

SB-5500 Series Control Firmware Flash Update Process

Firmware Updates Included:

File name	Firmware Description	Application Notes
5510R084.SBS	Main Control PCB	IVIS revision 3.97 or later IVIS doesn't support ExactDress at this time. Must be used with VKP software rev 2.4.0 or later. Must be used with 5547 (display PCB) firmware rev 0.53 or later Requires 5510R069.SBS or later. Requires GSD file 6.1 or later.
5512R036.SBS	Mech. Balancer Card (SB-5512)	
5518R036.SBS	Hydrokompenser Card (SB-5518)	
5522R039.SBS	AEMS Card (SB-5519) AEMS Card (SB-5522)	
5523R023.SBS	ExactDress Card (SB-5523)	
5532R036.SBS	Non-Contact Balance Card (SB-5532)	
5543R036.SBS	Manual Balance Card (SB-5543) Manual Balance Card (SB-5544)	
5547R053.SBS	Display PCB	
5560R028.SBS	ExactControl Card (SB-5560)	

IVIS revision 3.80 requires the following firmware minimum revisions:

5510R058.SBS Main Control PCB 5547R049.SBS Display PCB
5512R026.SBS Mech. Balancer Card (SB-5512) 5518R026.SBS Hydrokompenser Card (SB-5518) 5532R026.SBS Non-Contact Balance Card (SB-5532) 5543R026.SBS Manual Balance Card (SB-5543)
5522R024.SBS AEMS Card (SB-5522) 5560R007.SBS ExactControl Card (SB-5560)

Hardware Notes:

Certain new firmware features are only available if the card's hardware supports them:

Balance: Select dual plane operation from either card's RPM input.

Dual plane balancer cards must be of hardware revision 09 or newer. SB-5512, SB-5518, etc.
FPGA rev 6 or higher.

AEMS: Specify custom AE frequency and bandwidth.

AE cards must be of hardware revision 10 or newer. SB-5522, SB-5560
FPGA rev 8 or higher.

ExactControl: More than 16 jobs.

ExactControl card must be of hardware revision 08 or newer. SB-5560
This is a function of components loaded and not a function of the FPGA rev.

ExactControl: GAP and CRASH hardware limits for AE sensor input in ExactLimit strategy.

ExactControl card must be of hardware revision 10 or newer. SB-5560
FPGA rev 4 or higher.

ExactControl: Specify custom AE frequency and bandwidth.

ExactControl card must be of hardware revision 10 or newer. SB-5560
FPGA rev 4 or higher.

SB-5575 CE testing: All slot cards should be of revision 07 or higher.

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Discovering the current card revision information:

The hardware revision of a card is on a label fastened to the card and can only be viewed with the cover removed.

The firmware revision of a card is annotated in IVIS and the keypad in the form v.vv (example 0.23).

The FPGA revision of a card is annotated in IVIS and the keypad hex in the form xxvv (vv=09 in example xx09).

Via IVIS: The easiest method to display the revision from all controller cards is to display the Version page under the General Settings (gray) tab. All cards are shown with the software revision after the "/" slash. With MAIN revision 0.68 and newer the slot cards will have the FPGA revision shown as the last two digits before the "/" slash.

Via Keypad: With main card revision 0.39 and newer this method is preferred to the startup method (below). Make sure that all four slot cards are being displayed on the keypad at one time. If they are not, then press CANCEL as needed until a SHOW ALL button is displayed or all four slots are displayed. Press the SHOW ALL button if displayed. With all four slot cards displayed, press CANCEL two times.

MAIN and DISPLAY will show with the firmware revisions.

Via Keypad at Startup: Immediately after the controller turns on and shows the SBS logo and the SETUP button, press any button above the setup button and then press the setup button.

DISPLAY: The display revision is shown. Note that this cannot be displayed via IVIS.

MAIN: The main card revision is shown immediately following the "/" slash.

Next press the START button and keep pressing it every few seconds to keep the display from advancing.

SLOT CARDS: All installed slot cards will be identified with the card part number followed by the firmware revision. Following the firmware revision are some codes. The FPGA code follows the ":" colon (example 10:09 has rev 09).

Firmware Installation:

It is preferable to do any updates using IVIS or an attached display unit, but if necessary it will work with the SBS Virtual Keypad software.

