

# **Corrugator and Converting Management**

## **Integration Overview**

<b>Corrugated Technologies Inc.</b>
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**Confidential**

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2000.1	July 19, 2002	Eliminate references to PowerScheduling
2004.1	Feb 15, 2004	Added Sheet Board Ordered/Received and report Finished Goods Load generated transactions
2004.2	June 01, 2004	Added Advance Shipment Notification for purchased sheet board (SBASN)
2004.3	August 16, 2004	Eliminate PowerScheduling from integration diagram
2007	May 9, 2007	Added transaction to set parent order id on child orders (SPOID)
2007	July 07, 2007	Eliminated independent transactions for Specs. (i.e., Add/Change/Delete Specs)

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## Introduction

This document provides an overview of how ERP and business systems can share information with CTI's CorrTrim® Corrugator and CorrPlan® Converting Management solutions. It describes the methods, information flows and transactions of CTI's standard approach to integration with these systems.

## Methodology

CTI's CorrTrim® and CorrPlan® solutions use a transaction-oriented approach to integrate with corporate ERP and business systems. These systems provide information to CTI by writing transactions, with associated data, to an integration database. Transactions such as Add Order, Change Order, Cancel Order and Hold Order, are automatically processed by CTI when written to the integration database. Conversely, CTI writes transactions to the integration database when passing order status, schedules, order production and other information to external systems. The information data flows and the "predefined" transactions currently supported as part of CTI's integration standard are described in subsequent sections of this document.

The integration database can be managed by Borland InterBase, Microsoft SQL Server, Oracle, Informix, AS400/DB2 and by other fully functional relational database engines, which can be accessed from Microsoft client/server platforms using an ODBC driver that supports the SQL-92 ANSI standard. **If the ERP or business system runs on a platform that does not support direct access to an industry standard relational database via SQL, CTI supports the information dataflows and transactions described in this document using automatic transfer of ASCII files.**

Advanced ERP systems such as SAP support integration using communication objects like IDOCS, BAPI and Remote Function Calls (RFC). This integration can be achieved in two ways. One is to create these objects using COM or Java Beans installed on a server that runs in the domain of SAP. Other is to use the SAP's XML Business Connector, which supports a Web Services model of exchanging these objects with the integration partner via XML. CTI's solution is built around the Web Services .NET architecture and is capable of using BAPI directly with COM+ components or as a Web Services XML, which communicate with the SAP business connector.

**CTI also supports integration using the proprietary objects (and transport mechanism) of your ERP system when appropriate. The flexibility of CTI's technology promotes, and facilitates integration with all ERP / Business Systems.**

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## Integration Approach

The development required to obtain information from (or store information to) the ERP or business system is most effectively done by the customer IT staff or the customer's supplier/integrator since they are most familiar with the system. CTI will provide the Integration Specification document for the appropriate method, either direct RDB access or ASCII file transfer. This document defines the columns (or fields) of the integration database (or ASCII files) and other relevant information.

If the customer (or their systems integrator) desires to set-up the integration database, CTI will provide the data definition language statements that create the database tables. Other standard integration services provided by CTI include:

- analysis to determine the integration method, dataflows and transactions needed to support the solution
- delivery of sample transactions and data
- testing of integration development

