PERSONAL NOTES AND COMMENT AREA

Write any pertinent notes or comments regarding your particular installation here.

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BlueWave 2.0™ Download Tool

Operational Instructions

This document contains information for configuring and operating the JCM DT-200 BlueWave 2.0™ Handheld Download Tool used for updating operating firmware in JCM Banknote Acceptors. For iVIZION, UBA, TBV or VEGA Units, the BlueWave operates via the Banknote Acceptor's USB Port. For DBV-30X Units, a standard RJ-45 Patch Cable is used. For WBA Banknote Acceptors, a special Harness connects to the RJ-45 Port of the BlueWave device. For PUB 7/11 and EBA-3X Units, a PUB/EBA Adapter Assembly is used for RJ-45 Port connection. The DT-200 Blue Wave 2.0™ Handheld Download Tool is available separately, or as a Kit with the necessary Harnesses/Adapters as follows:

- BlueWave 2.0™ Download Tools available:
  - 1 - Download Tool Only (JAC Part No. 550-100720R).
  - 1 - iVIZION/UBA/TBV/VEGA/PC4 Kit (JAC Part No: 701-000212R) or
  - 1 - WBA Kit (Part No: 701-000213R) or
  - 1 - PUB Kit (JAC Part No: 701-000214R) or
  - 1 - EBA-3X Kit (JAC Part No: 701-000215R) or
  - 1 - DBV-30X Kit (JAC Part No: 701-000216R)
  - 1 - BlueWave 2.0™ Download Tool Operator's Guide (JAC Part No: 960-000924R).

NOTE: Connector Harnesses are also available as separate individual items (See Table 7 on Page 15).

BLUEWAVE 2.0 TOOL COMPONENTS

Figure 1 illustrates the primary component parts of a JCM BlueWave 2.0™ Tool.

Figure 1 Typical BlueWave 2.0 Kit Component Parts

SPECIFICATIONS

The DT-200 BlueWave 2.0™ Tool Specifications are as follows:

Table 1 DT-200 Specifications

Compatibility	USB Interface: iVIZION, UBA, TBV, VEGA & PayCheck 4 Printer. RJ45 Interface: DBV-30x (with Standard patch Cable), WBA (with WBA BlueWave Harness), Pub-7/11 or EBA-3x (with PUB/EBA Adaptor Assembly).
Download Time	USB Interface: 35 – 200 seconds (beginning to end) depending on Validator memory size. Serial Interface: Approximately 3 to 5 minutes @ a 38.4K Baud Rate.
Switches	Power, Load & Function (presently unused).
Interfaces	USB 1.1 or 2.0 Full Speed; Serial (opto-isolated)
LED Indicators	Three LEDS displaying **RED**, **GREEN** or **YELLOW**. Top (LED 1): Device Status Middle (LED 2): File and SD Memory Card Status Bottom (LED 3): Battery Life Indication
Voltage	2 AA Alkaline Batteries (3.0 Volts DC total) Operating levels: 1.5 VDC to 3.0 VDC
Memory	SD Card, 128 Megabytes or larger

BLUEWAVE 2.0 AND ACCESSORIES PARTS LIST

The following Tables list the various DT-200 BlueWave 2.0™ Kits and Optional Harness Cables available.

Table 6 BlueWave 2.0 Kits

JAC No.	Description*
701-000212R	Kit, BLUEWAVE 2.0, iVIZION/UBA/TBV/VEGA/PC4
701-000213R	Kit, BLUEWAVE 2.0, WBA
701-000214R	Kit, BLUEWAVE 2.0, PUB
701-000215R	Kit, BLUEWAVE 2.0, EBA-3X
701-000216R	Kit, BLUEWAVE 2.0, DBV-30X

* All Kits include the appropriate Harness Cable.

Table 7 Optional BlueWave 2.0 Harness Cables

JAC No.	Description
400-000086R	Harness, BLUEWAVE WBA
400-000087R	Harness, BLUEWAVE PUB
400-000088R	Harness, BLUEWAVE EBA
302-100012R	Cable, CAT5e, Patch, 3 Foot, Blue
302-100010R	Cable, USB A/M to B/M, 3 Foot, Black
302-100011R	Cable, USB A/M to Mini B/M, 3 Foot, Black

Table 8 BlueWave 2.0 Download Tool

JAC No.	Description
550-100720R	BlueWave 2.0 Download Tool

Table 9 Optional BlueWave 2.0 Adapter Assembly

JAC No.	Description
550-100724R	PUB/EBA Adapter Assembly

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IF the PayCheck 4 Printer Software is corrupted, the following Core Download Process must be used to restore the Printer to an Operational Mode.