CAUTION: If updating using IVIS without a keypad, make sure that the USB drive does NOT have a SAVE or RECALL or CRASH folder in the root directory. The presence of these folders force the controller to save or restore configurations (user settings) on the cards and will not allow a firmware update without a keypad.

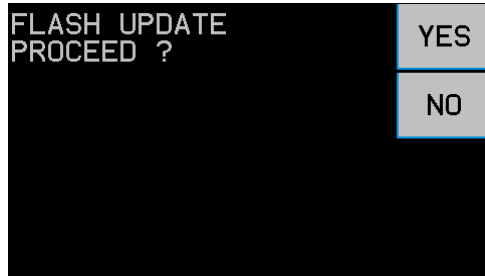
The firmware update process does allow for older revisions of firmware to be installed onto the SB-5500 controller, so please ensure that any updates are performed using the latest revisions of firmware files downloaded in the zip file from the SBS website www.grindingcontrol.com/support/software-firmware/ under **5500 Series Firmware**.

Firmware update files for the SBS SB-5500 Control have a file extension of **.SBS**. Unzip all of the *.SBS files and place them in the root folder of a standard USB flash drive, with all other files removed from this root folder. Be sure that the controller and front panel (if installed) are on and operating. Insert the USB flash drive into the mating USB connector on the rear panel of the SB-5500 controller.

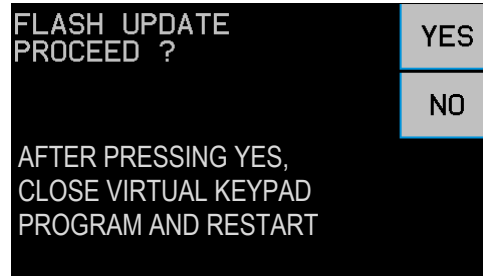
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Update methods vary depending on the revision of MAIN firmware installed and displays connected. With MAIN firmware of revision 0.55 and newer, use the procedure on the next page. This page is for 0.54 and older.

The following should show. See the next page for newer MAIN firmware



Installed revision prior to 0.44



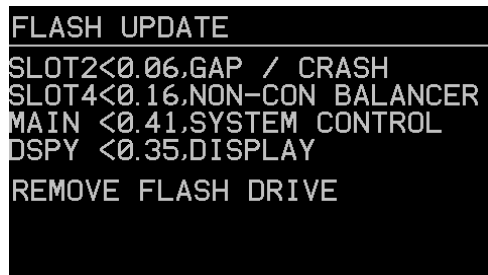
With Virtual Keypad and Installed revision 0.44 or later

Press YES to Continue with update, or NO or CANCEL to Cancel. (Remove flash drive if cancelled.)

Virtual Software Users Only:

The update process will interrupt communications between the SB-5500 and the SBS Virtual Keypad software program. The SBS Virtual Keypad software may also fatally abort on its own with a Microsoft error screen rather than a 'message box'. Typically this will happen when the physical display unit is attached to the controller and there is a firmware update for the display. Acknowledge the error message and terminate the SBS Virtual Keypad software. Please allow 5 minutes for the update to complete. Restart SBS Virtual Keypad software after removing the flash drive. Not all of the messages shown in the following screens may be shown if the update process was initiated using the SBS Virtual Keypad software.

The following screens are displayed while the update process is ongoing for the main PCB (MAIN), any installed device cards in slots 1-4 (SLOT#), or the display PCB (DSPY) of the controller. Two possible sets of displays are possible when updating. This depends on the current revision of firmware in 'MAIN'.



The update process will compare the files on the USB flash drive with the firmware installed on the control. As each file is compared and updated, it will be displayed in sequence in list form as shown above. The "<" symbol indicates that the control was updated to a different revision, while a "=" symbol is displayed instead if no update occurred because the firmware installed was the same revision as the file on the flash drive. Display shows a counter while the update is being transferred.

When the instruction is displayed to remove the flash drive, remove it to complete the update.

