiteness requirement of s. 112 para. 2 focuses on whether the claims, as interpreted in view of the written description, adequately perform their function of notifying the public of the scope of the patentee's right to exclude.FN44 Claims as granted are accompanied by a presumption of validity based on compliance with s. 112 para. 2,FN45 and the challenger in litigation must produce clear and convincing contrary evidence.FN46 Because a claim is presumed valid, a claim is indefinite only if it is insolubly ambiguous, and no narrowing construction can properly be adopted. FN47

FN42. See, e.g., S3 Inc. v. nVIDIA Corp. 259 F.3d 1364, 59 USPQ2d 1745, 1746 (Fed.Cir.2001); Atmel Corp. v. Information Storage Devices Inc., 198 F.3d 1374, 53 USPQ2d 1225, 1227 (Fed.Cir.1999)..

FN43. Personalized Media Comm. LLC v. United States ITC, 161 F.3d 696, 48 USPQ2d 1880, 1888 (Fed.Cir.1998)

FN44. E.g., Honeywell Int'l Inc. v. United States ITC, 341 F.3d 1332, 68 USPQ2d 1023, 1028 (Fed.Cir.2003).

FN45. E.g., S3 Inc. v. nVIDIA Corp., 259 F.3d 1364, 59 USPQ2d 1745, 1747 (Fed.Cir.2001).

FN46. E.g., Budde v. Harley-Davidson Inc., 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed.Cir.2001).

FN47. E.g., E.g., Honeywell Int'l Inc. v. United States ITC, 341 F.3d 1332, 68 USPQ2d 1023, 1028 (Fed.Cir.2003).

As we have seen, there is clear and convincing evidence-indeed indisputable evidence-that claim 7, as written, makes no sense. Indeed, Comtech admits that it needs correcting (CB 17 n. 3). But as we have also seen, the necessary corrections cannot be made by this Court, and Comtech has let ten years go by without making any effort at correction by proper means. Accordingly, the SM has concluded, as a matter of claim construction, that claim 7 is insolubly ambiguous and cannot be construed. ***It is therefore recommended that claim 7 be held invalid under*** 35 U.S.C. s. 112 ***para. 2 .***

Against the possibility that the Court may disagree with this recommendation, the SM has, in the discussion that follows, proceeded to construe the various elements of claim 7 along with those of the other claims.

D. ***Prosecution History Estoppel vs. Claim Construction***

A few comments on this topic are necessary to avoid possible confusion as this matter develops further. Radyne devotes substantial portions of its brief to arguments about the doctrine of equivalents and its sister concept, prosecution history estoppel, citing cases dealing with those issues. Those arguments evince a misunderstanding of the proper role of the prosecution history in claim construction. (See, for example: "Because prosecution history estoppel applies, claim 1 must be construed to literally require * * *." (RB 10); "claim 7 does not read on an RF converter system that employs direct coupling, or equivalents thereof, between the RF converter, the backup RF converter, and/or the other elements in the claims, because Comtech explicitly surrendered such subject matter by amendment in order to obtain allowance of these claims" (RB 53-54).)

Certainly the prosecution history, as an important part of the intrinsic evidence, is always relevant to claim construction. But as the Federal Circuit has explained, there is a clear line of distinction between using the contents of the prosecution history to reach an understanding about disputed claim language and the doctrine of prosecution history estoppel, which estops or limits later expansion of the protection accorded by the claim under the doctrine of equivalents when the claims have been purposefully amended or distinguished over relevant art to give up scope. Thus, it is technically correct to say that the doctrine of prosecution history estoppel is irrelevant to determination of literal claim scope. On the other hand, a particular interpretation of a claim term may have been disclaimed by the inventor during prosecution. Thus it is incorrect to ignore the prosecution history when interpreting claims.FN48 Through statements made during prosecution an applicant for a patent may commit to a particular meaning for a patent term, which meaning is then binding in litigation.FN49 The Federal Circuit refers to this, in contradistinction to prosecution history estoppel, as the doctrine of prosecution disclaimer. The doctrine is well established in Supreme Court precedent, precluding patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution. The Federal Circuit has adopted that doctrine as a fundamental precept in its claim construction jurisprudence. As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution. Where the patentee has unequivocally disavowed a certain meaning to obtain the patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender. The court has, however, declined to apply

the doctrine of prosecution disclaimer where the alleged disavowal of claim scope is ambiguous. To balance the importance of public notice and the right of patentees to seek broad patent coverage, the court has consistently rejected prosecution statements too vague or ambiguous to qualify as a disavowal of claim scope, and has required the alleged disavowing statements to be both so clear as to show reasonable clarity and deliberateness, and so unmistakable as to be unambiguous evidence of disclaimer. Consequently, for prosecution disclaimer to attach, the alleged disavowing actions or statements made during prosecution must be both clear and unmistakable.FN50 The same statements in the prosecution history can be used both to interpret the claims and to determine whether there is prosecution history estoppel. But the two doctrines must be carefully distinguished. Claim interpretation in view of the prosecution history is a preliminary step in determining literal infringement, while prosecution history estoppel applies as a limitation to the DOE after the claims have been properly interpreted and no literal infringement is found. Estoppel does not involve a reinterpretation of the claims.FN51

FN48. Biodex Corp. v. Loredan Biomedical Inc., 946 F.2d 850, 20 USPQ2d 1252, 1262 (Fed.Cir.1991).

FN49. CVI/Beta Ventures Inc. v. Tura LP, 112 F.3d 1146, 42 USPQ2d 1577, 1585 (Fed.Cir.1997).

FN50. Omega Eng'g Inc. v. Raytek Corp., 334 F.3d 1314, 67 USPQ2d 1321, 1327-29 (Fed.Cir.2003).

FN51. Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 228 USPQ 90, 96 (Fed.Cir.1985).

E. "*Each * * * individually comprises.*"

Claims 1, 5, and 7 in terms require that "each of" the primary RF converter means and backup RF converter means "individually comprises" FN52 switching means, input/output module means, power supply means, monitor/control means, converter means, synthesizer means, and reference oscillator means. Claims 3 and 4 are not quite so inclusive; each of the plurality of RF converters and the backup RF converter is required only to have switching means, and input/output module means.

FN52. The term "comprising" is "patent-speak" for "including," and permits inclusion of unnamed components. See, e.g., Hewlett-Packard Co. v. Repeat-O-Type Stencil, 123 F.3d 1445, 43 USPQ2d 1650, 1655 (Fed.Cir.1997).

In order to construe this language properly, it is important to understand that claims 3-5, in that they call for a "plurality" FN53 of primary RF converters, require at least two of them. In that case, each of the two or more primary RF converters is required to include the recited elements. By contrast, claims 1 and 7 simply call for at least one primary RF converter, and therefore only one need include the recited elements. Additional RF converters are not precluded by those claims, but the claims do not require that all of them, if there is more than one, include the recited elements.

FN53. The term "plurality" is "patent-speak" meaning "two or more." Dayco Prods. Inc. v. Total Containment Inc., 258 F.3d 1317, 59 USPQ2d 1489, 1497-98 (Fed.Cir.2001).

Even more importantly, it should not be assumed that, simply because the primary and backup RF converters are both required to include certain elements, those elements must be *structurally identical* in both converters. Provided that each contains structure that is supported by the '646 patent specification and that performs the function recited for the particular element, the "each individually comprises" limitation is met.