Core Download

1. Do not apply power to the Paycheck 4 Printer.
2. Ensure that the BlueWave Device has successfully read the File (e.g.,the bottom and Middle LEDs should both be lit GREEN).
3. Remove the Paper Holder from the Paycheck 4 Printer to gain access to its internal DIP Switches. Turn these Switches ON.

   NOTE: Refer to the Nanoptix Documentation for setting the two (2) Core Download DIP Switch positions if necessary.

4. Connect the BlueWave Device to the rear USB Port (e.g., this will ensure that the PayCheck Circuit Board does not receive any power from the BlueWave Device).
5. Then apply power to the Paycheck 4 Printer, then turn the 2 Core Mode DIP Switches to OFF.
   a). The Loader file will automatically begin downloading after enumerating with the Printer.
   b). LED #1 will flash between RED/GREEN.
   c). The Loader is re-flashed and the Unit will reboot similar to the preceding download process as described on page 13 of this Guide.
   d). LED #1 will light a steady YELLOW Color.
   e). When the Firmware is transferred and flashed; LED #1 will flash GREEN. Wait for the Paycheck 4 Printer to finish its final programming, Both LED #1 and LED #2 will then both light GREEN, when the Download is complete.

   NOTE: Ensure that the DIP Switches are all OFF, or the Paycheck 4 Printer will reboot into its Core Mode again.

   NOTE: The Core Mode download is time sensitive. The download MUST BE completed within 30 seconds. If it is not complete by then, the Watchdog timer will reset the Machine and the download will not work.

If there is an issue with timing, the Watchdog Jumper may be removed to disable the Watchdog Timer Circuitry and allow more time for downloading.

The Software Download Operation is now complete and power can be removed from the Printer.

BLUEWAVE COMPONENTS

Figure 2 illustrates the DT-200 BlueWave 2.0™ Primary Component Features.