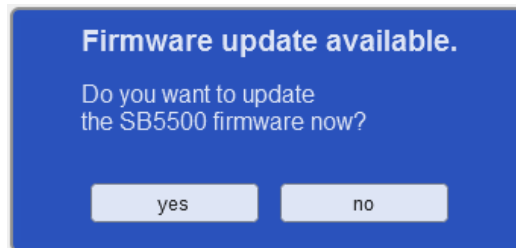
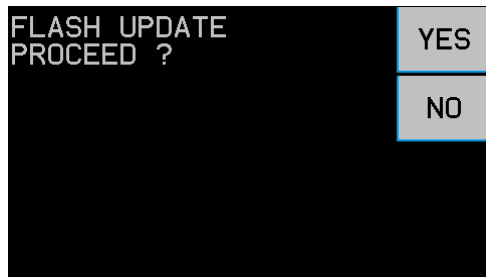
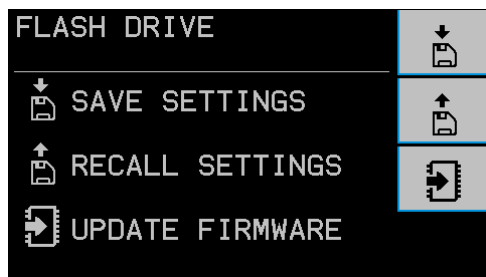


A progress line will be shown during the update of the display firmware, if needed.

Then the SBS controller will restart with the new firmware installed.

SB-5500 Series Control Firmware Flash Update Process

(MAIN firmware rev 0.55 and newer) If the following screen is displayed on the keypad press UPDATE FIRMWARE (3rd button). (Remove the flash drive if CANCEL is pressed.)

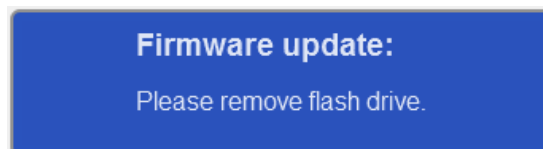
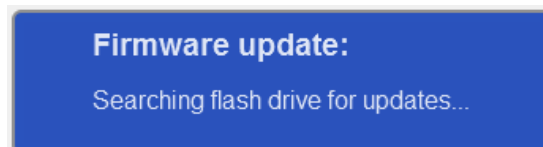
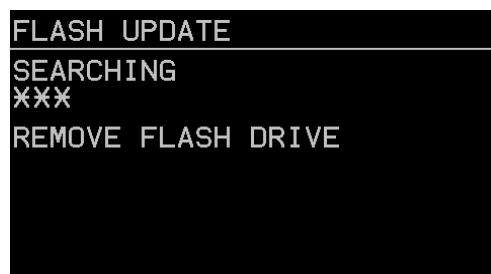


Then this appears:

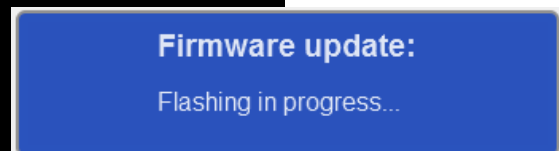
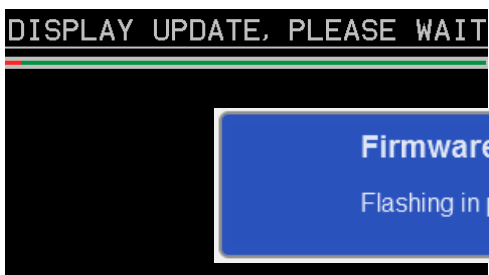
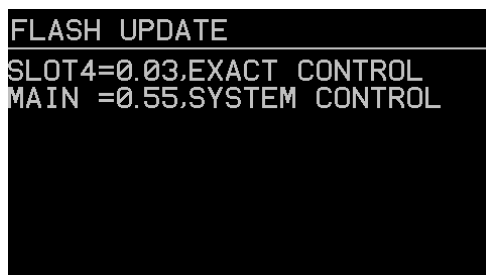
Keypad (if installed)

IVIS (if attached) If not this message, make sure the root folder does not have a SAVE, RECALL, or CRASH folder.

Press YES to Continue with update, or NO or CANCEL to Cancel. (Remove flash drive if cancelled.)



The controller searches the flash drive for firmware update files. Once it has found them it displays the instruction to remove the flash drive. Remove the flash drive to begin the firmware installation.



The update process will compare the files on the USB flash drive with the firmware installed on the control. As each file is compared and updated, it will be displayed in sequence in list form as shown above. The "<" symbol indicates that the control was updated to a different revision, while a "=" symbol is displayed instead if no update occurred because the firmware installed was the same revision as the file on the flash drive. Display shows a counter while the update is being transferred, then it shows a progress bar while it is updating.

