World Bill Acceptor

WBA-SS Series

Calibration
Software Download

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1. Description - calibration

Calibration sets a starting reference point for all the optical and magnetic sensors within the unit. This task can be done at the host unit or at your workbench.

WHEN TO CALIBRATE
- After the acceptor component has been disassembled for repair
- After a sensor board has been replaced
- Whenever bill acceptance is degraded
- Once a year

2. Tools needed

You will need the following tools for calibration at your workbench.

Tools needed for calibration at your workbench

12p↔ 20p Conversion Harness
(841-05-25, Part #: 067463)

Indicator LED

- **Black calibration paper**
  KS-030 (#055155) for WBA-1x
  KS-032 (#057487) for WBA-2x

- **White calibration paper**
  KS-031 (#055156) for WBA-1x
  KS-032 (#057485) for WBA-2x

- **Mag tool**
  (Part #: 041793)

Connect the cable to serial port

AC-Power

WBA - ** - SS

WBA I/F Test Bench
(PS15-006, Part #: 057117)
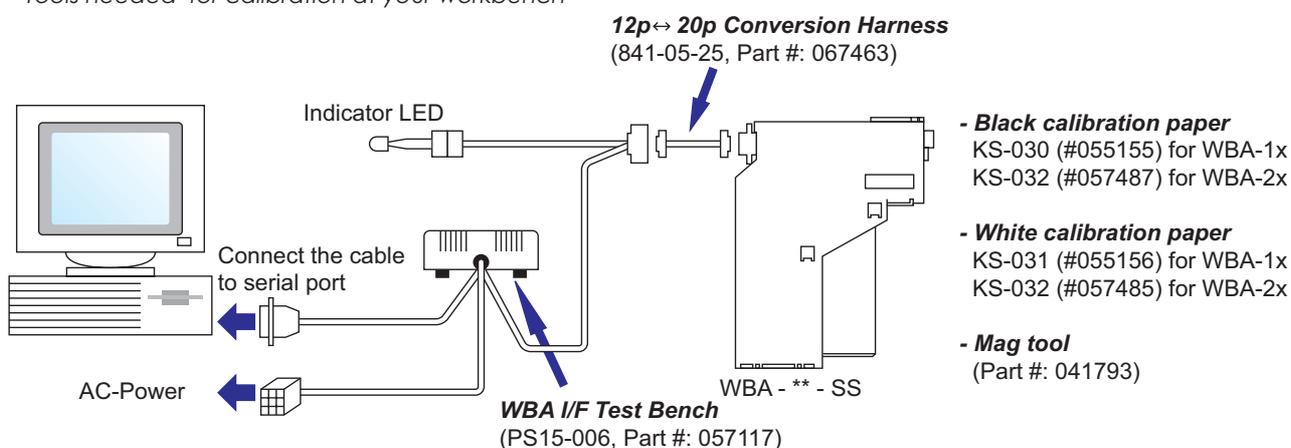
PC: IBM PC AT or compatible
OS: MS-DOS V5.x or 6.x

The WBA calibration program supports MS-DOS only. This program can be also executed by double-clicking the file, but use this method at your own risk. The execution may not be successful depending on your machine configurations.

3. Setting the WBA calibration mode

(1) Refer to the diagram above to properly connect the cables / harnesses.

⚠️ Make sure the power of PS15-006 / host machine is OFF when connecting the harness to the WBA. Failure to do so may cause electric shock and/or permanent damage to the equipment.

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(2) Set dipswitch No.8 ON and 1 to 7 OFF.

(3) Supply power to the WBA.

(4) The indicator LED flashes approximately every second.

(5) Set DIP switch No.8 OFF. Confirm the indicator LED turns off.

4. Starting the PC calibration program

There are 2 ways to start the WBA calibration software:

A) Start from MS-DOS

1) Turn on the PC and start MS-DOS. See your PC and MS-DOS manuals to find out how to start MS-DOS.

2) Insert the floppy disk containing the calibration program to the PC's floppy drive.

3) Change the current drive to the drive in which you have inserted the floppy disk (if it is A drive, enter A:).

4) To start calibration of WBA-12/13, enter "ADJ10" and press ENTER.

   To start calibration of WBA-22/23/24/25, enter "ADJ20" and press ENTER.

B) Start by double-clicking the calibration program *(Use at own risk)*

1) Turn on the PC and start Windows 98/2000/Me/XP.

2) Insert the floppy disk containing the calibration program to the PC's floppy drive.

3) Double-click the file to start the program ("ADJ10" for WBA-12/13, "ADJ20" for WBA-22/23/24/25).

5. Calibration procedure

(1) When the calibration program starts, screen 1 appears. Check the software name, type, and version number. To end the software without making calibration, press ESC.

```
WBA-xx, WBA-xx ACCEPTOR HEAD ADJUSTMENT SOFT  TYPE:A
                    VerX.XX
                    XX-XX-XX
         JAPAN CASH MACHINE CO., LTD.


                PUSH Enter KEY.
```

<scr 1>
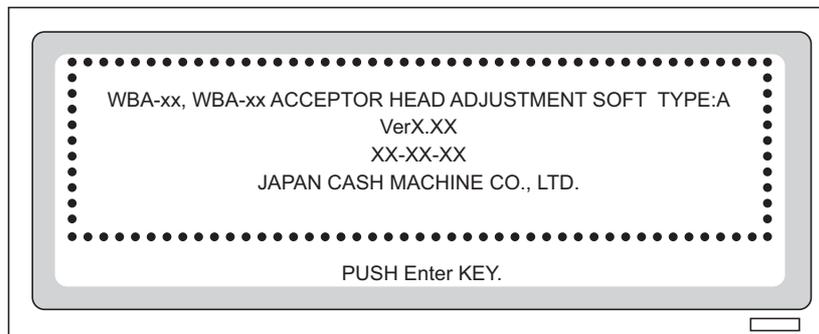
(2) Press the ENTER key. Screen 2 appears.

```
         Set White reference paper. Hit Enter Key.
```

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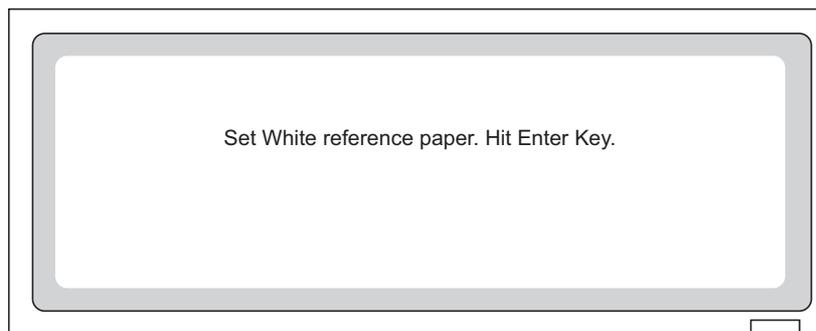
(3) Insert the white calibration paper ("KS-030" for WBA-12/13 and "KS-032" for WBA-22/23/24/25) as shown below, and close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.