Accordingly, it is recommended that all claims be construed to require that the backup RF converter means includes the recited elements; that claims 3-5 be construed to require that each of the primary RF converter means includes the recited elements; and that claims 1 and 7 be construed to require that at least one primary RF converter includes the recited elements.

F. ***Claim Elements Not Subject to*** s. 112 ***para. 6*** **Treatment**

The following elements have been determined by the SM not to fall within the ambit of s. 112 para. 16. In only one case ("high speed bus means") does the means clause itself require any additional construction. Radyne expresses concern, in connection with some claim elements, that Comtech is, in its proposed constructions, ignoring the functional language that accompanies the means clause. For example, in connection with "reference oscillator means," Radyne complains that Comtech's construction

seems to avoid [the functional limitation] by arguing for a claim construction that is met if the Radyne accused products merely have a reference oscillator, regardless of whether it meets the "stabilizing" limitation of the claim. Comtech's claim construction should be rejected because it reads a limitation out of the claim. (RB 45)

To allay this fear on Radyne's part, the SM wishes to emphasize that no construction recommended herein will "read a limitation out of the claim." Once again, if this report is silent on a particular term, be it in a structural clause or a functional clause, that simply means that *it does not require additional construction, not that it is to be disregarded*. In one or two cases cases the functional language following the means clause may contain a word or phrase that does separately require construction. But for the most part, the functional language is to be given its ordinary meaning, without additional construction. ***Accordingly, all functional limitations of the claims are significant, and the claims are to be construed as literally requiring those limitations.***FN54

FN54. It would, in the view of the SM, overwhelm the jury with unnecessary verbiage were each individual recommended construction also accompanied by a specific recitation to this effect. It should suffice simply to instruct the jury that, in the case of all functional clauses, the limitations are significant and cannot be ignored.

I> ***"Power supply means" (claims 1, 5 & 7)***

For the reasons given above, the element "power supply means for supplying power" ***is not subject to*** s. 112 ***para. 6*** and, despite the parties' Rule 4-3 agreed definition, ***the SM recommends that the term needs no further construction.***FN55

FN55. Radyne continues to contend that the element is subject to s. 112 para. 6, but agrees that it needs no

construction. (RB 37)

I> "***First RF converter means*** " ***(claims 1 & 7)*** FN56

FN56. Claims 1 and 7 are independent claims.

I> "***A plurality of RF converter means*** " ***(claims 3-5)*** FN57

FN57. Claim 3 is an independent claim; claim 4 is dependent upon claim 3 and thus includes all its limitations; claim 5 is in turn dependent upon claim 4 and thus includes all the limitations of claims 3 and 4.

The element in question here is " ***RF converter means*** for modulating an inputted intermediate frequency (IF) and outputting a desired RF." The SM has concluded that this element is not subject to s. 112 para. 6 treatment and, being a well-understood structure in this art, needs no further construction.

The '646 patent, in describing the prior art, indicates that RF converters "are a type of communication equipment which are used in satellite ground stations. (C1, L14-16) FN58 Dr. Heppe states that the term refers to a class of devices that "is widely known and described in textbooks addressing radio communications, satellite communications, and radar." (Heppe para. 12) According to him, in the context of the technology described in the ' 646 patent, the term "typically connotes a commercially-available integrated module * * * comprising a chassis, internal power supply, front panel controls, and other electronics such as local oscillator, frequency synthesizer module * * * comprising a chassis, internal power supply, front panel controls, and other electronics such as local oscillator, frequency synthesizer, mixer, etc., which support the function of RF conversion." (Heppe para. 13) He opines that the term "was understood and used, at the time of the invention, to denote structure for modulating an input signal to a desired output signal." (Heppe para. 14)

FN58. This notation indicates that the material of interest is found at lines 14-16 of column 1 of the '646 patent.

Although Dr. Heppe's declaration supports the SM's conclusion, it is not necessary to that conclusion, in view of the language in the patent itself that RF converters are a type of communication equipment used in satellite ground stations. There is no evidence to the contrary, and it may be reliably supposed that persons of ordinary skill in that art would know that and would know or easily be able to ascertain the structure of such equipment. Moreover, Fig. 1 of the '646 patent specifically illustrates an RF converter **10** that includes an input/output switch **12** that is coupled to converter **14** which modulates the inputted IF to produce the desired RF. The RF converter **10** is also shown to include a synthesizer **16,** a reference oscillator **18,** and a monitor and control module 20. (C3L36-56) In addition, the claim language itself identifies extensive structure for the "RF converter means." Claims 1 and 7 describe the RF converter means as having (1) "means for monitoring and controlling modulation of said inputted IF and for providing communication interface with a backup RF converter," (2) switching means, (3) input/output module means, (4) power supply means, (5) monitor/control means, (6) converter means, (7) synthesizer means, and (8) reference oscillator means. Claims 3 and 4 describe the RF converter means as including elements (1)-(3) and claim 5 adds elements (4)-(8). The fact that several of these elements (i.e., elements (1)-(3) and (5)) may themselves

be regarded as MPF elements in no way detracts from their contribution in defining a specific structure for the "RF converter means."

Radyne argues that a "converter" is a device that takes just one frequency and changes it to another frequency.FN59 (RB 16, 40) It cites the Kronschnabel declaration (Exhibit B para. 22) to the effect that, in order to perform the recited function of "monitoring and controlling modulation" of an inputted IF signal, "you would need a converter to change the frequency from one frequency to another, and a modulator to modulate the desired RF signal." This argument is pointless in view of the fact, as indicated above, that the claims expressly require the RF converter means to include the classical elements for RF modulation: a synthesizer, a reference oscillator, and "converter means * * * for receiving and modulating said inputted IF to said desired outputted RF."

FN59. This argument is deceptively simplistic. Any electrical engineer knows that a "frequency converter" can be a simple electromechanical or solid state device that does in fact simply change one frequency to another without mixing or modulation. But in the context of this case, the subject of the '646 patent is frequency conversion at *radio frequencies,* and such an engineer would naturally expect an RF converter to include circuitry for mixing or modulating an RF signal with an inputted IF signal, or vice-versa. An illustrative short discussion of this dichotomy may be found in Wikipedia, "Frequency Changer" at http://en.wikipedia.org/wiki/Frequency_converter. One supposes that Radyne would not object to a reference to Wikipedia, inasmuch as Radyne has included four references to this resource among the exhibits to its claim construction brief. (Exhibits J, P, Q & U)

It is recommended that the term "RF converter means" be regarded as outside the confines of s. 112 ***para. 6, and that it need be construed no further.*** FN60

FN60. Radyne continues to argue strenuously that the element is subject to s. 112 para. 6, but agrees that, if it is not a MPF element, it needs no construction. (RB 20) Comtech contends that the element is not governed by s. 112 para. 6 and agrees that it requires no further construction. (CB 15)

I> "*Backup RF converter means" (all claims)*

The element in question here is " ***backup RF converter means*** looped [claims 3-5: "coupled"] to said first RF converter means for performing fault detection and for assuming a frequency and an attenuation of said first [claims 3-5: "any of said plurality of"] RF converter means when a fault is detected on said first RF converter means." The SM has concluded that this element is not subject to s. 112 para. 6 treatment and, being a well-understood structure in this art, needs no further construction.