Once the firmware update is complete, then the controller will restart with the new firmware installed.

SB-5500 Series Control Firmware Flash Update Process

Balancer cards (SB-5512, SB-5518, SB-5532, SB-5543, SB-5544) Major features of revisions.

- | | | |
|----------|------|---|
| 02/05/10 | 0.15 | Probable first product release. |
| 02/03/12 | 0.19 | Added Portuguese. |
| 11/13/13 | 0.22 | Improved Plot performance.
Supported IVIS interface.
Combined Pre-balance and Manual balance for SB-2000 style operation.
Added Circumference Pre-Balance type.
Allowed Dual Plane on Manual balancer.
Added Low RPM limit. |
| 12/13/13 | 0.23 | Allowed velocity limits.
Added Hungarian. |
| 06/05/14 | 0.24 | Critical RPM values allowed below 300 (0 = OFF).
Added Profibus alternate without critical errors.
Added Japanese? |
| 10/30/14 | 0.25 | Allowed edit of pre-balance spread weight trial.
Allowed last pre-balance spread weight position as starting point.
Added P-P, P, RMS amplitude unit modes. |
| 01/30/15 | 0.26 | Allowed IVIS to set factory default.
Allowed IVIS to be aware that pre-balance could Trim. |
| 06/17/15 | 0.27 | Increase Non-contact zero balance cycle from 130 to 180 seconds. |
| 02/15/16 | 0.28 | Allowed for Profibus to gain control from a 'busy' operator screen.
Added zero balance cycle control and status to Profibus.
Made BIP stay on for at least 50 ms in Profibus. |
| 12/09/16 | 0.29 | Forced IVIS operator to clear errors that would normally show on keypad.
Disabled Trim for an RPM change of 3% from last balance.
Asserted BIP during Non-contact zero balance cycle.
Forced manual balance screen to time-out after 30 seconds of inactivity.
Asserted BIP during manual balance.
Allowed Trim balance in more circumstances.
Allowed the edit of initial spread weight angles on pre-balance. |
| 06/21/17 | 0.32 | Sent X-Y plot info to IVIS.
Added error 'R' if dual plane balance cards have different revisions.
Allowed RPM input selections from either dual plane card. |
| 08/31/17 | 0.33 | Added support for SB-5544 12-pin Manual balancer. |
| 08/24/18 | 0.34 | Added Jobs
Fixed table of weights optimization.
Fixed so each card can select its own RPM sensor in single plane mode.
Fixed an error condition that IVIS could not clear. |
| 06/20/19 | 0.35 | Fixed so upgrade from versions prior to 0.22 don't corrupt the configuration. |
| 09/05/19 | 0.36 | Fixed so Keypad displays RESOLUTION when editing units resolution.
Fixed so editing slot name from keypad doesn't corrupt Limit, Tolerance, etc. |

SB-5500 Series Control Firmware Flash Update Process

ExactControl cards (SB-5560, SB-5560-8) Major features of revisions.

- 12/15/14 0.03 Probable first product release.
- 08/25/15 0.07 Added PCT log files.
- 09/22/15 0.08 Added Two Digital Channel mode.
- 11/10/15 0.09 Add manual frequency and gain adjustment.
- 12/02/15 0.11 Added low pass filter parameter PT1 to input.
- 12/15/15 0.12 Added RPM1 as input selection.
- 02/04/16 0.14 Added Save and Recall.
- 04/17/16 0.15 Added bar graph to ExactGap Strategy symbol
Added pulse/revolution parameter to RPM1 input.
Added Max RPM parameter to RPM1 input.
- 07/29/16 0.18 Increased number of jobs to fill configuration memory.
- 11/23/16 0.21 Added learn status to Profibus channels.
Added AEMS signal pressure level to Profibus.
Added Executing Job # for each Profibus channel.
- 06/12/17 0.23 Allowed Profibus to control sensor learn cycle.
Added Y autoscale setting.
Added X scroll setting.
Added X scroll window time.
Allowed Band 8 adjustable frequency and bandwidth.
Added hardware filter selections for AE sensor input.
Added ExactLimit strategy with 4 limits, hardware Gap and Crash support.
- 10/20/17 0.24 Added param to exactlimits(aems) to enable hardware compares.
Added exact track.
Added code to create_log_file() to look for file names that are directory names, if found delete and create directory
- 11/07/17 A.25 Added additional limit checking to exactlimit so too big of sensitivity values and signal teach will limit the limit to 97%
Added additional limit checking to exactgap so too big of sensitivity values and signal teach will limit the limit to 80%
- 03/15/18 0.26 Added query requests for learn bar/band info at any time while learn is in process
Added infeed error enable.
Added sensor logical names for the various inputs.
Corrected byte order error in pct file for center frequency and width
Added missing filter type and filter time to pct file (always was writing zero to file)
Add check for 8 AE sensor and adjust capabilities telegram.
Added check if job is using sensor 7 or 8 with a 6 sensor board.
Added firmware changes for 8-sensor version (rev 06 PCB)
Exacttrack: added missing 'set output1 and 2 high'.
- 07/19/18 0.27 Fixed: restore configuration doesn't work.
- 07/11/19 0.28 Added ExactTrack smiley indicator.
Corrected the latch logic.