KS-030
(Part#: 055155)

KS-032
(Part #: 057487)
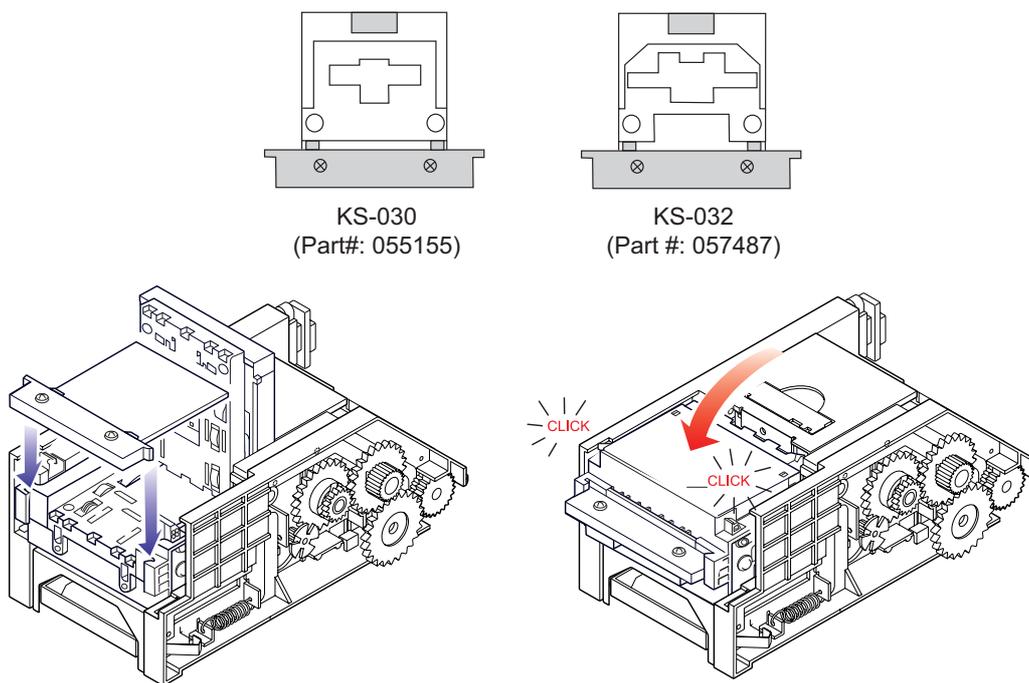
(4) Press the ENTER key to start calibration. Do not move the acceptor head and calibration paper during calibration.

• • • • • • • • • • Adjusting XXXX • • • • • • • • • •

<scr 3>
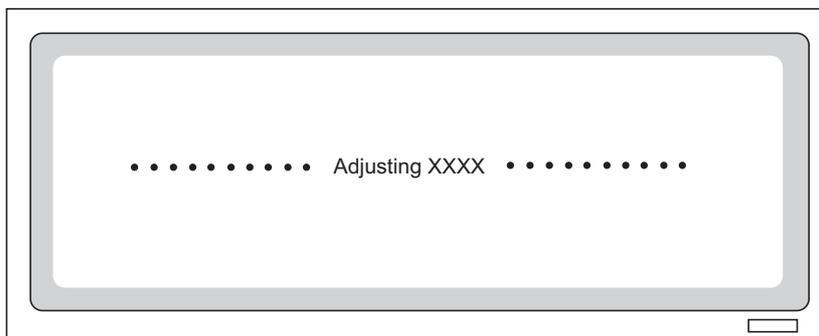
(5) When screen 4 appears, insert the black calibration paper.
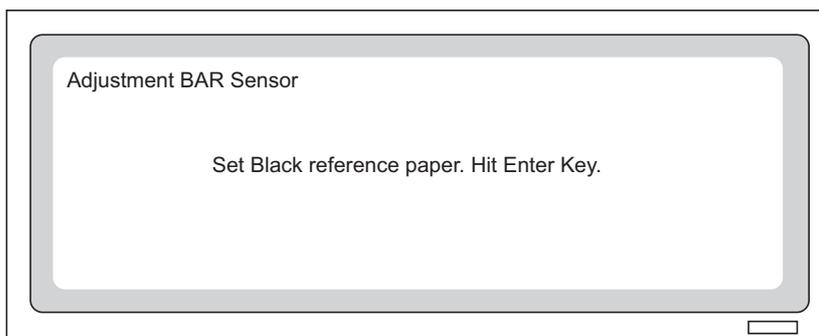
Adjustment BAR Sensor

Set Black reference paper. Hit Enter Key.

Close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.