Dr. Heppe states that, "[a]t the time of the invention, the adjective 'backup' was widely applied in reference to a redundant element of a system that could be used to substitute for a primary element in the event of failure of the primary element." He therefore concludes that the term would be recognized as an RF converter that serves as a backup in the event that a first RF converter fails. (Heppe para. 18)

Again, Dr. Heppe's opinion supports, but is not necessary to, the SM's conclusion. The patent itself makes clear that the prior art contemplates a system where, "[w]hen a fault occurs on any of the RF converter modules, the centralized switching unit can switch the RF converter module where the fault had occurred to

a backup RF converter module." (C1L28-32) In order for this to make any sense, the backup RF converter would have to be able to perform at least the converter functions of the primary RF converter, using the same or very similar structure. Indeed, the patent specification equates the two in terms of structure: e.g., "[t]he backup RF up converter is comprised of the same components as listed above for an RF up converter." (C4L25-27, C6L12-13) In addition, the claims expressly require the backup RF converter means to include "means for performing fault detection, self reconfiguration, and logical switching functions." As will be seen below, that element is expressed in MPF terms and is subject to s. 112 para. 6, but, again, that does not detract from its contribution to the structural definition of "backup RF converter means."

It is recommended that the term "backup converter means" be regarded as outside the confines of s. 112 ***para. 6, and that it need be construed no further.*** FN61

FN61. Radyne continues to argue strenuously that the element is subject to s. 112 para. 6, but agrees that, if it is not a MPF element, it needs no construction. (RB 27) Comtech contends that the element is not governed by s. 112 para. 6 and agrees that it requires no further construction. (CB 16)

It is noted that claims 1 and 7 specify that the backup RF converter is "looped" to the primary RF converter, while claims 3-5 say it is "coupled." In electronics patents, there is a tendency to use particular terms of art to indicate the electrical relationship of various circuit components. Thus, when two components are directly connected electrically, as by wires or a bus, the patent drafter often uses the term "connected." A broader term, "coupled," is often used to include situations where the electrical relationship is not so direct, as in the case of capacitive or inductive coupling, but it also includes direct connections. In the context of the '646 patent, the term "looped" is narrower than either "connected" or "coupled." It is used to describe what the patent refers to as a "daisy chain" configuration, in which a high speed bus is "looped" from "the backup RF converter 32 to a first RF up converter 10 (up converter # 1), to a second RF up converter 10 (up converter # 2) and so on till it terminates at an Nth RF up converter 10." (C5L7-12)

Radyne correctly points out that during prosecution of the '646 patent, claim 1 as filed was amended to distinguish over the prior art by changing "coupled" to "looped." From this it argues that "claim 1 cannot be construed to read on an RF converter system where the RF converters and the backup RF converter are directly coupled." (RB 11) This argument comes very close to the proper construction of "looped," but it does require a little tweaking. As Comtech candidly admits, it

amended the claims as filed to avoid a rejection over Miedema. * * * In amending the claims, the term "looped" was substituted for the term "coupled." Resort to Miedema and the prosecution history makes unmistakably clear what was meant by this substitution. Figure 1 of Miedema illustrates, for example, separate cables running between a monitor circuit and each repeater. In similar fashion, Miedema illustrates separate cables running between a control circuit and each switch (or shutter). As described in the Remarks section of the Amendment Letter (at 19-20), this configuration "shows a standard switching system that has a centralized control and monitoring unit ... [and that] requires long cable runs from each RF converter module to the centralized unit....

The '646 Patent, on the other hand, eliminates the separate cable runs between the "monitor circuit and each repeater" by looping a high speed bus between each of the primary converters and the backup converter. This feature is illustrated clearly in FIGS. 3 and 6 of the '646 Patent. Similarly, the ' 646 Patent eliminates the separate cables running between each switch and the control circuit by looping the input signal and

desired output signal between each of the primary converters and the backup converter. This feature is also illustrated clearly in FIGS 3 and 6.

It is thus very apparent given the structural differences between Miedema and FIGS. 3 and 6 that the claimed invention replaced the separate cable runs between the "centralized switching unit ... [and] each RF converter" (Amendment at 19)- *i.e.,* the "directly coupled cables"-with "looped cables running successively between the primary converters and the backup converter. *Of course, in a "looped" configuration, the final loop will "directly couple" the last RF converter and the backup RF converter. This "coupling," however, is clearly distinguishable from the prior art switch wherein each RF converter was separately and in parallel coupled to the central switch.* Moreover, the looping permits the elimination of the central switch. (CRB 7-8; emphasis added.)

As can be seen, this statement confirms Radyne's proposed construction almost perfectly. The only exception lies in the italicized language. It is clear from the specification of the '646 patent that, in the disclosed "daisy chain" configuration, one of the primary RF converters will be directly coupled to the backup converter:

Each RF up converter 10 is looped to a successive RF up converter 10 to form an active "daisy chain" configuration. The "daisy chain" terminates in a backup RF up converter 32 which *is directly coupled to the first of the plurality of RF converters 10.* (C4L67 to C5L3; C6L53-58; emphasis added.)

Indeed, claims 3-5 expressly recite this structure. Thus Radyne's proposed construction is a little too restrictive, in that it might be read to preclude direct coupling between the backup RF converter and *any one* of the primary RF converters.

Radyne also argues that the amendment requires that the claims be construed to cover RF converter systems that have the capability of "unlimited expansion." (RB 11) It apparently relies for this on a statement made during the prosecution history, to the effect that "the system has unlimited potential for expansion." (RB 9) But this goal is not expressly claimed. Nor need it be. As Comtech correctly points out, "[t]he fact that an inventor asserts that an invention achieves a particular objective does not in itself require the claims to be limited to structures that are capable of achieving that objective." FN62 Moreover, Radyne's position ignores that settled rule that "claim terms cannot be narrowed by reference to the written description or prosecution history unless the language of the claims invites reference to those sources. * * * In other words, there must be a textual reference in the actual language of the claim with which to associate a proffered claim construction." FN63 Here there is not. "Looped" certainly does not demand a potential for unlimited expansion.

FN62. See, e.g., Liebel-Flarsheim Co. v. Medrad Inc., 358 F.3d 898, 69 USPQ2d 1801, 1809 (Fed.Cir.2004). "Absent a clear disclaimer of particular subject matter, the fact that the inventor may have anticipated that the invention would be used in a particular way does not mean that the scope of the patent is limited to that context." Northrop Grumman Corp. v. Intel Corp., 325 F .3d 1346, 66 USPQ2d 1341, 1347 (Fed.Cir.2003).

FN63. Johnson Worldwide Assoc. Inc. v. Zebco Corp., 175 F.3d 985, 50 USPQ2d 1607, 1610 (Fed.Cir.1999).

Accordingly, it is recommended that the term "looped" or "looping" be construed to mean an interconnection arrangement where the backup RF converter is directly connected to no more than one of the primary RF converters.

I> "*Converter means*" *(claims 1, 5 & 7)*

The element in question here is " ***converter means*** coupled to said switching means for receiving and modulating said inputted IF to said desired RF." Both the RF converter means and the backup RF converter means are required by claims 1, 5, and 7 to include this element. The SM has concluded that this element is not subject to s. 112 para. 6 treatment and, being a well-understood structure in this art, needs no further construction.

The structure of the claims themselves makes it clear that the term "converter means" refers to that portion of the primary and backup RF converters that performs the conversion process. Both the primary and backup RF converters are required by the claims to include "converter means" and the specified function of the "converter means" is "receiving and modulating said inputted IF to said desired RF."

