ACE Software
ERP interface

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ERP Interface

The purpose of the Production Process ERP Interface is to provide manufacturers with a 'seamless', 'paperless' work order information flow from Planning, to Execution, and back to Planning. The key elements of the interface are:

1. The ERP system will produce a Work Order Schedule that is used to completely build the Job Queue. This eliminates manual entry of jobs and manual sequencing of jobs.
2. The Poller will maintain an Activity File that will inform The ERP system of work order starts and finishes. This provides real time information to ERP when jobs start and stop.
3. The system will produce ASCII files during the process of collecting data. The ERP system will input these files to maintain Parts Made, Down Time, Rejects, Material Used, and to affect Preventative Maintenance files. This eliminates manual production reporting to ERP.
4. The poller will maintain a Real Time file that can be used to affect the Work Order Schedule in real time. This feature is not required, but will be of use in the future or if Finite Scheduling is required.

The MRPPATH setting.

In the Poller PC's local WMS directory is a file named TRPOLL.INI. This file should have the following lines:

[General]
MRPPATH=F:\WMSSYS\MRPDATA

This is the network directory where the WMS system transfers data to and from the ERP system. If the lines are not in TRPOLL.INI then the ERP interface is not active.

The Work Order Schedule - from ERP to WMS.

As required the ERP system will produce a file that reflects released shop floor orders. This file will be used to re-build the Job Queue; no manual job entry is required. This is a comma delimited file so the field length may vary.

Field	Type	Align	Description	Range
Sequence – JQX *	N 2	right	Job Order in Queue	2-99
Machine # - ZMN	N 3	right	Production Machine Number	1-989
Work Order – JWO	C 10	left	Job, Work Order Number	Alpha-numeric
Product ID – JPI *	C 20	left	Product ID	Alpha-numeric
Parts Required – JPT *	N 10	right	Job Parts	Max 999999999
Tool ID – JTI	C 10	left	Mold ID	Alpha-numeric
Ship Date – JDE	N 8	left	YYYYMMDD	any valid date
Material	C 10	left	Material code	Alpha-numeric

* Required fields

The file, MRP2JQ.DAT, is located in the path MRPPATH. It is expected that the ERP system will append to MRP2JQ.DAT, and that system will delete the file after use.

The WMS software will check for the existence of MRP2JQ.DAT at the end of every poll loop.

Unassigned Queue: Jobs are placed in the unassigned list if their machine number is 999.
Deleting jobs in the existing queue upon update: In normal operation, the queue is completely deleted and new information is read in for every machine. That is, the update procedure expects a complete rebuild of the job queue on every update.
Exception: The current running job on each machine is not deleted during update.
Deleting selective jobs: Instead of completely rewriting the Queue on every update, it can be done selectively by machine. Upon update the routine checks the TRPOLL.INI file for an entry named ZAPLIST in the [General] section. This contains a list of machines, comma separated. Every machine in the list will have all of its jobs deleted, except for the running. Setting ZapList=NONE will keep all jobs for all machines, nothing will be deleted
Conflicting Work orders: In the case that an identical work order already exists in the Job Queue, it will be replaced by the data coming in from MRP2JQ.DAT.

The Part Production Standards File - from ERP to WMS.

As Product additions and changes take place in the ERP system the ERP system will maintain a file of transactions for use within system. The file called: WMSPRODS.DAT will be in the path MRPPATH in the TRPOLL.INI file.

Field	Type	Description
ID *	C 20	Product ID
MACHINE	N 3	Machine Number
TOOL_ID	C 10	Mold ID
MATCODE	C 10	Material #1 Code
DESC *	C 20	Product Description
STD_CYC *	N 7.2	Standard Cycle Time 9999.99 seconds
DOWN	N 7.2	Down Delay 9999.99 seconds
CYC_PTS *	N 4	Number of Parts per Cycle
STDCHGHRS	N 4.1	Job Change Hours 99.9
MATLBS	N 8.4	Units per Material #1 999.9999
CASE SIZE	N 6	Number of parts in a full case

* Required fields

It is expected that the ERP system will append to this file, and that system will delete the file after use.
Records that match on Product ID are updated, and records that do not match are added to the database.

The WMSJOBS File - from WMS to ERP.

A file called WMSJOBS.DAT will be managed in the directory pointed to by MRPPATH. The WMSJOBS.DAT file contains a record for each Job Start and each Job End. This output is designed to facilitate interfaces with ERP and other scheduling systems. This is a comma delimited file so the field length may vary.