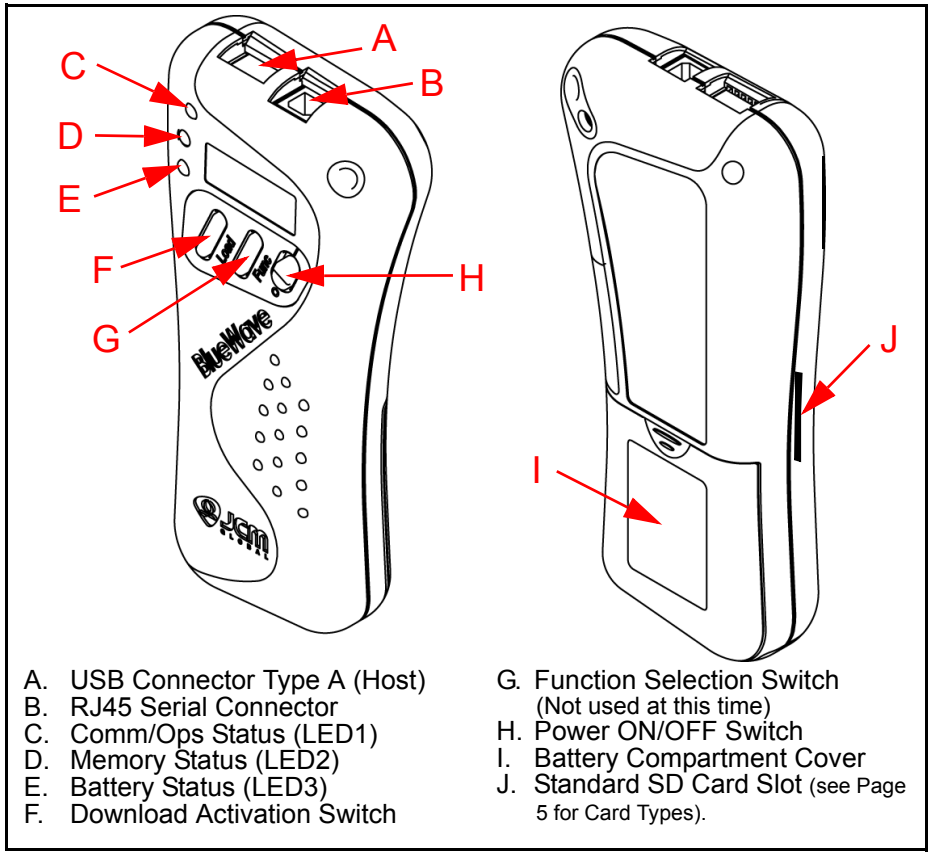

Figure 2 DT-200 BlueWave Primary Components

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DT-200 BLUEWAVE CONNECTIONS

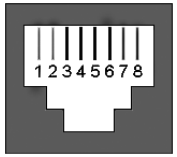
The following Cables are required to properly connect a BlueWave Device to your Validator:

1. For USB Connections:
   - USB Type-A Connector (Host) to a USB Type-B Connector (Function) (302-100010R for use with UBA Unit and a PayCheck 4 Printer)
   - USB Type-A Connector (Host) to a USB Mini-Type B Connector (Function) (302-100011R for use with iVIZION, VEGA, and a TBV Unit).
2. For Serial Connections (9600 Baud or 38.4K Baud):
   - Standard RJ-45 Male to an RJ-45 Male Patch Cable (302-100012R for use with DBV-30X Unit)
   - WBA Harness (400-000086R for use with a WBA Unit)
   - PUB/EBA Adapter Assembly (550-100724R) plus a Pub 7/11 Harness (400-000087R) for use with the Pub 7/11.
   - PUB/EBA Adapter Assembly (550-100724R) plus an EBA Harness (400-000088R) for use with an EBA-3X Unit.

Table 2 provides the Pin-out and wiring information for the required RJ-45 Serial Connections.

Table 2 RJ-45 Pin Connections

RJ 45 Pinout



RJ45 Pin No.	Signal
1	Serial Output to Validator, open collector, 24V DC tolerant
2	Ground
3	External power in, 6 volts to 24 volts, (12VDC nominal)
4	Serial In from Validator, 24 VDC tolerant
5	Serial Out to Validator, 3.3VDC CMOS level
6	Ground
7	Not Used
8	Not Used

NOTE: DBV-30X Units use a straight-through connected RJ-45 Cable.

3. Validators containing an Opto-isolated Interface (e.g., WBA) should be connected to pins 1 and 4.
4. Validators containing a low Voltage TTL Interface (e.g., Pub 7/11) should be connected to pins 5 and 4.

WARNING: The BlueWave Tool will be damaged if RJ-45 Pin #5 is connected to a higher Voltage Opto-isolated input!

UPDATING A PAYCHECK 4 SERIES PRINTER

Follow Steps 1 thru 4 of "DOWNLOADING SOFTWARE TO A VALIDATOR" on page 7. See the following notes regarding Steps 5 through 10 below:

NOTE: BlueWave 2 Devices manufactured after September 2011 have the capability of downloading Software to the PayCheck 4 Printer. The first 4 digits of the Serial Number is the Date Code. Example: 1110XXXXXX, indicates 2011 (11), October (10) as the manufactured date. Units manufactured prior to October 2011 can be returned to JCM for a Software upgrade. Complete the SRA request at: www.jcmglobal.com/en/support/repair/sra.aspx for return instructions.

NOTE: The BlueWave Software is in a different format than used on a PC. For the BlueWave, the PayCheck 4 Download File should end in .nff.

5. Apply Power to the PayCheck 4 Printer.

   NOTE: DO NOT connect the USB communications Cable to the Printer's side USB Port without power previously being applied to the Printer!

6. Connect a USB Male Type "A" to USB Male Type "B" Cable between the BlueWave 2 Device and the side USB Port of the PayCheck 4 Printer. The Top LED on the BlueWave Device will light GREEN when connected to the Printer.

Download will occur in the following three (3) steps:

Step 1 - Loader Download

1. Begin the "Loader" Download, by pressing the **"Load"** Button located on the BlueWave Device.
   a). LED #1 (Top) will flash RED/GREEN while the "Loader" is being downloaded.
   b). LED #1 will light YELLOW while the downloaded Loader File is being verified.

