Integration Outsourcing

Principal Applications to Successful Transition

by

Russell Phillips
Business Development
http://www.russphillips.com/

January 2001

1.0 Scope

This document ("the report") is a Tier-1 assessment of the principal applications involved in the successful transfer of product (outsourcing) from an original equipment manufacturer (OEM) to a contract manufacturer (CM), specifically relating to electronic box-build and full system integration. The report is to be used as a reference document when entering into a contractual agreement where a CM is to provide manufacturing services to an OEM in exchange for payment for services rendered.

The elements outlined in the report are not all encompassing of the elements to be considered, however, the core principals are represented. The report is a high level overview and is not intended to provide detailed specifications or requirements for managing an outsourcing program. Contrary, the report is a general outline and is more often used for consulting purposes. The author of the report assumes that the reader has general knowledge of the electronic contract manufacturing industry and the principals involved when applying best manufacturing practices (BMP).

2.0 Contract Review

Contract Review is not only an element of the ISO9000 standards, but it is critical to the success of any outsourcing project. Understanding the requirements and expectations of the customer is paramount and must be clearly described in a written document, agreed to by both the customer (buyer) and supplier (seller). Key elements of the contract to consider are listed:

A- Payment Terms
B- Length of Contract
C- Pricing Adjustments
D- Lead Times
E- Rescheduling
F- Warranty
G- ECNs
H- RMAs
I- Cancellation
J- Acceptance Standards

3.0 New Product Introduction

3.1 Product Knowledge

Obtaining product knowledge is the fundamental requirement to a successful transfer of integrated products from an OEM to a CM. Product knowledge can only be gained through a cooperative effort between OEM and CM. This principal of cooperation between buyer and seller is an underlying theme to all phases of outsourcing. It is common for certain personnel within an OEM to have feelings of opposition or resentment towards an outsourcing program.

Without the full cooperation from all parties involved, the transfer initiative will fail.

Engineering and Manufacturing personnel from both organizations must be assembled to create a single outsourcing team which will expedite the transfer of product knowledge from the buyer to the seller. The importance of this function cannot be overstated, and generally it is an ongoing activity for the life of the program.

3.2 Process Knowledge

Process knowledge is synonymous with product knowledge although there are subtle differences. The old adage "don't fix it if it isn't broken" applies to process transfer from buyer to seller. However, a CM's obligation to the OEM is to take cost out of the product. One way this is achieved is by improving on the current process. Having an in-depth understanding of the OEM's process is critical to the proper implementation and the continual improvement of the process.

3.3 Engineering Documentation

Clear and concise methodology must be implemented to ensure that all customer documentation is reviewed thoroughly before any assembly of product is performed. This is a timely process but could be the most important element of a successful outsourcing project. Documents provided by OEMs are often inaccurate even though they may be tightly controlled and appear to be at the latest revision. A close scrutiny of the Bill of Material, Assembly and Component Drawings, Schematics, AVL, and Acceptance Standards must be performed to ensure that when the product is manufactured it meets the requirements of the buyer.

4.0 Quality Assurance

4.1 First Article Process

Before production can begin, the seller must prove its capability to manufacture. In most cases a qualification lot is submitted to the buyer, usually consisting of one to three units. If raw inventory is available, it may be consigned to the CM to expedite the First Article Process, however, all piece parts and components must ultimately be inspected and qualified if the CM is to provide a successful turnkey solution. The First Article Process is a critical prerequisite to full-scale production and ongoing product evolution.

4.2 Test / Inspection Requirements

The customer's requirements for test and inspection must clearly be understood. Test functions are often left at the OEM's facility. Along with final test, there is usually some amount of final configuration to be performed. Until recently, most OEMs have been inclined to keep these functions inside their facilities.

In the event final configuration and test is part of the outsourcing strategy, the proper equipment, tools, software, and process knowledge must be transferred accurately. Equipment, tools, fixtures, and personnel may be consigned, or all these recourses may have to be secured by the seller. In either case, a true cooperative effort between buyer and seller must be deployed.

4.3 Quality Information System

When companies outsource, they are not getting rid of their proprietary products; they are simply ridding themselves of the manufacturing functions of those products. CMs provide services – not products. Therefore, the CM who implements the best IT tools will ultimately prevail, because they will consequently provide the best service.