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## Integration Data Flows

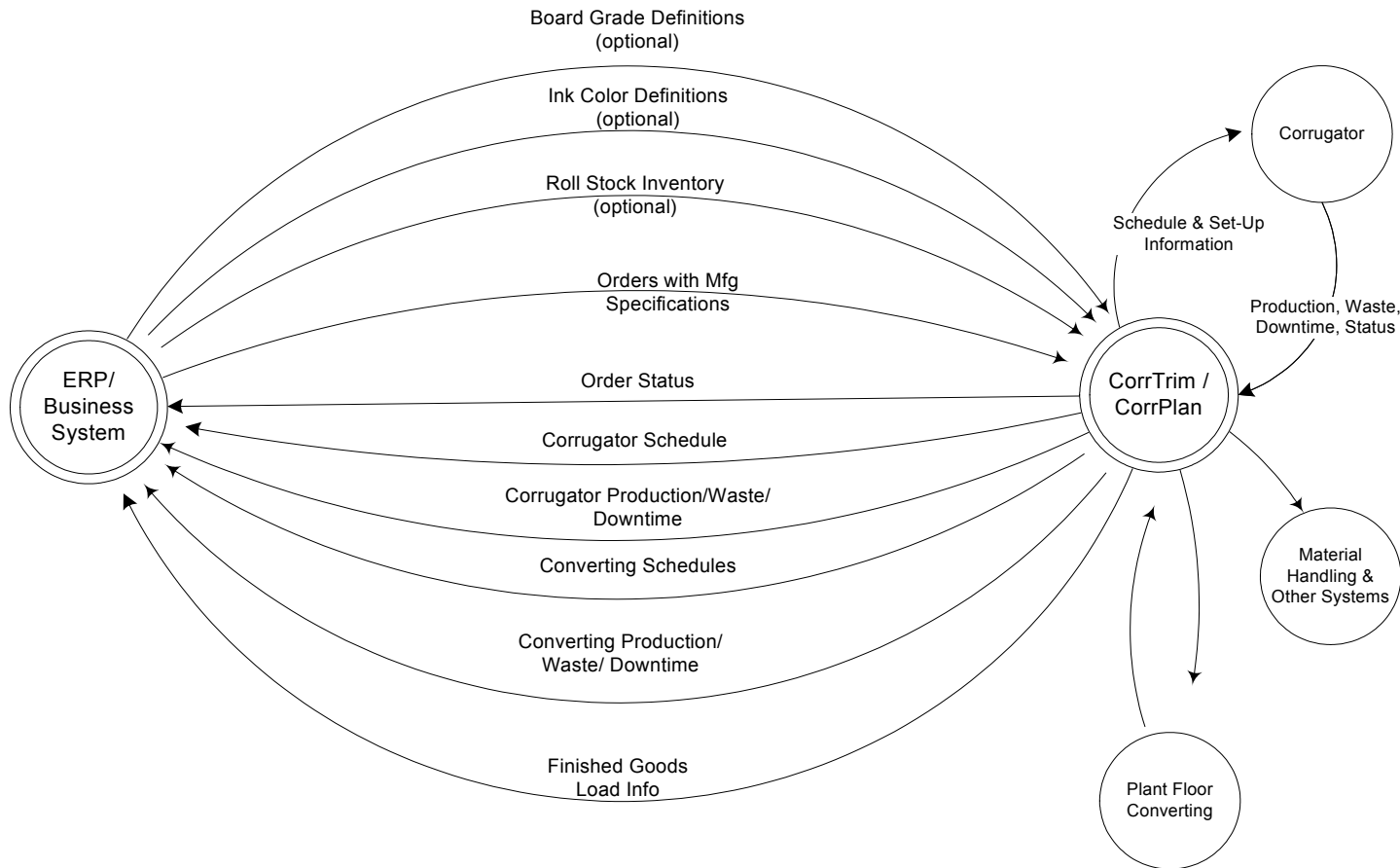


Diagram of Data Flows

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## Data Flows

CTI integration involves the implementation of the following data flows:

1. Orders with Manufacturing Specifications for plant scheduling (from ERP / business system)
2. Roll Stock Inventory (from ERP / business system) - *optional*
3. Corrugator Schedules (to ERP / business system) – *optional*
4. Corrugator Production/Waste/Downtime (to ERP / business system)
5. Converting Schedules (to ERP / business system)
6. Converting Production/Waste/Downtime (to ERP / business system) - *optional*
7. Order Status (to ERP / business system) – *optional*
8. Board Grade Definitions(from ERP / business system) – *optional*
9. Waste Reason Code Definitions(from ERP / business system) - *optional*
10. Downtime Reason Code Definitions(from ERP / business system) - *optional*
11. Ink Color Definitions(from ERP / business system) – *optional*
12. Finished Goods Load (to ERP / business system) – *optional*

The data (per the “Diagram of Data Flows”) will be exchanged between the ERP / business system and CTI’s Corrugator/Converting Management solutions using transactions placed in “interface” tables of XXXXX database.