Step 2 - Firmware Download

2. Firmware Download starts automatically after the Loader has been downloaded.
   a). LED #1 (Top) will flash RED/GREEN while the Firmware is being downloaded.
   b). LED #1 will light YELLOW while the Firmware is being verified.

Step 3 - Final Programming

3. Final Programming will start automatically after the Firmware is verified.
   a). LED #1 will flash GREEN while the PayCheck 4 Software is being programmed.
   b). LED #1 and LED #2 will light GREEN when programming is complete, and the PayCheck 4 Printer will perform a Reset operation.

WARNING: DO NOT remove Power or disconnect the USB Communications Cable until the Download and Programming Operations are complete! Doing either will cause the Printer to become inoperable!

To verify the Download operation, press the Button next to the USB Port on the left side of the Printer for 5 seconds; the PayCheck 4 Printer will print a test Ticket if the Software Loading Operation was successful.

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UPDATING AN EBA-3X SERIES VALIDATOR

Follow Steps 1 thru 4 of "DOWNLOADING SOFTWARE TO A VALIDATOR" as found on page 7 of this Operators Guide. See the following notes regarding Steps 5, 6, and 7 below:

5. Set DIP Switches 1, 5, 6, 7, and 8 to ON.

   NOTE: For Step 6 the following conditions apply:
   - *If the EBA has been removed from its operating platform and needs to have power applied, a +12VDC Power Supply may be connected to the* **+12VDC** *Connector located on the PUB/EBA Adapter (See Figure 3A). The Voltage applied at this Connector will provide power for both the EBA as well as the BlueWave Device.*
   - *The PUB/EBA Adapter features a* **Host In** *Connector (See Figure 3B) which may be used to feed both power and communication signals to the Validator. As above, the Voltage applied at this Connector will provide power for both the EBA as-well-as the BlueWave Device.*

6. Apply Power to the **EBA-3X** Validator.

   NOTE: For Step 7, the following connection conditions apply:
   - *Connect the 16-pin Double Row Connector to the 16-pin Interface Connector on the EBA-3X Validator using the EBA Harness (P/N 400-000088R).*
   - *On the opposite end of the EBA Harness connect the 16-pin Dual Row Connector to the 16-pin* **BV OUT** *Connector of the PUB/EBA Adapter (See Figure 3D).*
   - *Connect one end of an RJ-45 Male to RJ-45 Male Patch Cable (302-100012R) into the RJ-45 Connector on the BlueWave Device.*
   - *Connect the opposite end of the RJ-45 Patch Cable to the* **RJ45 I/O** *Connector of the PUB/EBA Adapter (See Figure 3C).*

7. Once the BlueWave Device is connected to the EBA-3X, and the BlueWave File is detected as suitable for use, LED #1 will light GREEN and LED #2 will extinguish (go out). However, if the BlueWave File is found unsuitable, LED #1 will flash RED indication an error has occurred (see Table 4 "LED Error and Operational Indications on page 8 of this Guide).
8. When LED #1 lights GREEN, start downloading the BlueWave EBA-3X File by pressing the BlueWave Device's "LOAD" Button.
9. LED #1 will turn **YELLOW** during the EBA-3X Software erase period. LED #1 will then alternately flash between RED & GREEN during the new Software Download. LED #1 will then turn **YELLOW** again during the CRC Verification Process.
10. LED #1 and LED #2 will then BOTH light GREEN indicating a successful Software Download has occurred. If LED #1 flashes RED, an error has occurred (see Table 4 "LED Error and Operational Indications" on page 8 of this Guide for an explanation of this procedure).

STANDARD SD CARD SET-UP

To prepare an SD Memory Card for use, proceed as follows:

1. Insert a Standard, 128 Megabyte or larger SD Card into a Memory Card Adapter Slot connected to a PC.

   Caution: JCM recommends a Brand name SD Card be used (e.g., Sandisk®, Patriot®, Kingston®, etc.). It has been discovered that some "Generic" Brands do not conform to Standard Protocol formatting specifications.

   NOTE: The Standard SD Card being used will need to be pre-formatted for FAT16 or FAT32 operation.

2. Create a Sub-directory named "DOWNLOAD" in the root directory of the SD Card.

   NOTE: The directory name, DOWNLOAD, must be one word and in ALL Capital Letters.