In this report on outsourcing requirements it is difficult to prioritize the importance of each element. As stated previously, the underlying theme for all elements is cooperation between buyer and seller. Just as important is efficient communication. The operative word here is efficient. Timely feedback from buyer to seller is essential in any customer / supplier relationship. Efficient communication procedures are just as important internally within a single organization.

There has to be an effective means of capturing, organizing, analyzing, and disseminating quality control data. Companies must capitalize on the array of IT tools now available, including the Internet, to meet this challenge. For valuable information regarding web-based quality systems, reference http://www.russphillips.com/.

4.4 Training

Every OEM has a different acceptance standard, or workmanship standard. Some OEMs do not have written standards; others use IPC, military, or some other prepackaged standard. Regardless of which standard is used, it is critical to understand the acceptance criteria of the customer. Operators have to be adequately trained to specific sets of customer standards. Both under-inspection and over-inspection of an integrated assembly can prove costly. The best approach to minimizing labor standards and maximizing quality yields is to implement customer dedicated work cells. This allows operators to have in-

depth product and process knowledge and a complete understanding of a customer's workmanship standards.

4.5 Traceability

The goal of any contract manufacturer should be to give the OEM better visibility and control over a manufacturing process after a product line has been outsourced. One way this can be achieved is by tracking all phases of manufacturing using bar coded serial numbers and an electronic data collection system. Traceability is essential for tracking continuous improvement, performing root cause analysis, calculating labor standards, and identifying additional training requirements. Costs to deploy these systems vary, but even the simplest of systems will yield a high return on investment.

4.6 AVL

To expedite the outsourcing initiative, it is recommended that all purchased parts remain with the OEM's current suppliers, unless of course the product is a prototype and no sourcing exists. By transferring existing purchase orders from the OEM to the CM, lead times are drastically reduced. In most cases, the OEM has contracted pricing agreements set up with its supplier base, which can be transferred directly to the CM. Cutting new purchase orders should only occur after the material pipeline is flowing to the CM's operation, except when no open orders exist.

Once the product transfer has become stable, the CM should be investigating second or third sources for various commodities. Taking cost out of the OEM's product is a primary goal and can be achieved by dual sourcing raw material. Since most OEMs require that CMs purchase material from approved suppliers, a first-rate supplier management program must be in place or convincing a customer to switch suppliers will be difficult.

5.0 Engineering and Logistics

5.1 Manufacturing Process Development

Accurate and efficient methods of deploying work instructions are critical to a manufacturing operation. Quality Control must be built-in to each and every step of the process, from the design-for-manufacturability phase all the way through to pack and ship.

Electrical schematics, routings, or CAD drawings will no longer suffice as work instructions for companies demanding excellence from its production force. The best solution for most integration facilities is electronic or tightly controlled and well-engineered hard-copy work instructions, preferably web-based. For

valuable information regarding web-based work instructions, reference http://www.russphillips.com/.

5.2 Best Manufacturing Practices

Best Manufacturing Practice has been described as a process, technique, or innovative use of equipment or resources that has a proven record of success in providing significant improvement in cost, schedule, quality, performance, safety, environment, or other measurable factors which impact the health of an organization. Some areas to consider when preparing for a contract manufacturing program are:

- Facility Layout
- Lean Manufacturing Concepts
- Kaizen / Continuous Improvement
- Supply Chain Management
  - Just-in-Time
  - Kan Ban
  - Supplier Ratings
- ISO9000
- Work Cell Teams
- Daily Production Meetings

5.3 Transfer Schedules

Transfer of product from OEM to CM must be done with very tight controls using a realistic timetable. If the transfer schedule is too lax the OEM may become anxious or frustrated and look for other manufacturing alternatives; if the schedule is too aggressive oversights and mistakes are likely and that too may cause the OEM to look for other alternatives. Integration outsourcing programs typically take months to bring to fruition. Proper planning and realistic goal setting is the key to success.

5.4 Quoting

Implementing a proven quoting methodology is paramount to not only winning integration contracts, but actually turning a profit from them as well. Several acceptable methods for quoting a product exist, and knowing which one to use with which customer or product type is a key element of any outsourcing program.

Knowing how the costs of integrated products break down is essential. In most cases 80 to 90 percent of the costs for electronic systems is in the material. Material overhead costs must be calculated accurately to ensure desired profit margins are achieved. Other factors to consider are true burdened labor rates, accurate labor standards, freight charges, warranties, special tooling and fixture requirements, non-recurring engineering costs, and cost of poor quality.