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AEMS cards (SB-5519, SB-5522, SB-5522-W, SB-5522-6) Major features of revisions.

- 02/10/10 0.02 Probable first product release.
- 10/11/11 0.07 Added Portuguese.
- 12/05/11 0.09 Increased speed of Analog Output.
- 12/20/12 0.11 Added peak dyne values to screen.
- 12/16/13 0.14 Added IVIS interface.
Added line plot type.
- 0.15 Added Profibus alternate without critical errors.
- 05/16/14 0.18 Added Japanese.
- 07/21/14 0.19 Allowed adjustable Gap limit.
Added graph time to display.
Computed Gap, Limit 1, and Limit 2 from sensitivity to Air.
Gap Limit 1, and Limit 2 can have independent screen order.
- 10/08/14 0.20 Removed LOCKED mode from menu entry.
- 11/15/16 0.22 Added Gain/Zoom/Pan.
Added zero offset adjust.
Allowed adjustment of independent Crash limit and limit order.
Added configuration settings Save and Recall.
- 03/02/17 0.23 Allowed IVIS to track Fluid Sensor status.
Allowed Profibus to control learn cycle.
- 03/30/17 0.24 Allowed IVIS to store Y scale zoom and pan settings.
- 05/17/17 0.26 Allowed Band 8 adjustable frequency and bandwidth.
- 06/19/17 0.27 Supports SB-5522-W version.
- 08/29/17 0.29 Enhanced learn cycle provides good support for AE+ sensors.
- 10/03/17 0.31 Supports SB-5519.
- 10/05/17 0.32 Supports SB-5522-6.
- 10/18/17 0.33 Updated Burn-in fixture sense algorithm (requires Main 0.68)
Made sure Burn-in sets FPGA filters AFTER acquisition thread does
- 10/20/17 0.34 Corrected relay limits position editing. Moved sensor select
into the learn function.
- 11/22/17 0.35 Added ability to get learn bar/band data at any time during learn (mostly
for ivis when second instance starts while all ready in learn
- 0.36 Folded into version 0.37.
- 03/16/18 0.37 Added 'disable crash latch in ivis' to capabilities and make sure
crash latch is disabled when recalling settings. Added sensor names, adjusted some
of the capabilities for the other card types.
- 09/26/19 0.39 Added AE signal offset control from IVIS (IVIS 3.95).

SB-5500 Series Control Firmware Flash Update Process

ExactDress card (SB-5523) Major features of revisions.

- 12/20/12 0.11 Probable first product release.
- 02/25/13 0.13 Changed MODE button to VIEW.
Keeps same VIEW on CNC start.
Jobs 1 and 2 have separate learns with auto sensor 2 on job 2.
- 04/11/13 0.14 Increased to 32 Jobs, no mode, and reorganized menus.
- 12/16/13 0.16 Added IVIS interface (but IVIS does not support).
- 03/19/14 0.18 Reduced display words to G and C.
Added adjustable Gap.
Used 1.5 ms filter on processing, 15 ms filter on AE display.
Added plot time to run view.
- 04/03/14 0.19 Disabled VIEW button during teach.
Show RED ending segments for cycle too short.
- 05/01/14 0.20 Re-enabled VIEW button.
Compute Gap Sensitivity based on percentages.
Added Start/Stop and Teach icons to display.
Disabled CNC Error output during manual setup.
Disabled CNC status icons during manual setup.
- 05/16/14 0.21 Added Japanese.
- 08/18/17 0.22 Individually set each MIN zone limit.