This conclusion is also supported by Dr. Heppe's declaration. He concludes, based upon the literature of the art, that the term "was understood and used by persons of skill in the art, at the time of invention, to denote structure for the specific elements within an RF converter which perform the function of mixing or modulating an input signal to a desired output signal." (Heppe para. 17) Mr. Kronschnabel's opinion is not to the contrary. He states that, in his opinion, to perform the recited modulation function, the converter would necessarily have to have a modulator. (Exhibit B para. 22)

It is recommended that the term "converter means" be regarded as outside the confines of s. 112 ***para. 6, and that it need be construed no further.***

I> "*High speed bus means*" *(all claims)*

The element in question here is " ***high speed bus means*** looped to said backup RF converter means and said first RF converter means for providing an interface between said first RF converter means and said backup RF converter means" (claims 1 and 7) or " ***high speed bus means*** for looping each of said plurality of RF converter means to a successive RF converter means of said plurality of RF converter means and for providing an interface between each of said plurality of RF converter means and said backup RF converter means" (claims 3-5).

There can be no doubt that, as of 1995, a person of ordinary skill in the art would have understood what was meant by the term "bus means" in the context of the '646 patent, both structurally and functionally. In Dr. Heppe's opinion, "the term would have been understood by one skilled in the art, at the time of the invention, to denote a type of structure consisting of one or more conductors, *e.g.,* wires, used for transmitting signals or power from one or more sources to one or more destinations. The class of structures contains members with varying numbers of electrical conductors and a variety of protocols, and would include standardized and widely-available buses as well as non-standard or proprietary buses." (Heppe para. 19) Radyne's expert does not opine to the contrary. Mr. Kronschnabel says that in his opinion "the term 'bus' generally would have a meaning to a person skilled in the art." (Kronschnable para. 17) Thus, the term "bus means" connotes sufficient structure (particularly in light of the further limitation "looped to said backup RF converter means and said first RF converter means for providing an interface" between them (claims 1 and 7) or "for looping each of said plurality of RF converter means to a successive RF converter means * * *

and for providing an interface between each of said plurality of RF converter means and said backup RF converter means" (claims 3-5)) to take it outside the strictures of s. 112 para. 6.

The real controversy with respect to this element is the meaning of "high speed" as a modifier for "bus means." In other words, does "high speed" connote a specific bus structure? Does it demand an absolute minimum data transmission rate? Radyne's answer to the first of these questions is that the "high speed bus means" cannot be read to cover a serial communications interface such as an RS-485 or RS-232C port. (RB 48-49) Its argument in this respect is based upon Figs. 1 and 4 of the '646 patent, which show separate inputs to the RF converter for a "Serial Comm. Interface (RS-485/RS-232C)-Com 1" and a "High Speed Bus." From this Radyne draws the rather simplistic conclusion that 'high speed bus means" therefore necessarily excludes both an RS-485 and RS-232C interface. The logic of this conclusion is not apparent to the SM. The function and purpose of those interfaces is not described in the patent, and there appears to be no warrant for excluding them from the class of buses that fall within the scope of the recited "high speed bus means" unless, of course, they cannot be considered "high speed" within the context of the ' 646 patent.

On that question, Radyne relies on Mr. Kronschnable, whose opinion is that "the term 'high speed bus' as used in the '646 Patent should reasonably be interpreted as having a data transfer speed that is greater than the data transfer speed of any of the other command and control interfaces disclosed in the patent-for example, the 'Serial Comm. Interface (RS-485/RS-232C)-Com 1' that is shown in the patent" (Kronschnable para. 18) and that "a data transfer speed in the hundreds of kilobits per second-and possibly quite a bit faster-would have been required at the time of the invention for a 'bus' to be considered 'high speed' in the context of the '646 Patent." (Kronschnable para. 19) This opinion is based upon the functional complexity of the claimed system and "the reasonable expectation for minimizing any outage period by accomplishing these functions (fault detection, self reconfiguration, and logical switching) quickly." (Kronschnable para. 18) Radyne also cites contemporaneous U.S. patents that use the term "high speed bus" as an indicator of data transmission speeds that would accord with Mr. Kronschnable's definition. (RB 49)

Comtech disagrees. It says that because "high speed" is a term relative to the context in which it is used, it should not be construed as limited to an absolute threshold rate of data transmission. In the context of the '646 patent, according to Comtech, "high speed" simply means that "the speed of data transmission along the conductors is high relative to the data loading of the bus, which is dictated by the equipment operating at the sources or destinations connected to the bus." (CB 21) For these arguments, it relies upon Dr. Heppe's opinion that "[a]lthough engineers do not attach a particular data rate threshold to the term 'high speed bus,' the phrase indicates a bus whose speed is sufficiently higher than the nominal data throughput requirements of a system, so that the performance of the application(s) running on devices accessing the bus are [*sic:* is] not degraded by delays in data transfer." (Heppe para. 23) He supports this opinion by reference to the U.S. patents cited by Radyne, which indicate a broad range of transmission rates. He also refers to extrinsic technical sources that appear to regard the RS-485 standard as one capable of high speeds. (Heppe para. 21-22)

Comtech is clearly correct on this issue. Although Mr. Kronschnable correctly frames the question in terms of a "reasonable expectation for minimizing any outage period by accomplishing these functions (fault detection, self reconfiguration, and logical switching) quickly," he provides no basis for his conclusion that "a data transfer speed in the hundreds of kilobits per second-and possibly quite a bit faster-would have been required." Any attempt to impose a threshold data transmission rate on the term "high speed bus" appears to require guesswork, plain and simple. As Dr. Heppe concludes, the required data transmission speed is one that will not cause degradation of the performance of the devices that access the bus. To put it in terms of

the patent claims, the only rational construction of the term "high speed" in the context of the '646 patent is one that will enable the claimed system to work as intended, to provide, in the language of the preamble of claim 1, "reliable backup protection through a distributed protection switching scheme that prevents disruption in communications due to an RF converter failure." ***Accordingly, it is recommended that the term "high speed bus means" be regarded as outside the confines of*** s. 112 ***para. 6, and that the term "bus" needs no further construction. It is also recommended that the term "high speed" in this context means a data transmission rate sufficiently high to enable the RF converter system in question to achieve its claimed goals: i.e., reliable backup protection that prevents disruption in communication due to an RF converter failure.***

⊳ "*Synthesizer means*" *(claims 1, 5 & 7)*

The element in question here is " ***synthesizer means*** coupled to said converter means for providing a frequency to modulate said inputted IF to said desired outputted RF." Both the RF converter means and the backup RF converter means are required by claims 1, 5, and 7 to include this element. The SM has concluded that this element is not subject to s. 112 para. 6 treatment and, being a well-understood structure in this art, needs no further construction.

The '646 patent describes a preferred type of synthesizer 16,

comprised of two separate components. The fine step module 16A is used for increasing the frequency of the synthesizer in predetermined increments in order to modulate the inputted IF to the desired RF. In the preferred embodiment of the present invention, the fine step module 16A increases or decreases the frequency of the synthesizer in 125 khz increments. The sum loop module 16B which is coupled to the fine step module is used for summing a plurality of the predetermined increments in order to produce the required frequency to modulate the inputted IF to the desired RF. (C3L60-C4L3)

This clearly describes a specific type of frequency synthesizer.