KS-31
(Part #: 055156)

KS-33
(Part #: 057485)
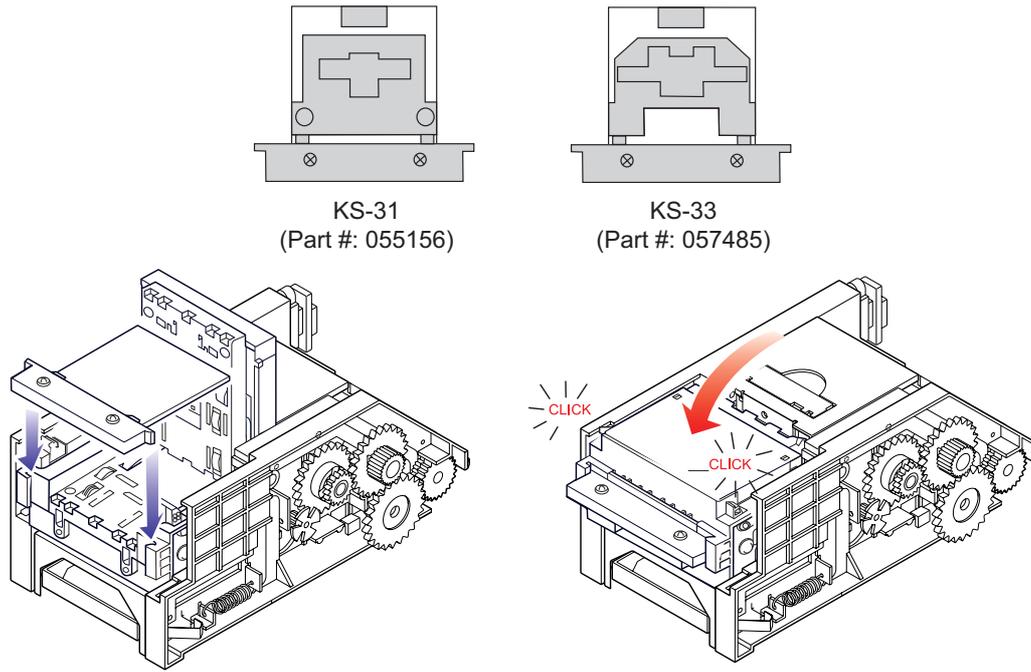
(6) Press the ENTER key to start calibration. Do not move the head and calibration paper during calibration.

• • • • • • • • • •   Now Adjusting   • • • • • • • • • •

<scr 5>
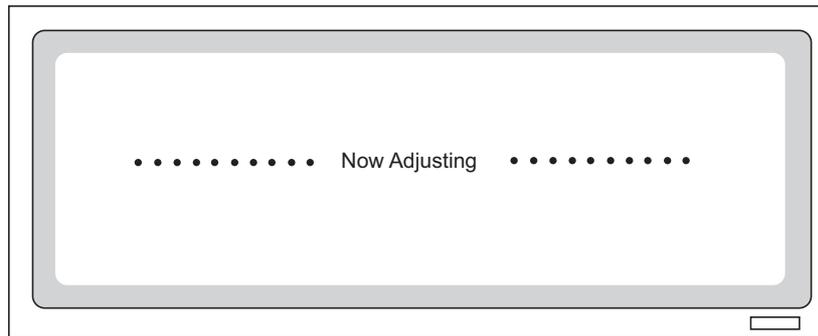
(7) When screen 6 appears, remove the black reference paper and insert the white calibration paper again and press the ENTER key.

Adjustment BAR Sensor

Set White reference paper. Hit Enter Key.

<scr 6>
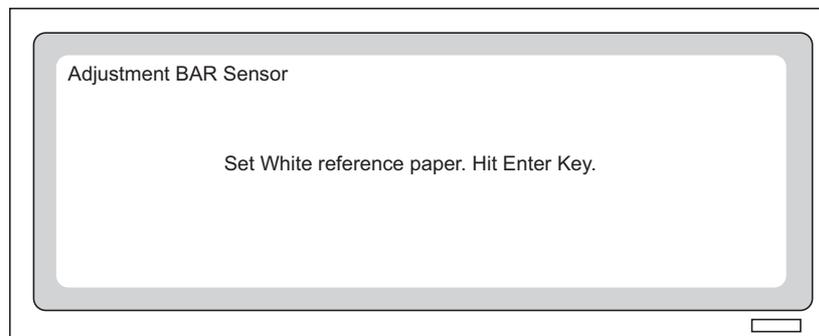
(8) Press the ENTER key to start calibration. Repeat the steps (5) to (8) three to five times until screen 7 appears.

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(9) When screen 7 appears, calibration with black and white calibaration papers is complete. Remove the calibration paper and close the acceptor head. Make sure that the tabs on both side of the acceptor head are firmly locked.


Pull out reference paper. Hit Enter Key.

<scr 7>
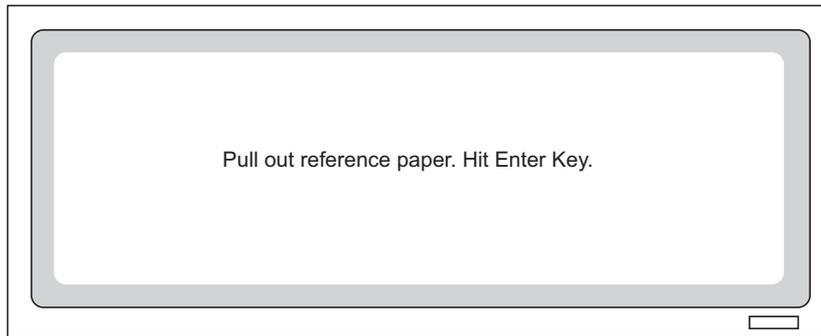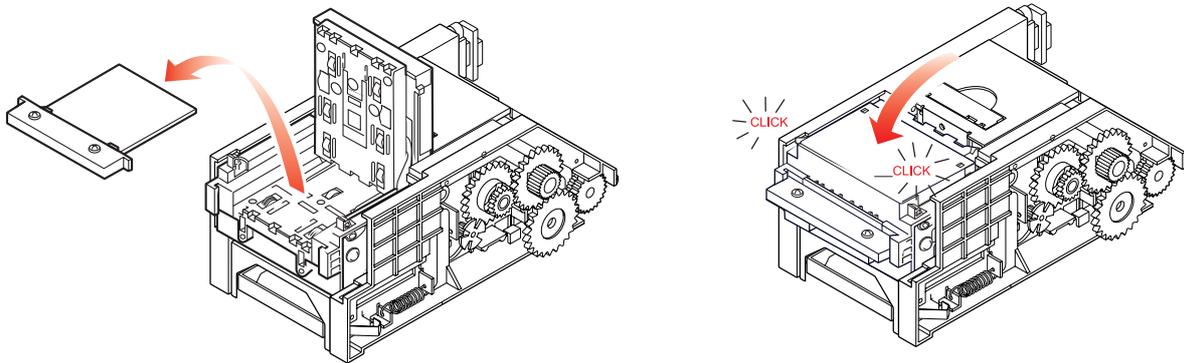
(10) Press the ENTER key to start calibration without calibration papes (no paper calibaration).