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## Transactions Supported by CTI

The following tables and text identify the transactions that are used to implement the data flows between CTI and the company's ERP / business system.

### Planning and Production Transactions

The following transactions support the planning and production process:

Transaction / (Code)	From	To	Events that trigger the transaction and Issues	Comments	Associated Transaction Data Records / Tables
1. Add Order with Spec (AORS)	ERP	CTI	When new production order is created in Business System.	Same as Add order except specification information is also provided in the one transaction.	SpecTran LoadFormSpecTran CorrOperSpecTran ConvOperSpecTran OperProcessSpecTran OperScoreSpecTran OrderTran
2. Change Order with Spec (CORS)	ERP	CTI	When any of the following changes for the order: <ul style="list-style-type: none"> <li>• delivery date/time</li> <li>• ready date/time</li> <li>• corrugation date</li> <li>• quantity</li> </ul>	Same as change order except that the specification is provided in the same transaction.	SpecTran LoadFormSpecTran CorrOperSpecTran ConvOperSpecTran OperProcessSpecTran OperScoreSpecTran OrderTran
3. Delete Order (DELO)	ERP	CTI	When order is deleted by the business system.	Removes completed and unscheduled orders from CTI. Will not remove planned orders.	OrderStatusSetTran
4. Cancel Order (CANO)	ERP	CTI	When order is canceled by the business system.	Removes unscheduled orders from CTI. Will not remove completed or planned orders.	OrderStatusSetTran

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Transaction / (Code)	From	To	Events that trigger the transaction and Issues	Comments	Associated Transaction Data Records / Tables
5. Set Hold on order (HLDO)	ERP	CTI	When hold is put on the order for reasons such as unavailability of cutting die, printing die, labels or other materials.		OrderStatusSetTran
6. Release Hold on order (RELO)	ERP	CTI	When the hold is released on an order. (If an order was being held for multiple reasons, this transaction is sent when the last hold is released.)		OrderStatusSetTran
7. Confirm Sheet Board Purchase (CSBP)	ERP	CTI	When outside supplier of sheet board confirms acceptance of sheet board purchase order.		OrderStatusSetTran
8. SheetBoard Received (SBRCVD)	ERP	CTI	When corrugated sheet board (from another supplier) has been received into the plant.		OrderStatusSetTran
9. Set Parent Order ID (SPOID)	ERP	CTI	Should be sent when the Parent-Child relationship is initially known (after each child order is sent to CTI) and when/if the relationship changes.	Used to specify that an order (child) is dependant upon another order (parent) such when a label is laminated to a sheet that is subsequently converted for multiple orders.	OrderStatusSetTran
10. Report Order Status (RPOS)	CTI	ERP	Periodically (e.g. every 10 minutes) Orders & Status for orders whose status has changed since the last send of order status.		OrderStatusRptTran

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Transaction / (Code)	From	To	Events that trigger the transaction and Issues	Comments	Associated Transaction Data Records / Tables
11. Advance Shipment Notification for purchased sheet board (SBASN)	CTI	ERP	When user inputs (or CTI receives notification when purchased board will arrive.		OrderStatusRptTran
12. Report Corrugator Schedule (RCSH)	CTI	ERP	New corrugator schedule generated (set-ups added) and when the following occurs to a previously sent corrugator line-up: 1) setups deleted 2) set-ups re-sequenced	The transactions to the individual set-ups are indicated, e.g., Add, Deleted, Change, Timing change.	CorruSchedTran
13. Report Converting Schedule (RCVS)	CTI	ERP	Planner revises the converting schedule.	Would send the locked portion of the converting work center line-ups for each operation (e.g., orders corrugated or planned on the corrugator)	ConvSchedTran
14. Report Corrugator Production Waste & Down Time (RCPA)	CTI	ERP	1) Corrugator dryend completes a set-up 2) After revision of production information		CorruProductionTran CorruDownTran CorruWasteTran