Dr. Heppe's opinion supports the SM's conclusion. He states that "[a] frequency synthesizer was well-known to those skilled in the art at the time of the invention as a device or circuit element that generates a commanded frequency-typically by manipulating a known frequency provided by a reference oscillator." (Heppe para. 31) Indeed, he refers to a 1987 textbook devoted to frequency synthesizers. (Heppe para. 33)

Radyne suggests that Dr. Heppe's opinion is irrelevant because it proceeds on the assumption that the claimed "synthesizer means" is a frequency synthesizer. It argues that the "relevant inquiry here is whether the word 'synthesizer' *all by itself* elaborates sufficient structure for performing entirely the specified functions of the claim element." (RB 42; emphasis added.) This argument clearly implies that Dr. Heppe, and the Court (and SM), and persons of ordinary skill in the art are forbidden, as a matter of law, from referring to the function that the synthesizer means is required to perform in order to determine whether the term connotes sufficient structure to remove it from the ambit of s. 112 para. 6. But that, in the opinion of the SM, is not the law. Just to cite one particularly apt example, the Federal Circuit has, on at least three very recent occasions, approved reference to the accompanying functional language in order to determine whether the terms "circuit" or "circuitry" connoted sufficient structure to one of ordinary skill in the art to avoid s. 112 para. 6 treatment.FN64 In the most recent of these cases, the court noted that the claim language "does not merely describe a circuit; it adds further structure by describing the operation of the circuit." FN65 Here, too, the claim language adds further structure for the term "synthesizer means," in that

it is required to be "coupled to said converter means for providing a frequency to modulate said inputted IF to said desired outputted RF." In other words, the synthesizer means is an RF frequency synthesizer, whose structure is well understood by those in the art.

FN64. Massachusetts Inst. of Tech. v. Abacus Software, 462 F.3d 1344, 80 USPQ2d 1225, 1232-33 (Fed.Cir.2006); Linear Tech. Corp. v.. Impala Linear Corp., 379 F.3d 1311, 72 USPQ2d 1065, 1070 (Fed.Cir .2004); Apex Inc. v. Raritan Computer Inc., 325 F.3d 1364, 66 USPQ2d 1444, 1450-51 (Fed.Cir.2003).

FN65. Massachusetts Inst. of Tech. v. Abacus Software, 462 F.3d 1344, 80 USPQ2d 1225, 1233 (Fed.Cir.2006).

Radyne seeks to distinguish these cases, and *Lighting World*FN66 as well, on the basis that the terms at issue there did not include the word "means," and the issue was whether the presumption that s. 112 para. 6 did *not* apply had been overcome. It contrasts that situation with the present one, where the word "means" *is* used, and the issue is whether the presumption that s. 112 para. 6 *does* apply has been overcome. (RB 13-14) The SM does not see the logic in this proposed distinction. If it is open to the construer of claims to look to the functional claim recitation to find structure for the term "circuit," surely it is permissible to look to the functional recitation to find structure for the term "circuit means," and it is likewise permissible to look to the functional recitation "for providing a frequency to modulate" to find structure for the term "synthesizer means." Radyne's position highlights a distinction without a difference.FN67 At the May 3 hearing, Radyne attempted to justify such a distinction by suggesting that the presumption that accompanies the word "means" is somehow stronger than the "reverse presumption" that applies when that word is absent. But the SM knows of no case that so holds, and cannot perceive any basis, in logic or legal policy, that would compel such a holding.

FN66. See footnote 34 and accompanying text, supra.

FN67. At least one District Court opinion agrees with the SM's assessment. See Technology Licensing Corp. v. VideoTek, 67 USPQ2d 1842, 1845 n. 2 (N.D.Calif.2002). An unpublished Federal Circuit decision, *DESA IP v. EML Techs.,* No. 06-1168 (Fed.Cir. Jan. 4, 2007) notes the distinction but does not explain the difference.

It is recommended that the term "synthesizer means" be regarded as outside the confines of s. 112 ***para. 6, and that it need be construed no further.***

⊩> "*Reference oscillator means*" *(claims 1, 5 & 7)*

The element in question here is " ***reference oscillator means*** coupled to said converter means and said synthesizer means for stabilizing said converter means and said synthesizer means." Both the RF converter means and the backup RF converter means are required by claims 1, 5, and 7 to include this element. The SM has concluded that this element is not subject to s. 112 para. 6 treatment and, being a well-understood structure in this art, needs no further construction.

The '646 patent describes a reference oscillator 18 that is

Coupled to the converter 14 and to the synthesizer 16. The reference oscillator 18 is a highly stable oscillator which is used to determine the stability and to help stabilize the converter 14 and the synthesizer 16. The reference oscillator 18 can be an internal oscillator or it can be external to the RF up converter 10 and coupled to the RF up converter 10 at an input 18A (see Fig. 1). (C3L44-51)

If the SM may be permitted to inject a personal background note, he himself knew what a reference oscillator was back in college in the late 1950s. This being the case, it would hardly be surprising to learn that persons skilled in the art of RF converter systems would have no trouble, in April 1995, understanding what was meant by that term, both structurally and functionally.

This conclusion is supported by Dr. Heppe's opinion that the term "was understood and used by persons of skill in the art, at the time of invention, to denote structure that provides a stable (i.e., fixed), high-quality oscillatory output which can be used as a 'reference' by other circuit elements to generate desired signals." (Heppe para. 34) Again, as in the case of the synthesizer means, Radyne wants to have "reference oscillator means" evaluated without reference to the functional requirement that it stabilize the converter means and synthesizer means. Ignoring the accompanying functional language is, as indicated previously, improper as a matter of law.

It is recommended that the term "reference oscillator means" be regarded as outside the confines of s. 112 ***para. 6, and that it need be construed no further.***

G. ***Claim Elements Governed by*** s. 112 ***para. 6***

The parties do not dispute that the following elements are subject to treatment under s. 112 para. 6. The SM agrees. The first one ("means for performing fault detection" etc.) does not even have adjective modifiers associated with the term "means." The others have such modifiers (i.e., "monitor/control" means, "switching" means, "transmit switch module" means, and "input/output module" means), but those modifiers do not provide any inherent structural information, and themselves are nothing more than functional statements. More importantly, the associated functional recitations do not provide any basis for inferring structure. ***Accordingly, the presumption of MPF treatment created by the use of the word "means" has not been overcome, and each of these elements must be construed in accordance with*** s. 112 ***para. 6.***

Radyne's principal contention with respect to these MPF claim elements is that the '646 patent specification does not disclose sufficient structure to perform the recited functions. In *Budde v.. Harley-Davidson Inc.,* FN68 the Federal Circuit laid out the proper approach to this problem:

FN68. 250 F.3d 1369, 58 USPQ2d 1801, 1806 (Fed.Cir.2001).

In construing means-plus-function claim limitations, a court must first define the particular function claimed. Thereafter, the court must identify "the corresponding structure, material, or acts described in the specification." It is not until the structure corresponding to the claimed function in a means-plus-function limitation is identified and considered that the scope of coverage of the limitation can be measured. Whether or not the specification adequately sets forth structure corresponding to the claimed function necessitates consideration of that disclosure from the viewpoint of one skilled in the art. Moreover, failure to

disclose adequate structure corresponding to the recited function in accordance with 35 U.S.C. s. 112, paragraph 1, results in the claim being of indefinite scope, and thus invalid, under 35 U.S.C. s. 112, paragraph 2.

For a court to hold that a claim containing a means-plus-function limitation lacks a disclosure of structure in the patent specification that performs the claimed function, necessarily means that the court finds the claim in question indefinite, and thus invalid. Because the claims of a patent are afforded a statutory presumption of validity, overcoming the presumption of validity requires that any facts supporting a holding of invalidity must be proved by clear and convincing evidence. Thus, a challenge to a claim containing a means-plus-function limitation as lacking structural support requires a finding, by clear and convincing evidence, that the specification lacks disclosure of structure sufficient to be understood by one skilled in the art as being adequate to perform the recited function. (Citations omitted.) FN69

FN69. See also Intellectual Prop. Dev. Inc. v. UA-Columbia Cablevision, 336 F.3d 1308, 67 USPQ2d 1385, 1393 (Fed.Cir.2003).