• • • • • • • • • • Adjusting XXXX   • • • • • • • • • •

<scr 8>
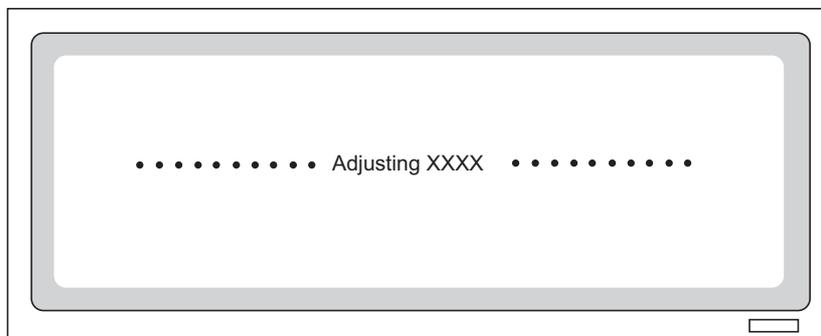
(11) When the calibration is complete, screen 9 appears.

MAG GAIN ADJUST

Set MAG HEAD TESTER. Push Enter Key.

<scr 9>

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(12) Calibrate the magnetic sensor(s). Insert the mag head test board to the acceptor and find a location where the second line of mag head test board just above the roller of acceptor head lower tray (show the diagram below)   Make sure that the tabs on both side of the acceptor head are firmly locked. ***Closing the acceptor head after the calibration starts results in an error***.

Align the second line of mag head test board
just above the roller of acceptor head lower tray

Mag tool
(Part #: 041793)
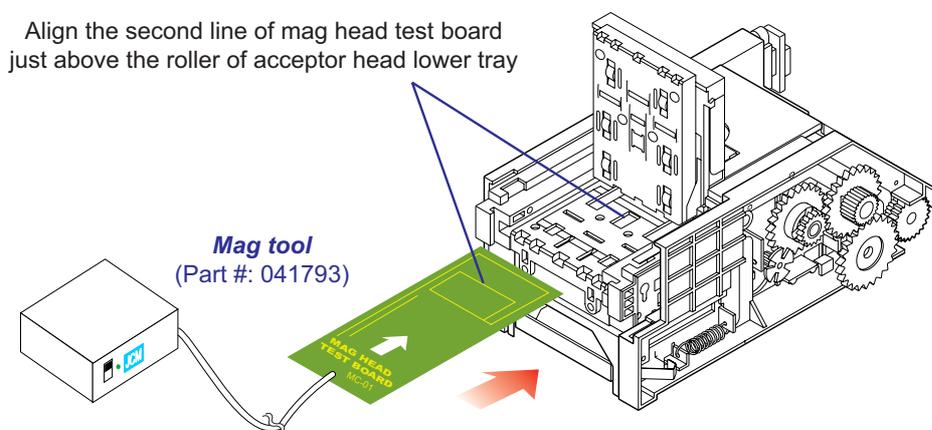
(13) Press the ENTER key. Screen 10 appears. (a) shows the current value and (b) shows the peak value detected after the mag board has been inserted.

MAG GAIN ADJUST

MAG Center A/D = 0.8v (41) PEAK: 0.84v
                  (a)   (b)

Adjust peak level. Push Enter key to start.

<scr 10>
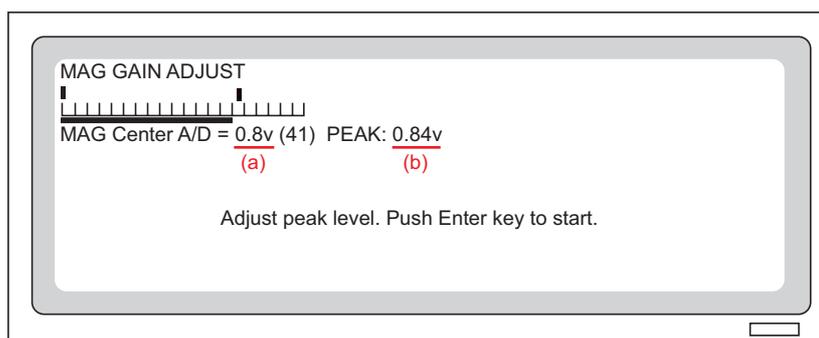
(14) Slowly move the mag-head test board back and forth to find the peak value. ***The peak value (b) should be between 0.5V and 1.2V.***
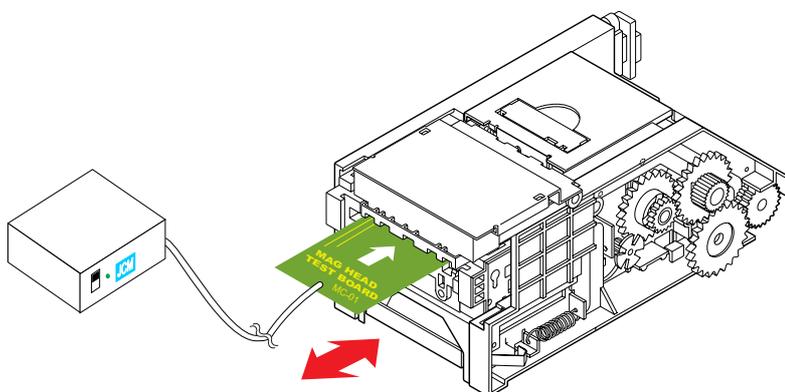
(15) Continue to move move slowly the MAG head test board back and forth several millimeters to find the position ***where the "MAG Center A/D" value enters the range within -0.1V in relation to the peak value***.