SB-5500 Series Control Firmware Flash Update Process

Main card (EC-5510-A, EC-5501-A) Major features of revisions.

- Many unreported revisions fix bugs or support changes in slot card features.
- | | | |
|-----------|------|--|
| 04/23/10 | 0.29 | Probable first product release. |
| 12/09/10 | 0.37 | Flash update skipped for matching revision. |
| 05/05/11 | 0.39 | Display firmware version. |
| 10/28/11 | 0.41 | Added Portuguese. |
| 10/29/12 | 0.49 | Allow disable of Profibus critical errors. |
| 12/17/13 | 0.50 | Added Hungarian. |
| | | Added IVIS interface. |
| 01/28/14 | 0.51 | Added Profibus alternate without critical errors. |
| 03/26/14 | 0.52 | Change Profibus address via IVIS. |
| 04/21/14 | 0.54 | Added FPGA version to firmware version screen. |
| | | Added Japanese. |
| 12/16/14 | 0.55 | Added flash update support via IVIS. |
| | | Report Main revision to IVIS for display. |
| 02/05/16 | 0.60 | Added Save and Recall of user configuration settings. |
| 02/18/16 | 0.62 | Added Save/Recall/Flash Update screen. |
| 04/04/16 | 0.63 | Display firmware revision from both Flash banks. |
| 09/16/16 | 0.64 | Added Save and Recall support via IVIS. |
| 23-Nov-16 | 0.65 | Revised settings save/recall to include checksums in files and more common code between flash drive and ivis. |
| | | Cleanup some communication issues with the ivis connect telegram to the cards. |
| 13-Jun-17 | 0.66 | Added a Profinet led test to burnin. This is for initial board turn on/test only. |
| 20-Jun-17 | 0.67 | Removed extra rtos debug from slot 1 connector. This is for initial board turn on/test only. |
| 18-Oct-17 | 0.68 | This version has all the Profinet code added, mostly untested and disabled. |
| | | This also incorporates 0.66 and 0.67 changes for general release. Changed startup a bit. Currently AEMS card will use a different fixture detect that is incompatible with the bit and supports two sensors per connector on back of card. |
| | | Added additional status to flash update to id mismatched card fpga rev. |
| | | Changed hardware rev code to ivis to be fpga rev code. |
| 15-Nov-17 | 0.69 | Timing fix for lcd thread when the lcd isn't present. Slowed down the response time so it more closely emulates the lcd. |
| 13-Sep-18 | 0.71 | Added to profibus to handle gsd 6.x for SB5562 card. |
| | | Fixed the loss of a small amount of data during parameter recall. |
| 31-Oct-18 | 0.81 | Added main board name save/recall functionality for IVIS. |
| | | Fixed a bug that would intermittently cause a USB drive to not be detected when plugged in. |
| 09-Nov-18 | 0.82 | Added profinet support. |
| | | Fixed a bug that prevented a change to the profibus channel number when a customer would try to change it through IVIS. |
| 09-Oct-19 | 0.83 | Added Firmware Update via IVIS |
| 25-Mar-20 | 0.84 | Added extended Profibus configurations available in IVIS version 3.97 or newer |
| | | Fixed 5% internal frequency error |

SB-5500 Series Control Firmware Flash Update Process

For Profibus

GSD revision 1.0	9 languages, Main, Mech bal, N/C bal, Man. bal, Hydro bal, AEMS, and Empty.
GSD revision 2.0	added 1 language and ExactDress.
GSD revision 3.0	added 1 language, 8 more Diagnostic bits, alternate versions without diagnostics for Mech bal, N/C bal, Man. bal, Hydro bal, AEMS, and ExactDress.
GSD revision 4.0	added ExactControl.
GSD revision 5.0	added 1 language, AEMS zero, and ExactControl with acknowledge.
GSD revision 5.1	fixed some byte/word count incompatibility on ExactControl.
GSD revision 6.1	added Jobs to Mech bal, N/C bal, and Man. bal. added SB5562 support.