# Pick-to-Light Solutions Kit Product Manual

Original Instructions
p/n: 214476 Rev. C
25-Sep-25
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# Chapter 1 Interface Information

The Pick-to-Light Solutions Kit for improved productivity in picking systems is an easy-to-use solution to reduce error during the assembly process. It comes with a pre-programmed DXM700 and HMI with touch screen for pick-to-light system setup and integration. The Pick-to-Light Solutions Kit harnesses the power of all models of PICK-IQ® devices, is simple to mount and install, and solves more applications with flexible pick functionality. Functionality is divided into the following categories:

**Device Identification**

View and update device IDs.

**Recipe Setup**

Create pick recipes by interactively touching the devices in their pick order. Recipes can also be entered using the touch screen. Relate recipes and pick sequences to barcodes.

**Recipe Execution**

Execute and change between recipes. Scan barcodes to execute recipes.

**Utilities**

Tools to check the status of devices and to add customized behaviors.

*Main Menu*




## Device Identification

Each PICK-IQ device on a network should be assigned a unique numeric identifier so that it can be controlled by the Pick-to-Light Solutions Kit. This is referred to as the *device ID* of a pick-to-light node and serves as the name for the device on the network. The identifiers can be assigned into the range between 2 and 99. The meaning of the number is not important to the solutions kit, and any numbering scheme that is meaningful to the user can be chosen. Numbering them in their physical order is a common choice. PICK-IQ devices have a factory default device ID of 1.

Pressing **Device Identification** brings the user to a submenu for viewing or modifying device ID assignments.


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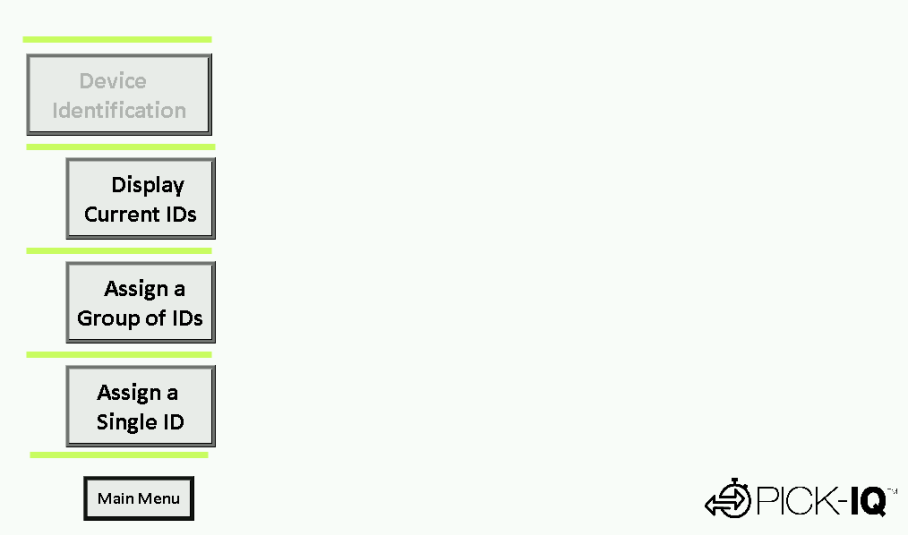
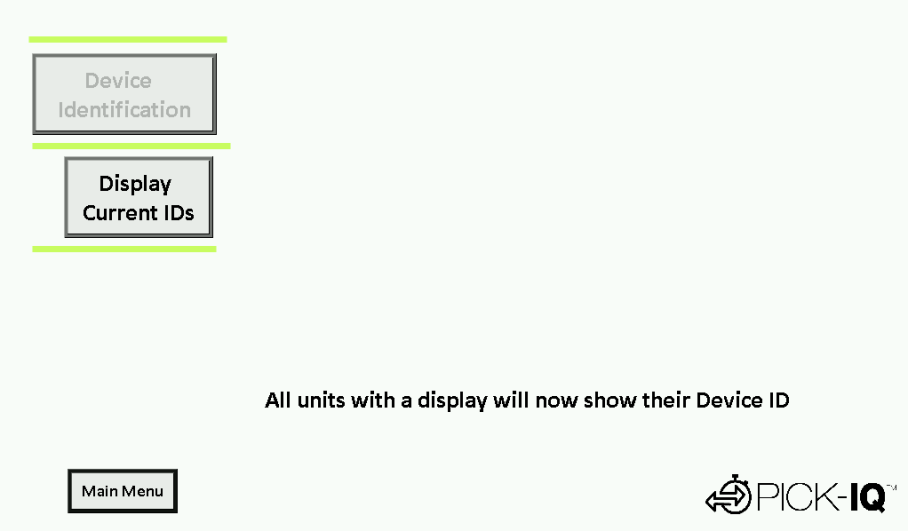
*Device Identification Submenu*




## Display Current IDs

From the Device Identification submenu, press **Display Current IDs** to bring up the Display Current IDs screen.