(16) When the "MAG Center A/D" value enters the designated range, press the ENTER key. The calibration starts and screen 11 appears.

```
MAG GAIN ADJUST


• • • • • • • • •   Adjusting MAG Gain   • • • • • • • • •
```

<scr 11>
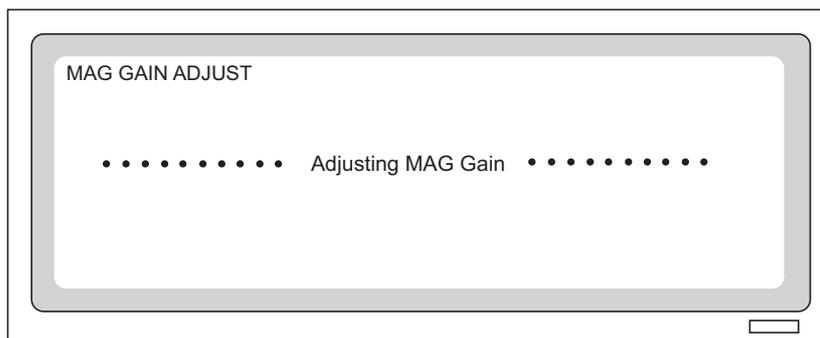
(17) When the calibration is complete, screen 12 appears. A prompt asks if the calibration results should be written in the acceptor head memory. Press the Y key and then ENTER to write the data to memory. If you choose N, all the calibration data will be lost when the power turns off.

```
Write the adjustings to VALI HEAD. Yes-->Y No-->N :
```

<scr 12>
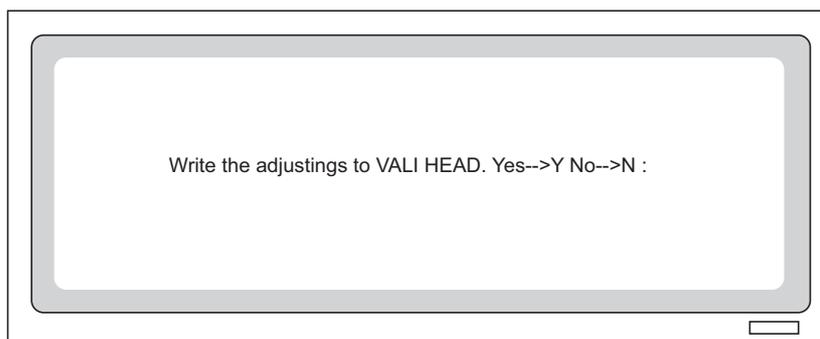
(18) When the screen 13 appears, all calibration procedures are complete. If you wish to continue calibration with another acceptor head, press ENTER and replace with a new acceptor head. To end calibration procedure, press ESC

```
• • • • • • • • • •   Complete   • • • • • • • • • •
Push Enter KEY TO CONTINUE. END:ESC KEY.


DATE: xxxxxxxx ID: WBAxxxxxx
Write Complete
```

<scr 13>

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6. Error messages

xxxxx Communication Error xxxxx: Communication with WBA has failed.

> => Check all the connections. Make sure you have executed the correct calibration program.

xxxxx Adjustment Error (Gain) xxxxx: Gain calibration error

> => Make sure you have correctly inserted white calibration paper as instructed by the monitor.

xxxxx Adjustment Error (Black Level) xxxxx: Black level calibration error

> => Make sure you have correctly inserted black calibration paper as instructed by the manitor.

xxxxx Adjustment Error (No paper) xxxxx: No paper level calibration error

> => Make sure you have removed calibration paper.

xxxxx Adjustment Error (MAG) xxxxx: Magnetic head calibration error

> => Make sure you have correctly inserted mag head test board as instructed by the monitor.

When an calibration error occurs, the sensor signal name and signal value involved in the calibration error will be displayed on the line above the message "xxxxx Adjustment Error (XXXX) xxxxx."

Example of error message:

```
L2I(2.80V)[1.47]NG
XXXXX Adjustmennt Error (XXXX) XXXXX
```
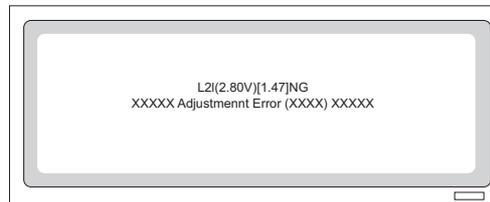
7. Sensor Signal Name and Sensor Name Conversion Table

Sensor signal name	Sensor name
c2i	HPC,LEC
r2i	HPR,LER
l2i	HPL,LEL
c2r	HPC,LEC
r2r	HPR,LER
l2r	HPL,LEL
a	PT1,LE1
b	PT2,LE2
bur	HBAR
cdr	HPC
rdr	HPR
ldr	HPL

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Sensor signal name	Sensor name
c2i	UHPC, DHPC
c2r	
cui	UHPC
cur	
cdi	DHPC
cdr	
r2i	UHPR, DHPR
r2r	
rui	UHPR
rur	
rdi	DHPR
rdr	
l2i	UHPL, DHPL
l2r	
lui	UHPL
lur	
ldi	DHPL
ldr	
rei	PT1
lei	PT2
rai	PT3
lai	PT4
bur	HBAR

WBA-2 * -SS

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8. Description - donwloading to flash memory

This section describes how to download software program to the flashrom of the CPU board.

WHEN TO DOWNLOAD

- Software Upgrade
- After a CPU board has been replaced

This paragraph describes the method of using WBA I/F test bench. For the method 2), see a separate instruction manual of DT-004.
This paragraph is for flashrom models only (WBA-12/22/24).

9. Tools needed

Tools needed for downloading

12p↔20p Conversion Harness
(841-05-25, Part #: 067463)

Indicator LED

Connect the cable to serial port.