3. Copy the Validator Software File required into the DOWNLOAD directory on the SD Card.

   For Example:

   For a UBA-10 ID003 (USA) Unit, the file name will be "u19220_id003.usa". This is the file to copy into the DOWNLOAD Folder on the SD Card for a UBA 10 Unit.

   NOTE: Only one Validator Software File should be loaded into the DOWNLOAD Directory at a time. If multiple files are placed in the DOWNLOAD Directory, the first file listed will be the one used as the Download File.

   Additional Validator Software Files can be stored on the Standard SD Card in a separate Directory named "FILES" placed in the SD Card's Root Directory. To use a stored Validator Software File, copy it into the DOWNLOAD directory using a PCs Copy and Paste functions, and then Delete the File it is replacing.

   NOTE: Only the top most File in the DOWNLOAD Folder will be used. Other Files present WILL BE ignored (e.g., NOT USED).

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CHECKING THE BATTERY LEVEL

Prior to downloading Software into a Validator, ensure the BlueWave's Battery life is acceptable as follows:

1. Turn on the BlueWave Tool.
2. Verify the Battery condition by observing the Color of the LED #3 and comparing it to the Colors listed in Table 3.

Table 3 Battery Life Indicator LED

LED #3 Color	Condition
Green	Batteries are good.
Yellow	Batteries are about half discharged.
Red	Batteries are Low and need to be replaced.
OFF	Replace Batteries.

UPDATING A PUB 7/11 VALIDATOR

Follow Steps 1 thru 4 of "DOWNLOADING SOFTWARE TO A VALIDATOR" as found on page 7 of this Operators Guide. See the following notes regarding Steps 5 through 10 below:

5. Set DIP Switches 1, 7, and 8 to ON.

NOTE: For Step 6 the following conditions apply:

- *If the PUB 7/11 has been removed from its operating platform and needs to have power applied, a +12VDC Power Supply may be connected to the* **+12VDC** *Connector located on the PUB/EBA Adapter (See Figure 3A). The Voltage applied at this Connector will provide power for both the PUB 7/11 as well as the BlueWave Device.*
- *The PUB/EBA Adapter features a* **Host In** *Connector (See Figure 3B) which may be used to feed both power and communication signals to the Validator. As above, the Voltage applied at this Connector will provide power for both the PUB 7/11 as-well-as the BlueWave Device*

6. Apply Power to the **PUB 7/11** Validator.

NOTE: For Step 7, the following connection conditions apply:

- *Connect the 4-pin Single Row Connector to the 4-pin Maintenance Connector on the PUB 7/11 Validator using the PUB Harness (P/N 400-000087R).*
- *On the opposite end of the PUB Harness connect the 16-pin Dual Row Connector to the 16-pin* **BV OUT** *Connector of the PUB/EBA Adapter (See Figure 3D).*
- *Connect one end of an RJ-45 Male to RJ-45 Male Patch Cable (302-100012R) into the RJ-45 Connector on the BlueWave Device.*
- *Connect the opposite end of the RJ-45 Patch Cable to the* **RJ45 I/O** *Connector of the PUB/EBA Adapter (See Figure 3C).*

7. Once the BlueWave Device is connected to the PUB 7/11, and the BlueWave File is detected as suitable for use, LED #1 will light GREEN and LED #2 will extinguish (go out). However, if the BlueWave File is found unsuitable, LED #1 will flash RED indication an error has occurred (see Table 4 "LED Error and Operational Indications on page 8 of this Guide).
8. When LED #1 lights GREEN, start downloading the BlueWave PUB 7/11 File by pressing the BlueWave Device's "LOAD" Button.
9. LED #1 will turn YELLOW during the PUB 7/11 Software erase period. LED #1 will then alternately flash between RED & GREEN during the new Software Download. LED #1 will then turn YELLOW again during the CRC Verification Process.
10. LED #1 and LED #2 will then BOTH light GREEN indicating a successful Software Download has occurred. If LED #1 flashes RED, an error has occurred (see Table 4 "LED Error and Operational Indications" on page 8 of this Guide for an explanation of this procedure).

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PUB/EBA ADAPTOR USAGE

When using a BlueWave device to update Firmware on a PUB 7/11 or EBA-3X Series Validator, the PUB/EBA Adapter Assembly shown in Figure 3 is also required.