The Federal Circuit also instructs that "[a] determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the consumer of patent claims." FN70

FN70. E.g., Default Proof Credit Card Sys. Inc. v. Home Depot U.S.A., 412 F.3d 1291, 75 USPQ2d 1116, 1121 (Fed.Cir.2005)

I> "*Means for performing fault detection, self reconfiguration, and logical switching functions*"

Each claim requires this element as part of the "backup RF converter means." The recited functions are "fault detection, self reconfiguration, and logical switching." The '646 patent expressly identifies the structure that performs these functions as a microprocessor. (C4L27-30; C5L4-7) Radyne says that it "does not contend that the details of how the microprocessor is programmed to achieve the stated functions must be disclosed." FN71 However, it insists that "the general 'black box' decision logic or a flow chart of some sort that would enable the microprocessor to perform, for example, what the patentee believes constitutes a 'logical switching function,' should be described." (RB 28)

FN71. And indeed they need not. See, e.g., In re Hayes Microcomputer Patent Litig., 982 F.2d 1527, 25 USPQ2d 1241, 1246-47 (Fed.Cir.1992).

This sounds more like an argument directed at lack of enablement, under 35 U.S.C. s. 112 para. 1, rather than a claim construction inquiry under s. 112 para. 6. But the presumption of validity applies with full force to questions of enablement and it is the burden of a patent challenger under 35 U.S.C. s. 112 to show by facts supported by clear and convincing evidence that the patent is not enabling.FN72 Radyne has offered no evidence at all on this score, much less clear and convincing evidence. Comtech, by contrast, proffers the opinions of Dr. Heppe to the effect that "one of ordinary skill working in 1995 would have understood: 1) what was intended by the functions recited; and 2) how to implement them with the indicated structure, *i.e.,* a microprocessor as indicated." (Heppe para. 41) Thus, "one of ordinary skill would have known how to write a program to recognize or 'detect' that a fault has occurred at a primary RF converter

based on signals (information) received therefrom." (Heppe para. 42) And "[t]he person of ordinary skill would have known how to write a program to implement 'self reconfiguration' by the same microprocessor used for fault detection. For example, one of ordinary skill would have known how to program a microprocessor to read a previously stored configuration of a primary RF converter, and use this information to generate hardware configuration commands (or their equivalent) to control or adjust the output of the backup RF converter." (Heppe para. 43) Finally, "[o]ne of ordinary skill would have understood how to program a microprocessor to generate logical outputs that could be used to control the switches disclosed in the patent." (Heppe para. 44)

FN72. Northern Telecom Inc. v. Datapoint Corp., 908 F.2d 931, 15 USPQ2d 1321, 1329 (Fed.Cir.1990).

Accordingly, it is recommended that the MPF element "means for performing * * * " be construed to mean a microprocessor programmed to perform "fault detection, self reconfiguration, and logical switching functions" (and also any structural equivalent that was known as of September 9, 1997).

I> "*Monitor/control means" (claims 1, 5 & 7)*

The element in question here is " ***monitor/control means*** coupled to said power supply means for controlling modulation of said inputted IF and for providing communication interface." Both the RF converter means and the backup RF converter means are required by claims 1, 5, and 7 to include this element. This element is redundant to the " ***means for monitoring and controlling modulation of said inputted IF and for providing communication interface with a backup RF converter***" which is spelled out in the "RF converter means" clauses of claims 1, 3, and 7.

At the outset, Radyne urges that because the means for performing these functions is recited twice in each of the claims, that necessarily requires two separate and distinct structures. It argues "if the monitor and control assembly 20 is the corresponding structure for the first claimed 'means,' it cannot also be the corresponding structure for the separate component claimed in claim 1 as the 'monitor/control means.' " (RB 22) It states this proposition as though it were a rule of law and, indeed, cites a case, *Default Proof v. Home Depot*.FN73 But that case in no way supports Radyne's legal thesis. In *Default Proof* the claim included two elements a-"point-of-sale assembly" that included several structures for performing several functions, and "means for dispensing at least one debit card." The court held that the specification failed to link the "means for dispensing" structure with any of the structures recited as part of the point-of-sale assembly, and, inasmuch as no other structure was identified, held the claim indefinite under s. 112 para. 2. The present case is quite different, in that the elements in question are both expressed in MPF format and both recite performing the same functions. There is certainly nothing in *Default Proof* (or any other case of which the SM is aware) that compels a conclusion that a MPF element cannot be recited more than once in a claim. Indeed, there was good reason for the double recitation: the drafter was making it clear that the backup RF converter as well as the primary RF converter needed to have the recited functionality. Nor is there anything in *Default Proof* (or any other case of which the SM is aware) that prevents a means recited in one element from sharing structure with a means recited in another element, where the two means are recited to perform the same functions.

FN73. Default Proof Credit Card Sys. Inc. v. Home Depot U.S.A., 412 F.3d 1291, 75 USPQ2d 1116 (Fed.Cir.2005).

The claimed function for the "monitor/control means" is "controlling modulation of said inputted IF and * * * providing communication interface." In the case of the "means for monitoring and controlling," an additional function-"monitoring * * * modulation of said inputted IF"-is spelled out, although that seems implicit in the very term "monitor/control means." Accordingly, the functions performed by the separately recited means are substantially identical.

The '646 patent identifies a "monitor and control module 20 * * * coupled to the I/O switch 12, the converter 14 and the synthesizer 16 for controlling the modulation of the inputted IF to the desired RF. The monitor and control module 20 is also used for providing communication interface with a backup RF up converter." (C3L51-56) This constitutes a clear linkage between the claimed functions and the described structure. The question then becomes, is this structure adequate to perform the recited functions? Radyne argues that it is not, but offers no evidence to discharge its burden of clear and convincing evidence. Comtech, for its part, again relies upon the opinion of Dr. Heppe, to the effect that the monitoring and controlling functions recited in the claims "were performed in prior art RF converter systems, typically by microprocessors. Monitoring requires logical interpretation of data; controlling requires issuing of hardware configuration commands in response to inputs from a human operator or other stimuli. A microprocessor offers a cost-effective way to achieve this functionality along with ease of design. One skilled in the art would readily perform the necessary design exercise to select a candidate microprocessor from the numerous products available, and program the selected microprocessor to perform the required functions." (Heppe para. 39) As for the function of providing a communication interface, Heppe opines that an "interface is needed between the primary RF converter(s) and the backup RF converter because, as the patent discloses, the backup RF converter monitors configuration changes in the primary RF converter(s). Since the patent identifies the communication path between the RF converter(s) and the backup RF converter as a high-speed bus, one of ordinary skill would have understood that the claimed structure must transmit and receive data on the high speed bus. One of skill at the time, therefore, would have understood the structure to comprise a microprocessor since the data carried by the bus must be formatted for transmission and interpreted after reception. Microprocessors are easily adapted to these functions." (Heppe para. 40)

In the face of this evidence, the SM obviously cannot say that Radyne has met the standard set forth in *Budde v. Harley-Davidson,* that "a challenge to a claim containing a means-plus-function limitation as lacking structural support requires a finding, by clear and convincing evidence, that the specification lacks disclosure of structure sufficient to be understood by one skilled in the art as being adequate to perform the recited function." ***Accordingly, it is recommended that the MPF elements "monitor/control means" and "means for monitoring and controlling" be construed to mean a microprocessor programmed to perform monitoring and controlling modulation of the inputted IF and to provide, together with the high speed bus, communication interface with a backup RF converter (and also any structural equivalent that was known as of September 9, 1997).***

I> "***Switching means (all claims)***

I> "***Transmit switch module means*** **" *(claims 4 & 5)*** FN74

FN74. The element in question here is " ***transmit switch module means*** for looping said inputted IF and said desired RF of each of said plurality of RF converter means to said successive RF converter means of said plurality of RF converter means and for switching any of said plurality of RF converter means where said fault occurs to said backup RF converter means." Claims 4 and 5 equate this element to the "switching

means" of claim 3. The SM has concluded that the construction adopted for "switching means" should apply to this element as well, and neither party appears to take issue with that approach.