AC-POWER

WBA - ** - SS

WBA I/F Test Bench
(PS15-006, Part #: 057117)
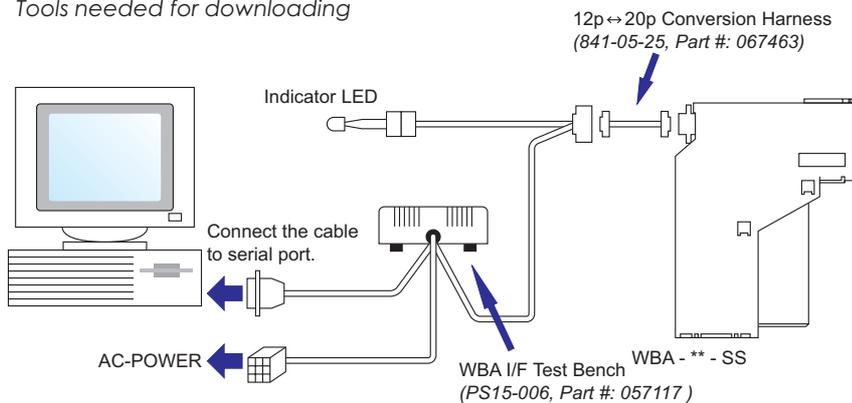
PC: IBM PC/AT and compatibles
The PC must have 1 or more RS-232C communication ports (D-sub pin).

Communication port address: 3F8 to 3FF (serial port 1)
2F8 to 2FF (serial port 2)
OS: MS-DOS Version 5.x, 6.x

The WBA calibration program supports MS-DOS only. This program can be also executed by Windows 98 MS-DOS Prompt or Windows Me/2000/XP Command Prompt. However, the execution may not be successful depending on your machine configurations.

10. Setting the WBA Download Mode

(1) Refer to the diagram above to properly connect the cables / harnesses.

Make sure the power of PS15-006 / host machine is OFF when connecting the harness to the WBA.
Failure to do so may cause electric shock and/or permanent damage to the device.

Location of DIP switches

Switches #1, 6 - 8 ON

OFF 1 2 3 4 5 6 7 8

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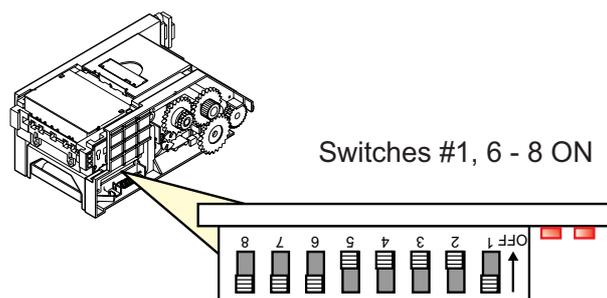
(2) Set the CPU board DIP switches 8, 7, 6 and 1 ON and switches 5 to 2 OFF. This way the baud rate is set to 38400bps. Note the baud rate of 38400bps is avaialble for 4M flashrom only (WBA12/22/24).

(3) Supply power to the unit.

(4) The CPU board LED 1 and LED 2 flash alternately and the forced download mode starts.

(5) Save the download program (DWN.exe) and the software into a floppy drive (or the same directory).

11. Starting the download program

There are 2 ways to start the WBA download program.

A) Start from MS-DOS

1) Turn on the PC.

2) Insert the floppy disk containing the download program (DWN.exe) and the software to the PC's floppy drive.

3) Start MS-DOS. See your PC and MS-DOS manuals to find out how to start MS-DOS.

4) When the MS-DOS menu appears, type "A" and press ENTER (when your floppy disk is in "A" drive).

5) Type "DIR" and press ENTER. The list of file names in the floppy disk appears.

6) Find the file name of software and enter the parameters as shown in the diagram below. For example, if the file name is 2420710.USA, and the serial port number is 1, type as:

DWN 2420710.USA 2 252 246 1 (ENTER)

B) Start from Windows98 MS-DOS Prompt or Windows 2000/Me/XP Command Prompt Menu *(Use at own risk)*

1) Turn on the PC and start Windows 98/2000/Me/XP.

2) Insert the floppy disk containing the download program (DWN.exe) and software to the PC's floppy drive.

3) Start MS-DOS Prompt or Command Prompt from START menu of Windows.

4) When the MS-DOS/Command Prompt menu appears, type "A:" and press ENTER (when your floppy disk is in A drive).

5) Type "DIR" and press ENTER. The list of file names in the floppy disk appears.

6) Find the file name of software and enter parameters as shown in the diagram below. For example, if the file name is 2420710.USA, and the serial port number is 1, type as:

DWN 2420710.USA 2 252 246 1 ENTER

```
Microsoft (R) Windows 98
        (C) Copyright Microsoft Corp 1981-1999

(4) ──►  C:/Windows>A:

(5) ──►  A:/>DIR

         2420710 USA     524,288 01-12-15   21:21   2420710.USA
         DWN     EXE      57,863 98-08-28   11:45   DWN.EXE

(6) ──►  A:/>DWN 2420710.USA 2 252 246 1
```
File name of software
Donwload Program
Space   Space
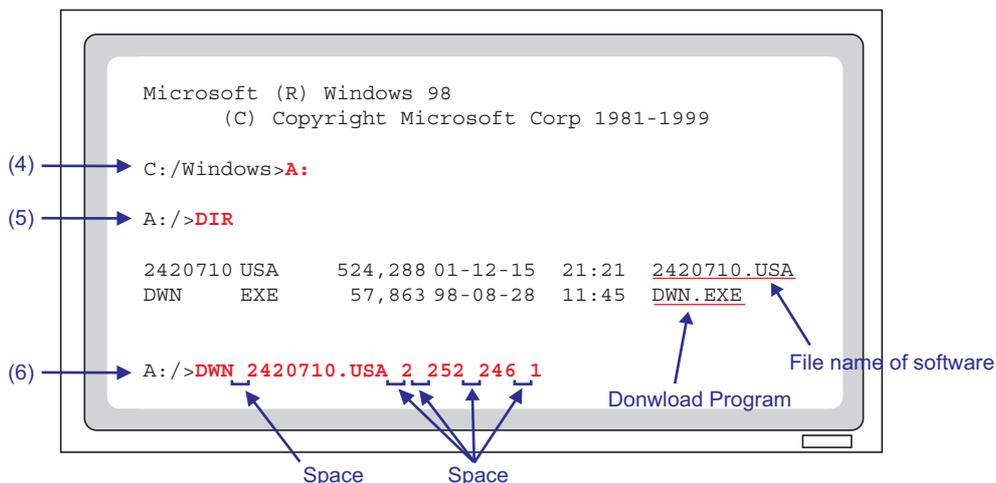
Explanation of Parameters: **DWN Filename [baud rate] [address] [size] [port]** ENTER

File name	Download filename.	(Must be specified.)
[baud rate]	Baud rate 0: 9600bps, 1:19200bps, 2: 38400bps	Default: 0
[address]	Fixed at 252 (FC hex.).	Default: 252
[size]	Fixed at 246.	Default: 246
[port]	Serial port number	Default: 2

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12. Example of the download procedure

Execution Screen

When the program starts, the following screen appears.