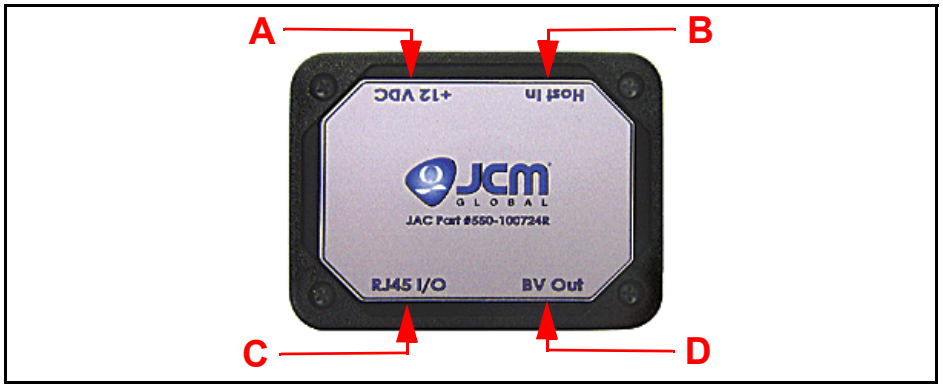

Figure 3 PUB/EBA Adapter Assembly

The Adapter contains an internal Jumper Plug (JP1) which requires setting for either "**PUB**" or "**EBA**" depending on the type of Validator being updated. To change the Jumper's position proceed as follows:

1. Use a Phillips Head Screwdriver to remove the four Phillips Head Screws holding the Adapter's top Cover Plate in position, and then lift the Cover Plate up and off the lower portion of the Box.
2. The Figure 4 photo indicates the location of internal Jumper JP1. If working with an EBA-3X Series Validator, position the Jumper Plug onto the two left-side Pins where the Circuit Board Silk-screen Text indicates "**EBA**".
   If working with a PUB 7/11 Validator, then position the Jumper Plug onto the two right-side Pins where the Circuit Board Silk-screen Text indicates "**PUB**".

   NOTE: The Figure 4 Photo shows the Jumper Plug set for use with a PUB 7/11 Validator

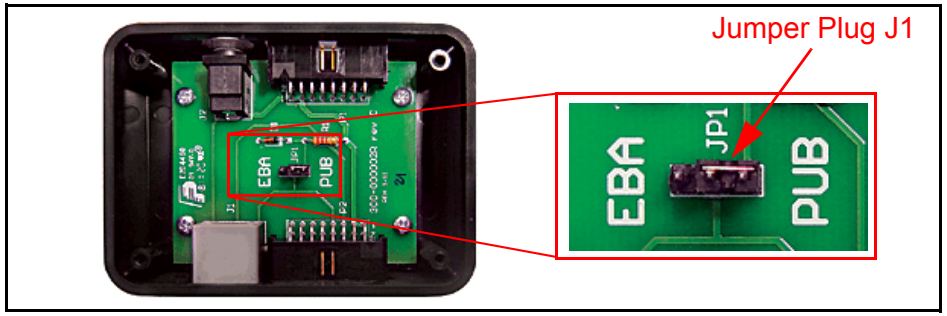

Figure 4 PUB/EBA Adapter Internal Jumper JP1 Location

3. Once the Jumper has been correctly positioned, replace the top Cover Plate and secure it to the Adapter Assembly Box with the 4 Phillips Head Screws that were previously removed.

DOWNLOADING SOFTWARE TO A VALIDATOR

To Download Software into a Validator, proceed as follows:

1. Insert the pre-programmed Standard SD Card into the Memory Slot on the BlueWave Tool (Review Figure 2, Item J on page 3 of this Guide).
2. Turn ON the DT-200 BlueWave Handheld Device. The BlueWave 2.0™ Tool will calculate the CRC and check the File within the DOWNLOAD Folder to ensure its integrity and verify that it is a valid file type for JCM products. This process will take 20-30 seconds. If a file has not changed from its last usage, the integrity will not be checked again.
3. LED #2 will light **YELLOW** during the integrity check.
4. LED #2 will light **GREEN** when the file check is complete, and the BlueWave 2.0™ Tool is ready for use.
5. Ensure that the proper Download Mode is set on the Validator (See Table 5, "Setup and Cable Requirements" on page 9 of this Guide).
6. Apply power to the Validator being updated. If the Validator already had power applied when the DIP Switches were set in Step 5, then power will need to be recycled on the Validator in order for it to re-initialize properly in DOWNLOAD Mode.
7. Connect the Validator to the BlueWave with the appropriate Cable for the Unit type (See Table 5," Setup and Cable Requirements" on page 9 of this Guide). The BlueWave will determine if the file in the DOWNLOAD directory is suitable for use. If the file is suitable, LED #1 will light **GREEN** and LED #2 will turn **OFF**. If there is an error, (e.g., the file is not suitable), LED #1 will flash RED (See Table 4, "LED Error and Operational Indications" on page 8 of this Guide).