Item	Type	Format	Align	Description	Range
Machine # - ZMN	N	3	right	Monitor - Machine Number	1-989
Work Order - JWO	C	10	left	Job, Work Order Number	alpha-numeric
Product ID - JPI	C	20	left	Product ID	alpha-numeric
Parts Requested - JPT	N	9	right	Parts Scheduled	max 999999999
Parts Completed - ACP	N	9	right	Parts Completed (release quantity)	max 999999999
Run Id	N	9	right	Unique job Identifier	max 999999999
Tool ID - JTI	C	10	left	Tool/Mold used on the Job	alpha-numeric
Date - current	C	10	left	MM-DD-YYYY of Activity	any valid date
Time - current	C	5	left	HH:MM of Activity	any valid time
Status - calculated	C	1	left	C - Job End Complete P - Job End Partial R - Job Started	single character

It is expected that system will continue to append to WMSJOBS.DAT, and that the ERP system will delete the file after use.

The WMSREALT File - from WMS to ERP.

A file called WMSREALT.DAT will be managed in the directory pointed to by MRPPATH. The WMSREALT.DAT file contains one record for each Machine. This output is designed to facilitate interfaces with ERP and other scheduling systems. This is a comma delimited file so the field length may vary. The file is rewritten at the end of every poll loop. All data in this file is the accumulated total of the entire shift at the time it is written

Item	Type	Format	Align	Description
Monitor Number	NUM,	3	right	
Job Sequence Number	NUM,	9	right	Unique RUNID key to SERIALNU.DBF
Product ID	"CHAR",	20	left	Product being manufactured
Work Order	"CHAR",	10	left	Work Order Number
Tool ID	"CHAR",	10	left	Tool/Mold in use
standard cycle time	NUM,	6	right	std cycle 999.99
max parts per cycle	NUM,	3	right	maximum parts per cycle
cyc.t_last	NUM,	7.2	right	last cycle 9999.99 seconds
avg10	NUM,	6.2	right	avg last 10 999.99 seconds
shp_avg.aval	NUM,	6.2	right	shift average 999.99 seconds
run.ccnt	NUM,	8	right	Run Tot Cyc
dt.mdur	NUM,	6.1	right	slow d/t total 9999.9 minutes
run_tim	NUM,	6.1	right	run time total 9999.9 minutes
dt.mdur	NUM,	6.1	right	setup total 9999.9 minutes
dt.mdur	NUM,	6.1	right	man. d/t total 9999.9 minutes
job.parts	NUM,	8	right	job parts done
shift.parts	NUM,	8	right	shift parts
job.rej	NUM,	7	right	job rejected
shift.rej	NUM,	7	right	shift rejected
pr_to_go	NUM,	8	right	job parts to go
part.p_cyc	NUM,	3	right	parts per cycle
hr_to_go	NUM,	6.1	right	hours to go 9999.9 hours
sysflg	NUM,	6	right	flags
byte 1		1		1 running, 2 down slow, 3 down manual, 4 setup, 6 Unknown
byte 2		1		0 nothing, 1 job change requested, 2 Help call, 3 poll line locked
byte 3		1		1 red light, 2 amber light, 3 green light, 4 amber light flash
byte 4		1		0 nothing, 1 sample data available, 2 bar code job change, 3 PLDL after VT 28 power outage
byte 5		1		0 nothing, 1 get last 50 shots, 2 machine analysis active, 3 running MDT02 AC off, 8 Running on PLDL
byte 6		1		0 nothing, 1 learn data active
tcyc.t_last	NUM,	5	right	PV #1 99999 decimal implied as 999.99
injtm.t_last	NUM,	5	right	PV #2 99999 decimal implied as 999.99
hldtime.t_last	NUM,	5	right	PV #3 99999 decimal implied as 999.99
rcvtime.t_last	NUM,	5	right	PV #4 99999 decimal implied as 999.99
moldopn.t_last	NUM,	5	right	PV #5 99999 decimal implied as 999.99
apv4.a_peak	NUM,	5	right	PV #6
apv5.a_peak	NUM,	5	right	PV #7
apv6.a_peak	NUM,	5	right	PV #8
apv7.a_peak	NUM,	5	right	PV #9
apv8.a_peak	NUM,	5	right	PV #10
apv9.a_peak	NUM,	5	right	PV #11
apv10.a_peak	NUM,	5	right	PV #12
apv11.a_peak	NUM,	5	right	PV #13
apv12.a_peak	NUM,	5	right	PV # 14
apv13.a_peak	NUM,	5	right	PV #15
dt.cres	NUM,	2	right	cur. dt reason
dt.cdur	NUM,	6.1	right	current d/t 9999.9 minutes
totdwn	NUM,	4	right	total down incidents
oper[0]	NUM,	6	right	operator #1
oper[1]	NUM,	6	right	operator #2
pkd_case	NUM,	6	right	cases
cycles on signal #2	NUM,	8	right	number of cycles on signal #2 since shift reset
cycles on signal #3	NUM,	8	right	number of cycles on signal #3 since shift reset
cycles on signal #4	NUM,	8	right	number of cycles on signal #4 since shift reset
cycles down slow	NUM,	8	right	machine cycles while in down slow since shift reset
cycles setup	NUM,	8	right	machine cycles while in setup since shift reset
cycles down manual	NUM,	8	right	machine cycles while in down manual since shift reset
Material 1 code	"CHAR",	10	left	code for material - for future use only
Material 1 color	"CHAR",	10	left	color of material - for future use only
Material 1qty	NUM,	8.4	right	Material weight 999.9999 - for future use only