Note: If the download file is correct, "DWLD01" appears on the top line.

Selected serial port No.

Entered download filename.

If the download file is correct, "DWLD01" is shown here.

Baud rate

Dev.=fc Port=2 File=2420710.USA DWLD01:00200000:0027FFFF 91DO 38400bps RUN 1

DOWN LOAD PROGRAM Ver. 214-00 05/JUN/'03 JCM

I: Addressed Reset   V :Version Information Request
G: Global Reset   Ctrl - X: Abort
F: File Download   P: Program Check Verify
                                          S: Set Start Addr. & Seed Val.
Ctrl - f: File Download (Selection)   (Start Addr.: 000000 Seed Val.: 0000)

Device Ver. :
Vaildator Status: Disable
Comm Status: OK   Poll - - ->   <- - - Bill Validator Disabled

Operation:

Use the letter keys to enter a command.

I: Addressed Reset - Reset a selected unit in the game machine.

V: Version Information Request - Reads the program version after downloading is complete.

G: Global Reset - Reset all the units (including WBA) connected to the host controller

Ctrl + X: Abort - Exit the program.

F: File Download - Downloads the specified file.

P: Program Check Verify - Check CRC by the WBA itself.

Ctrl + F: File Download (Selection) - *DO NOT USE THIS COMMAND*

S: Set Start Addr. & Seed Val. - The start address and initial value of CRC when checking CRC.

(1) Press F key (capital letter) to start the download program.

(2) Downloading starts. The LEDs 1 and 2 on the CPU board flashes alternatively.
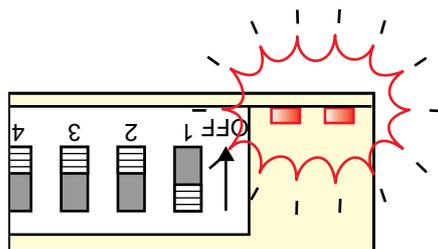
(3) When the downloading is completed, LED1 and LED2 flash in unison.

(4) "CRC" appears on the monitor.

```
┌──────────────────────────────────────────────────────────────────────┐
│ ┌──────────────────────────────────────────────────────────────────┐ │
│ │                                                                    │ │
│ │  Dev=fc Port=2 File=2420710.USA  DWLD01:00200000:0027FFFF 91DO 38400bps [RUN] 1 │ │
│ │  ┌── DOWN LOAD PROGRAM Ver. 2.11-00 28/AUG/'98 JCM ──┐           │ │
│ │  │ I: Addressed Reset          V :Version Information Request │   │ │
│ │  │ G: Global Reset             Ctrl - X: Abort               │   │ │
│ │  │ F: File Download            P: Program Check Verify       │   │ │
│ │  │ Ctr - f: File Download (Selection)  S: Set Start Addr. & Seed Val. │ │
│ │  │                             (Start Addr.: 000000 Seed Val.: 0000) │ │
│ │  └────────────────────────────────────────────────────────┘   │ │
│ │                                                                    │ │
│ │  Device Ver. :                                                    │ │
│ │  Vaildator Status: Disable                                       │ │
│ │  Comm Status: OK                                                 │ │
│ │             Download Data - - ->         <- - - ACK              │ │
│ │                    Poll - - ->           <- - - Program Download Ready │ │
│ │             Download Data - - ->         <- - - ACK              │ │
│ │                    Poll - - ->           <- - - Program Download Ready │ │
│ │             Download Data - - ->         <- - - ACK              │ │
│ │                    Poll - - ->           <- - - Program Download Ready │ │
│ │      Download End and Confirm - - ->     <- - - ACK              │ │
│ │                    Poll - - ->           <- - - No Activity      │ │
│ │                    Poll - - ->           <- - - Prog. Check Verified-V91DO:M91DO │ │
│ │                         ACK - - ->                    (a)     (b) │ │
│ │                    Poll - - ->           <- - - Bill Validator Disabled │ │
│ │                                                          ┌────┐  │ │
│ │                                                          └────┘  │ │
│ └──────────────────────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────────────────────┘
```

(a) V ∗ ∗ ∗ : CRC value calculated by WBA

(b) M ∗ ∗ ∗ : CRC value calculated by PC

If the downloading is successful, the CRC* values of (a) and (b) should be the same.

(5) The downloading is complete. Press the "Shift" V key to verify the update if necessary.

(6) Exit the program (Ctrl - X).

Reference: "CRC"is an error correction method for checking whether or not data is correctly transmitted.

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13. Setting the WBA DIP Switches

1. Test Mode

Selecting the test mode
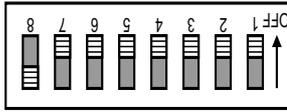
1. Set DIP switch 8 to ON and switches 1 to 7 to OFF.
2. The indicator LED will flash.
3. Set DIP switches to the test mode setting you want to execute.
4. Set DIP switch 8 to OFF.
5. The test mode starts.

Setting the test mode.
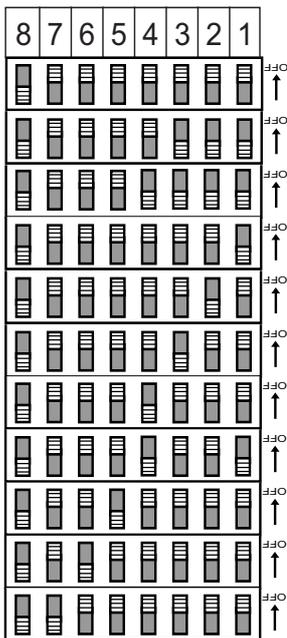
8	7	6	5	4	3	2	1	Description
								Online test
								Transport unit/acceptor head bill acceptance operation test (See Error Code Table 1 and 3.)
								Bill acceptance test of unit with cash box (See Error Code Table 1 and 3.)
								Transport motor forward rotation test
								Transport motor reverse rotation test
								Stacker up/down test
								Acceptor head/stacker test (See Error Code Table 2.)
								Stacker test (without acceptor head)
								Solenoid test
								Acceptor head sensor test (PH06) See "Details about the Acceptor Sensor Test (PH06)."
								Stacker sensor test (PH07) See "Details about the Stacker Sensor Test (PH07)."