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Transaction / (Code)	From	To	Events that trigger the transaction and Issues	Comments	Associated Transaction Data Records / Tables
15. Report Converting Production, Waste Downtime (RCVA)	CTI	ERP	1) After job (operation) completes and all required information (e.g., waste quantities with reasons) has been collected 2) After revision of production information.		ConvProductionTran ConvWasteTran ConvDownTran
16. Report Finished Goods Load Generated (FGLOAD)	CTI	ERP	When load tag printed for finished goods load (at converting workcenter).		FGLoadTran
17. Roll stock inventory to CTI (RINV)	ERP	CTI	On command by planner at any time.		RollStockInvTran
18. Add Ink Color Definition (AICD)	ERP	CTI	When new Ink Color is created in Business System. When an existing Ink Color is modified in Business System (Delete spec would precede this New Spec transaction.)		InkColorDefTran
19. Delete Ink Color Definition (DICD)	ERP	CTI	When an existing Ink Color is removed in Business System When an existing Ink Color has been modified in Business System		InkColorDefTran

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Transaction / (Code)	From	To	Events that trigger the transaction and Issues	Comments	Associated Transaction Data Records / Tables
20. Add Board Grade Definition (AGRD)	ERP	CTI	When new Board Grade is created in Business System. When an existing Board Grade is modified in Business System (Delete spec would precede this New Spec transaction.)		BoardGradeDefTran
21. Delete Board Grade Definition (DGRD)	ERP	CTI	When an existing Board Grade is removed in Business System When an existing Board Grade has been modified in Business System		BoardGradeDefTran

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## Overview of Transaction Tables/Records

The interface tables/records that allow the sharing of information by the Corrugator/Converting Management solution and the Business System are identified in this section. The tables/records are used to identify the implemented transactions and to pass the transactions between CTI and the Business System.

Table/Record Name	Description
	<b>Planning / Production Transaction Data Tables/Records</b>
SpecTran	Contains identifying and other basic item specification information (such as customer, specification ID and finished dimensions) associated with the Item Specification transaction.
CorrOperSpecTran	Contains information regarding the corrugation of the board required for this item such as flute, board grade, corrugated sheet quantities and corrugated sheet dimensions associated with the Item Specification transaction.
ConvOperSpecTran	Contains the work center (Converting station) routing and set-up information associated with the Item Specification transaction.
OperProcessSpecTran	Identifies the processes such as TearTape and Coatings that are applied at the corrugator and converting operations associated with the Item Specification transaction.
OperScoreSpecTran	Identifies the scores that are applied at the corrugator and converting operations for the item associated with the Item Specification transaction.
LoadFormSpecTran	Contains information regarding the forming of WIP units, bundles, pallets and unitized loads for the item associated with the Item Specification transaction.
OrderTran	Contains identifying and other basic order information (such as Quantities and Dates) associated with the Order transaction.
CorruScheduleTran	Contains the current corrugator schedule associated with the transaction.
CorruProductionTran	Contains the corrugator production information, e.g., completion of a corrugator set-up, associated with the transaction.
CorruWasteTran	Contains the corrugator waste information associated with the corrugator waste transaction.
CorruDownTran	Contains the corrugator down time information associated with the transaction.
CorruLoadQtyTran	Contains the good sheets quantity provided by an auxiliary source (such as post-corrugator scale)
ConvScheduleTran	Contains the converting operation schedule information associated with the transaction.
ConvProductionTran	Contains the converting production information associated with the transaction.
ConvWasteTran	Contains the converting waste information associated with the transaction.
ConvDownTran	Contains the “unplanned” converting downtime information associated with the transaction.
RollStockInvTran	Contains the plant’s roll stock inventory (by Grade/Width stock

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	keeping unit) information associated with the Roll Stock transaction.
FGLoadTran	Contains load information associated with the finished good load transaction.
	<b>Static Data Definition Tables/Records</b>
ReasonDefTran	Contains the reason (Waste, DownTime, Order hold) information associated with the Reason Definition transaction.
BoardGradeDefTran	Contains the board grade information associated with Board Grade Definition transaction.
InkColorDefTran	Contains the ink color information associated with the Ink Color Definition transaction.