   NOTE: When connecting the BlueWave device to a Validator that already has power applied, the BlueWave device will automatically power-up, regardless of the On/Off Switch position setting on the BlueWave device itself.

8. When LED #1 lights **GREEN**, start downloading the Validator by pressing on the BlueWave's "**LOAD**" Button.
   LED #1 will turn **YELLOW** during the Validator Software erase period. LED #1 will alternately flash between **RED** and **GREEN** during the Software download to the Validator. LED #1 will turn **YELLOW** again during the final CRC verification process (e.g., acknowledge back from Validator).
9. LED #1 and LED #2 will both light **GREEN** to indicate a successful download, or LED #1 will light **RED** or flash **RED** indicating an Error occurred during the download cycle (See Table 4, "LED Error and Operational Indications" on page 8 of this Guide for an explanation of the indicated error.

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LED INDICATORS

Table 4 lists the various LED Error and Operational Indications that LED #1 and LED #2 can report.

Table 4 LED Error and Operational Indications

LED #1*	LED #2†	Condition
OFF	OFF	IDLE
OFF	RED Flashing	SD Card not found
OFF	YELLOW Flashing	Verifying file on SD Card
OFF	1 RED Flash	Unable to open SD Card
OFF	2 RED Flashes	Unable to open File
OFF	3 RED Flashes	File Error – wrong type or corrupted File
OFF	Lit GREEN	CRC File check complete, ready to start
YELLOW Flashing	OFF	USB Connecting
RED Flashing	OFF	Validator Connection Issue (No response)
Lit GREEN	OFF	Connected, ready to start
1 RED Flash	OFF	Error connecting to Validator (incorrect response)
Lit YELLOW	OFF	Waiting for Validator to report
RED/GREEN alternating Flashes	OFF	Busy Programming
Lit GREEN	Lit GREEN	Program finished, CRC verification complete, Successful Download occurred
3 RED Flashes	Lit GREEN	Program failed, CRC error

* LED #1 indicates a BlueWave Operational Status or Communications occurrence.

† LED #2 indicates a File or Memory Card Status occurrence.

VALIDATOR CABLE AND SET-UP REQUIREMENTS

NOTE: New CPU Circuit Boards without Software pre-loaded in them, or Validators Units with corrupt Memory may require the use of Forced Download Mode to initialize; other Boards can be in a normal Operational Mode. To identify the proper settings type, check the specific Validator's Service and Operations Manual related to the Unit that will be receiving a BlueWave Software download.

Table 5 lists the various Setup and Cable Requirements for the JCM Validators accessible via BlueWave 2.0™ Tool.

Table 5 Setup and Cable Requirements

Validator/ Printer	Switch Setting	Cable Connection	Notes
iVIZION	None or DIP Switches 6,7 & 8 ON	USB Type-A to USB Mini-Type B	
UBA	None or DIP Switches 6,7 & 8 ON	USB Type-A to USB Type-B	
TBV	DIP Switches 1,6,7 & 8 ON	USB Type-A to USB Mini-Type B	
WBA	DIP Switches 1,6,7 & 8 ON (38.4K Baud) or DIP Switches 7 & 8 ON (9600 Baud)	RJ45 to WBA 12/14	WBA Harness required
DBV-30X	DIP Switches 1, 6, 7 & 8 ON	RJ45 to RJ45	A straight thru connection
VEGA	DIP Switches 1, 7 & 8 ON	USB Type-A to Mini-Type B	
PUB 7/11	DIP Switches 1,7 & 8 ON	RJ45 to PUB	PUB/EBA Adapter and PUB Harness required
EBA 3x	DIP Switches 1, 5, 6,7 & 8 ON	RJ 45 to EBA 3x	PUB/EBA Adapter and EBA Harness required
PayCheck 4	NONE	USB Type-A to USB Type-B	

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