Details about the Acceptor Sensor Test (PH06)
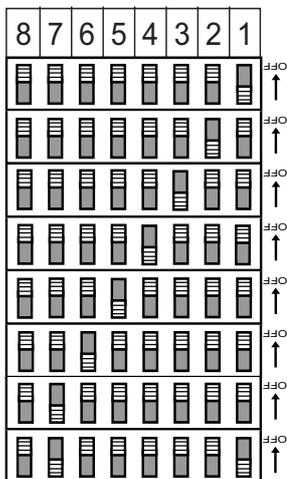
8	7	6	5	4	3	2	1	WBA-10	WBA-20
								PLEV	FLEV
								Reserved	PT3
								PT1	PT4
								PT2	PT1
								HPL	PT3
								HPR	UHPL,DHPL
								HPC	UHPR,DHPR
								Reserved	UHPC,DHPC

Details about the Stacker Sensor Test (PH07)

8	7	6	5	4	3	2	1

 Feed in sensor

 Solenoid lever

 Feed out

 Stacker home

 No cassette

 Validator encoder

 Stacker endcoder

 Acceptor head detached signal
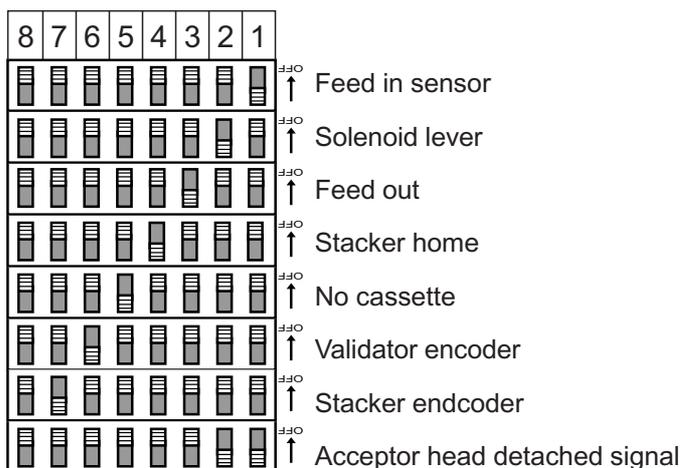
DIP switch input test

8	7	6	5	4	3	2	1

1

2

3
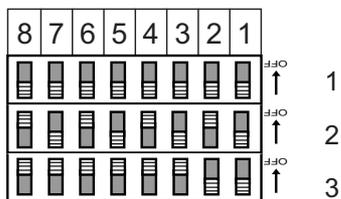
Change the DIP switch settings in the order of 1, 2, and 3.

If the test is successfull, the LED turns ON.

Serial port loopback test
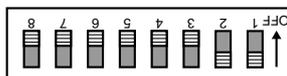
If the test is successfull, the LED turns ON.

2. Download Mode

Forced download mode

8	7	6	5	4	3	2	1

(baud rate 9600bps: for WBA10/20 only)

(baud rate 19200bps: for WBA10/12/20/22/24)

(baud rate 38400bps: for WBA12/22/24 only)

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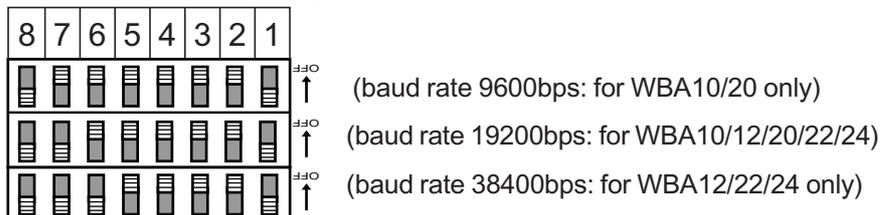
14. Error Code

Error Code Table 1

Error Code Table 1 summarizes the error codes of the receiving operations of the transfer unit/acceptor headpiece and the unit with cash box.

No. of indicator LED flashes	Description
1	Cash box full
2	Stacker jam, or pusher unit problem.
3	Transport cover is open, or stacker lever problem.
4	Jam in the acceptor head.
5	The acceptor head is detached or it has been calibrated, or wrong acceptor head type.
6	Transport motor problem. The pulse signal is not sent from the encoder sesor.
7	Reserved.
8	Stacker lever problem.
9	Reserved.
10	No cash box.
11	Reserved.
12	Reserved.

Error Code Table 2

Acceptor head and stacker test.

No. of indicator LED flashes	Description
1	Reserved.
2	Stacker lever problem.
3	Jam in the acceptor head.
4	Cash box jam.
5	Cash box full.
6	Pusher mechanism problem.
7	The acceptor head is detached or it has not been calibrated, or wrong acceptor head type

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Error Code Table 3

Return code.

Number of pulses	Reason for return
1	Crooked insertion
2	Magnetic pattern error
3	A sensor other than DT1, PT2 detected a bill while the acceptor was on standby.
4	The dark-light ratio of the bill is below the fixed value
5	(1) The *HPC sensor did not detect the bill within the specified period after it was initially taken in. (2) The *HPL *HPR, did not delect the bill within the specified period after it was initially taken in. (3) The feed sensor did not detect the bill within the specified period after it was initially taken in.
6	Reserved
7	Error in a photosensor
8	Level error; the bill is unusually dirty. Two overlapping bills were detected.
9	Returned an illegal bill type.
10	Reserved
11	Stacker lever trouble.
12	None of the *HPR, *HPC, nor *HPL detected a bill when the type of bill signal is output. The feed-in sensor stops detecting a bill before the *HPC sensor during transfer of bill to cash box. The HPC sensor detected a bill again during transfer of bill to cash box.
13	Bill length error.
14	Color pattern error.

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15. Sensor, Board, and Motor Locations