Material 2 code	“CHAR”,	10	left	code for material - for future use only
Material 2 color	“CHAR”,	10	left	color of material - for future use only
Material 2qty	NUM,	8.4	right	Material weight 999.9999 - for future use only
Material 3 code	“CHAR”,	10	left	code for material - for future use only
Material 3 color	“CHAR”,	10	left	color of material - for future use only
Material 3 qty	NUM,	8.4	right	Material weight 999.9999 - for future use only
Material 4 code	“CHAR”,	10	left	code for material - for future use only
Material 4 color	“CHAR”,	10	left	color of material - for future use only
Material 4qty	NUM,	8.4	right	Material weight 999.9999 - for future use only
Lot Number	“CHAR”,	6	left	Lot number, only added if lot number flag is turned on, in trpoll.ini

End Of Shift WMSHIST – from WMS to ERP

At the end of each production shift the system outputs parts made, parts rejected, run time, and down time information to a file named WMSHIST.DAT. This data is appended to the file WMSHIST.DAT. This is a comma delimited file so the field length may vary. All data in this file is the accumulated total of the entire shift

Data Item	Type	Align	Example Content
Year	num 4	left	1992
Month	num 2	left	02
Day	num 2	left	19
Shift	num 1	left	1
Machine	num 3	right	112
Work Order	alpha 10	left	ASO1234567
Product ID	alpha 20	left	PRODID1234
Product Desc	alpha 20	left	PROD NAME
Run Time	num 8.1	right	000480.0 minutes
Down Time	num 8.1	right	000060.0 minutes
Setup	num 8.1	right	000030.0 minutes
Down Manual	num 8.1	right	000030.0 minutes
Shift Parts Made	num 8	right	00004000
Shift Rejects	num 8	right	00003500
Machine Cycles	num 8	right	00000425
Tool ID	alpha 10	left	MOLD NUMBER
Cases Packed	num 8	right	BOXES THIS SHIFT
Parts Packed	num 9	right	PARTS BOXED
Material #1	alpha 8	left	MATERIAL ONE
Material #2	alpha 8	left	MATERIAL TWO
Material #3	alpha 8	left	MATERIAL THREE
Material #4	alpha 8	left	MATERIAL FOUR
Matrl Color #1	alpha 8	left	CLEAR
Matrl Color #2	alpha 8	left	BLUE
Matrl Color #3	alpha 8	left	CLEAR
Matrl Color #4	alpha 8	left	BLUE
Matrl Lbs #1	num 8.2	right	001.55
Matrl Lbs #2	num 8.2	right	000.45
Matrl Lbs #3	num 8.2	right	001.55
Matrl Lbs #4	num 8.2	right	000.45
Standard Cycle	num 6.2	right	020.25 seconds
Shift Average	num 6.2	right	020.30 seconds
Down Times (1 –40)	num 8.1	right	000002.4 minutes
Reject Counts (1-20)	num 8	right	00000015 parts
Count #2	num 8	right	Total cycles on signal #2
Count #3	num 8	right	Total cycles on signal #3
Count #4	num 8	right	Total cycles on signal #4
Cyc Slow	num 8	right	Cycles in Down Slow
Cyc Setup	num 8	right	Cycles while in Setup
Cyc Manual	num 8	right	Cycles in Down Manual
Lot Number	alpha 6	left	Lot number, only added if lot number flag is turned on, in trpoll.ini

One record is produced for each job run during the shift. It should be noted that the file WMSHIST will contain records for production jobs that were manually entered, as well as the jobs that originated in the file MRP2JQ.

File access

WMSHIST.DAT and WMSJOBS.DAT should be deleted as they are used by other applications. This is best performed by first renaming the file. This is a very fast operation and can eliminate collisions. After renaming extract the data and delete the file to avoid data duplication. These files are created using the same technique. The data is added to a temporary file, then renamed.

WMSREALT.DAT is maintained solely for external systems and can also be renamed and deleted. Although this file does not grow and use up disk space as the others

MRP2JQ.DAT and WMSPRODS.DAT is renamed by Production Process and deleted after use.