The element in question here is " ***switching means*** for switching said inputted IF and said desired RF from said first [claims 3-5: "any of said plurality of"] RF converter means to said backup RF converter means when said fault is detected [claims 3-5: "occurs"] on said first RF converter means and from said backup RF converter means back to said first [claims 3-5: "one of said"] RF converter means when said first RF converter means is cleared of said fault." Both the RF converter means and the backup RF converter means are required by all claims to include this element. The '646 patent describes the structure that performs these functions as follows:

According to one embodiment of the present invention, the I/O switch 12 is a transmit switch module comprised of an IF transfer switch 12A and a RF transfer switch 12B. When a fault occurs on the online RF up converter 10 (up converter # 1), the transmit switch module is activated. The IF transfer switch 12A and the RF transfer switch 12B of the transmit switch module transfer the IF input and RF output to the backup RF up converter 32. The backup RF up converter 32, whose I/O switch is an I/O module, assumes the frequency and attenuation of the faulted RF up converter 10 and compensates for the loss. (C4L35-46)

Radyne's principal argument here is that since both the primary and backup RF converters are required by the plain language of the claim to have "switching means," both must have identical structure corresponding to that MPF element. But this is contradicted by the specification language quoted above. The primary RF converter is expressly stated to have a transmit switch module "comprised of an IF transfer switch 12A and a RF transfer switch 12B." By contrast, the backup RF has an I/O switch that "is an I/O module." Nothing is said about transfer switches 12A and 12B. This is clearly illustrated in Figs. 3 and 6 of the patent. Indeed, none of the drawing figures illustrates the backup RF converter as having its own transfer switches, and the specification nowhere describes such a structure.FN75

FN75. Radyne urges that the '646 specification provides some support for its position with statements to the effect that the backup RF converter has the same "components" as the primary RF converter. See, e.g., C4L25-27; C5L4-5. But in view of the lack of any such specific description or illustration of identical structure, these statements fall short. Indeed, these statements support what is expressly claimed: that each of the primary and backup RF converters "individually comprises" certain elements. See Section E above.

Accordingly, it is recommended that this MPF element be construed to mean the transfer switches associated with the primary RF converters, and the signal path connectors associated with the backup RF converter, which together perform switching said inputted IF and said desired RF from said first [claims 3-5; "any of said plurality of"] RF converter means to said backup RF converter means when said fault is detected [claims 3-5; "occurs"] on said first RF converter means and from said backup RF converter means back to said first [claims 3-5; "one of said"] RF converter means when said first RF converter means is cleared of said fault (and also any structural equivalent that was known as of September 9, 1997).

Radyne also argues (RB 34) that the claims are invalid for indefiniteness under s. 112 para. 2 "[b]ecause no structure is shown for performing the function of switching the inputted IF and the desired RF from the backup RF converter means back to the first RF converter means when the first RF converter means is

cleared of the fault." As Dr. Heppe points out:

In FIGS 3 and 6, the I/O switches are illustrated as "baseball" switches. These switches, also called " ***R*** switches" because of their well-known use in redundant systems, were known in the prior art. * * * The switch may be implemented mechanically or electrically. The baseball symbol illustrates schematically the signal flows inside the switch, which has two channels (typically) that can route signals among four input/output ports. The switch can be operated in a least two possible positions, and can be commanded back and forth between these two possible positions. The position of the switch determines the signal flow in the system at large. Because the switch can be set and reset (*i.e .,* commanded to either of the two possible positions), the switch can be first commanded to route a singal away from a primary converter to the backup RF converter and, subsequently, the switch can be commanded to route a signal back to the primary RF converter. * * * (Heppe para. 50)

One of ordinary skill in the art, viewing the baseball switch symbol, would have known that each switch can be commanded to each of two positions-one position is used when the primary RF converter is functional, and the other position is used when the primary RF converter is not functional and the backup RF converter is being used instead. Hence, the presence of two-position baseball switches in the switching circuits depicted in FIGS 3 and 6 provides sufficient disclosure of structure to one of ordinary skill in the art for performing the function of switching as discussed above and recited in the claims. (Heppe para. 51)

These opinions appear to be eminently reasonable, and Radyne offers no contradictory evidence of its own. Again, as in the case of the "monitor/control means," the SM obviously cannot say that Radyne has met the standard set forth in *Budde v. Harley-Davidson,* that "a challenge to a claim containing a means-plus-function limitation as lacking structural support requires a finding, by clear and convincing evidence, that the specification lacks disclosure of structure sufficient to be understood by one skilled in the art as being adequate to perform the recited function." Thus, Radyne's indefiniteness challenge must be rejected.FN76

FN76. Radyne also argues that the claims are invalid for failure to meet the description requirement of s. 112 para. 1. As in the case of the enablement requirement (see text accompanying note 71, supra), the presumption of validity applies with full force to compliance with the written description requirement and it is the burden of a patent challenger under 35 U.S.C. s. 112 para. 1 to show by facts supported by clear and convincing evidence that the description is defective. See, e.g., Ralston Purina Co. v. Far-Mar-Co Inc., 772 F.2d 1570, 227 USPQ 177, 178 (Fed.Cir.1985). Radyne has not even approached that threshold. In addition, unlike the question of claim definiteness (and like the question of enablement), compliance with the written description requirement is not an issue of claim construction.

Finally, Radyne argues that a proper construction of this element "requires some structure in the claimed switching means that automatically (as opposed to manually) switches back to the first RF converter means 'when' it is cleared of a default [*sic*. fault]." (RB 34) This argument appears to have two distinct prongs. First, Radyne is effectively contending that there can be no human intervention in operating the claimed system. While it is undoubtedly true that a human being cannot constitute a "means" in the context of MPF claiming, FN77 Comtech is not suggesting that a human operator is part of the disclosed *structure*. Note that the claimed function is "switching said inputted IF and said desired RF * * * from said backup RF converter means back to said first RF converter means when said first RF converter means is cleared of said fault." Nothing in this language would preclude switching structure that required human intervention; structure that requires manual operation would nonetheless perform the recited function. Moreover, nothing in the

intrinsic evidence supports Radyne's contention that manual operation of the switching means is precluded. As Comtech points out in its reply brief, "[m]uch like any electronic device, with the claimed invention the switching means may be operated by human intervention-like the switch on a car radio which is turned on and off by the driver." (CRB 21)

FN77. Default Proof Credit Card Sys. Inc. v. Home Depot U.S.A., 412 F.3d 1291, 75 USPQ2d 1116, 1123 (Fed.Cir.2005).

Radyne also contends that the word "when" is significant, and must be construed to mean "as soon as," or "that the function occurs 'promptly' whenever the condition is satisfied." (RB 35) Obviously the word "when" has many meanings,FN78 and to select "as soon as" or "promptly" would require some rational basis in the intrinsic evidence. The specification of the ' 646 patent contains this passage:

FN78. A search of http://www.onelook.com/ (an online dictionary search tool) turned up some 22 separate sources with dozens of definitions.

When a fault occurs on one of the online RF up converters 10, the IF and RF transfer switches 12A, 12B switch the IF input and the RF output of the faulted online RF up converter 10 to the backup RF up converter 32. The faulted RF up converter 10 can now be removed from the redundant RF up converting system 30 by separating the RF up converter 10 from its I/O switch leaving the active redundant RF up converting system 30 intact through the I/O switch. (C5L14-22)

This passage has several implications. In keeping with the claimed goal of preventing disruption in communication due to an RF converter failure, it clearly implies that, in the event a fault is detected, the system will automatically and promptly switch over to the backup RF converter. But it also implies that, in order to clear the fault, it may well be necessary to remove the faulty RF converter from the system, and perhaps replace it with another. This would of course require human intervention. And after that removal and replacement, the new or repaired RF converter could be switched back into the system, either automatically or manually. Obviously, the need for haste is not critical at this end of the operation, as opposed to the initial switchover upon detection of a fault. Thus, "when" in the phrase "when said fault is detected" should be interpreted to mean "promptly" and "automatically," while "when" in the phrase "when said first RF converter means is cleared of said fault" should be interpreted to mean "after" and should not be interpreted to exclude manual intervention.

Radyne argues that the word "when" must be given the identical meaning in connection with both of its occurrences in this claim element, citing *Fin v. OAM*.FN79 In that case the Federal Circuit explained that "we begin with the presumption that the same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims." In the opinion of the SM, that presumption is readily overcome in this case by the above-quoted passage from the patent specification.

FN79. Fin Cont. Sys. Pty. Ltd. v. OAM Inc., 265 F.3d 1311, 60 USPQ2d 1203, 1208 (Fed.Cir.2001).

Accordingly, the functional clauses in this element should be construed to mean that the backup RF converter is switched in promptly and automatically upon detection of a fault in the primary RF converter, and that the primary (or a replacement) RF converter is thereafter switched back into the

system either automatically or manually.

I> "*Input/output module means*" *(all claims)*

The element in question here is " ***input/output module means*** for looping said inputted IF and said desired RF between said first [claims 3-5: "each of said plurality of"] RF converter means and said backup RF converter means." Both the RF converter means and the backup RF converter means are required by all claims to include this element. The structure identified in the '646 patent for looping the signals is, in the case of the primary RF converter, the four terminals identified as RF and IF loop inputs and outputs (see Fig. 1) together with the transfer switches 12A and 12B (see Fig. 3), and in the case of the backup RF converter, a direct coupling to the first of the primary RF converters (C5L2-3). As explained by Dr. Heppe (Heppe para. 53):

Referring to FIG. 1, which illustrates a primary RF converter 10, there are four connectors identified involving looping: IF LOOP INPUT, IF LOOP OUTPUT, RF LOOP INPUT and RF LOOP OUTPUT. The patent also discloses that "[t]he IF and RF transfer switches 12A, 12B are for input/output looping of the IF and RF signals." Col 4:64-66. Accordingly, the IF and RF transfer switches * * * are part of the means for looping at the primary RF converts. These connectors and switches comprise the I/o module means for looping associated with the primary RF converter 10. In the case of the backujp RF converter, only two connectors (and no transfer switches) are required for looping since the backup RF converter terminates the chain as shown in, for example, FIG 3. Hence, at the backup RF converter 32, the I/O module means for looping would comprise the two connectors without the switches.

Radyne points to no evidence to contradict this opinion as to what a person of ordinary skill in this art would identify, from the description in the patent, as the structure that performs the recited looping function. And again, as in the case of the "switching means," there is nothing in the patent that compels a conclusion that the structure must be identical in both the primary and backup RF converters. ***Accordingly, this MPF element should be construed to mean the signal path connectors and transfer switches associated with the primary RF converters, and the signal path connectors associated with the backup RF converter, which together perform looping said inputted IF and said desired RF between said first [claims 3-5: "each of said plurality of"] RF converter means and said backup RF converter means (and also any structural equivalent that was known as of September 9, 1997).*** **The functional term "looping" ("looped") has already been construed in connection with the "backup RF converter means."**

CONCLUSION

It is instructive to construct a hypothetical claim incorporating the SM's recommended construction of the various claim elements. What follows is a hypothetical version of claim 5 of the '646 patent (the narrowest and therefore the most complex of the asserted claims), rewritten in independent form to reflect those elements as construed (or not construed) and to remove a great deal of unnecessary verbiage; the MPF elements are indicated in bold underscore; the construction of individual italicized terms is given in brackets:

5. An RF converter system for transmission of communication signals which provides reliable backup protection through a distributed protection switching scheme that prevents disruption in communication due to an RF converter failure comprising, in combination:

a *plurality* [more than one] of RF converters for modulating an inputted intermediate frequency (IF) and

outputting a desired RF, wherein each RF converter has ***means for monitoring and controlling of said inputted IF and for providing communication interface with a backup RF converter;***

a backup RF converter coupled to a first of the RF converters for performing fault detection and for assuming a frequency and an attenuation of any of the RF converters where a fault occurs, is detected on the first RF converter, the backup RF converter having ***means for performing fault detection, self reconfiguration, and logical switching functions;*** and

a *high speed* [a data transmission rate sufficiently high to enable the RF converter system in question to achieve its claimed goals: i.e., reliable backup protection that prevents disruption in communication due to an RF converter failure] bus for looping [an interconnection arrangement where the backup RF converter is directly connected to only one primary RF converter] each of the RF converters to a successive RF converter and for providing an interface between them and the backup RF converter so that the backup RF converter can monitor configuration changes in each RF converter;

each of the RF converters and the backup RF converter having:

switching means for switching said inputted IF and said desired RF of any of the RF converters to the backup RF converter *when* a fault occurs [automatically and promptly] and from the backup RF converter back to the RF converter [automatically or manually] *when* [after] it is cleared of the fault, wherein the switching means is ***transmit switch module means for looping sid inputted IF and said desired RF of each RF converter to the successive RF converter and for switching the RF converter where a fault occurs to the backup RF converter;***

a power supply;

monitor/control means coupled to the power supply ***for controlling modulation of said inputted IF and for providing a communication interface with the backup RF converter;***

a converter coupled to the switching means for receiving and modulating said inputted IF to said desired RF;

a synthesizer coupled to the converter for providing a frequency to modulate said inputted IF to said desired outputted RF; and

a reference oscillator coupled to the converter and the synthesizer for stabilizing them.

The SM is by no means suggesting that such a hypothetical claim be published to the jury. That would likely be regarded as wholly inappropriate, given the admonition that courts (and special masters) "do not rework claims. They only interpret them." FN80 Nonetheless, the exercise has been helpful to the SM and may, it is hoped, be helpful to the Court and parties as well. The hypothetical claim set forth above illustrates quite well just what the net result of these proceedings has been. Rather than a dozen MPF elements, we now have four. Rather than providing redundant constructions for many of the terms in the claim, we now define only a very few. It is submitted that the parties could do worse than to use such a hypothetical claim as a working outline, or template, for presenting their respective infringement and validity cases to the jury.

FN80. E.g., Intervet Am. Inc. v. Kee-Vet Labs. Inc., 887 F.2d 1050, 12 USPQ2d 1474, 1476 (Fed.Cir.1989).