*Display Current IDs Screen*




1. Press **Display Current IDs** again to put the device indicators into a fast blue flash.
   This also disables the input actuators (optical or touch).
   The Device ID is shown if the device has a display.
2. Press **Display Current IDs** again to turn off this mode.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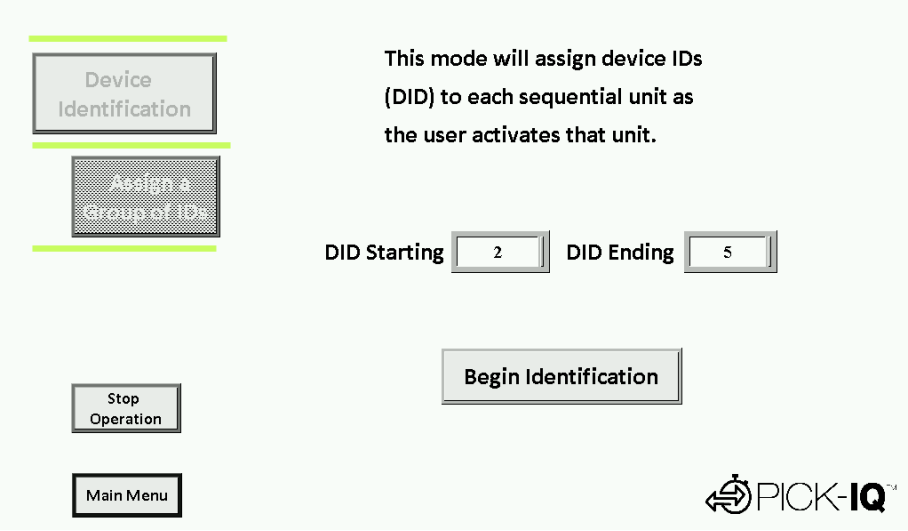
## Assign a Group of IDs

From the Device Identification menu, press **Assign a Group of IDs** to bring up the Assign a Group of IDs screen. This screen is used to interactively assign device IDs to PICK-IQ devices. This can only be used to give device IDs to PICK-IQ devices that contain an actuator (push button, touch button, or optical sensor). For indicator-only models, see Assign a Single Device ID.

*Assign a Group of IDs Screen*




This functionality is used to set IDs to all devices in the network.

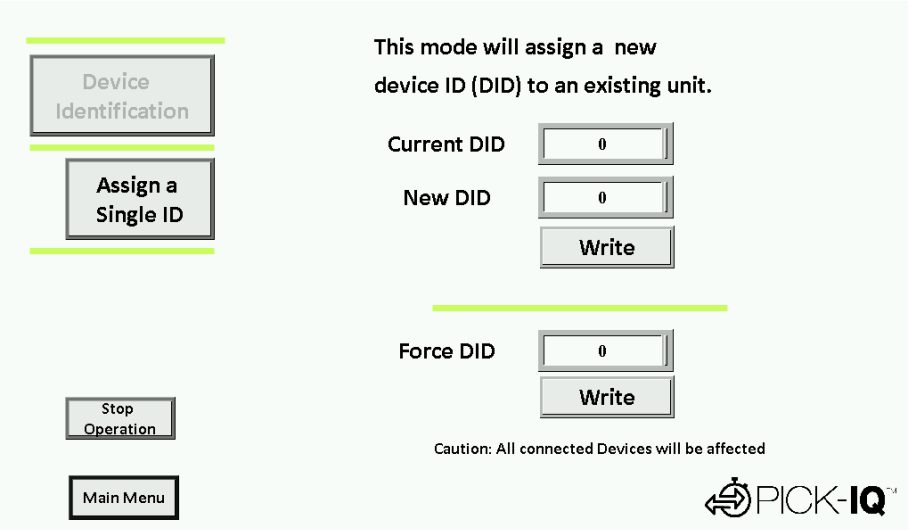
1. Enter the first device ID to be assigned in the `DID Starting` field.
2. Enter the final device ID to be assigned in the `DID Ending` field.
3. Press **Begin Identification** to start the process.
4. Actuate each unit in turn to give it the next device ID.

   The unit flashes blue and the ID is shown on the display (where present) when it is actuated and accepts its new ID. The assignment process automatically ends when `DID Ending` is assigned to a device. Press **Stop Operation** to end the process early.

## Assign a Single Device ID

From the Device Identification menu, press **Assign a Single ID** to bring up the Assign a Single ID screen. This screen can be used to directly assign device IDs over the network. It offers two methods of modifying IDs:

*Assign a Single ID Screen*





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1. To modify a device whose current ID is known:
    a. Enter the ID to be modified in the `Current DID` field.
    b. Enter the replacement ID in the `New DID` field.
    c. Press **Write** to complete the update.

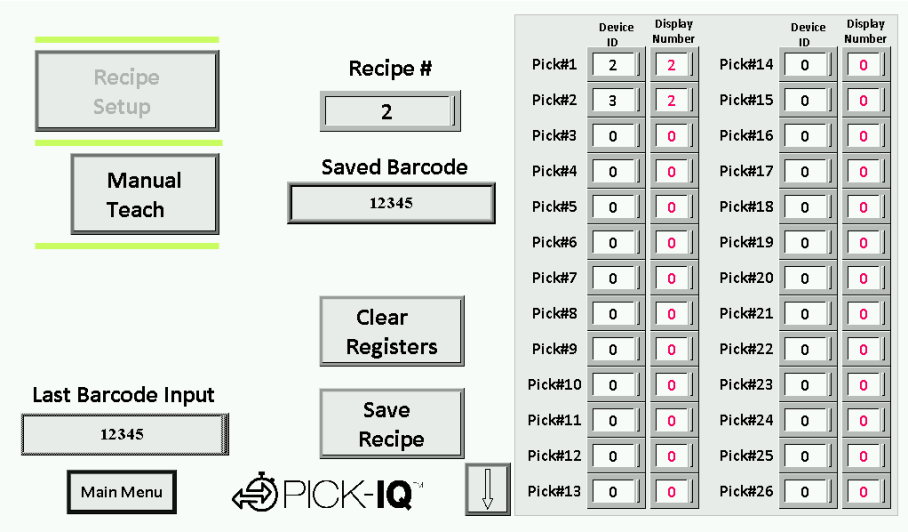
    One use case for this would be replacing a device on the network with a new device. New PICK-IQ devices have an ID of 1, and it can be changed to another ID by entering 1 into the `Current DID` field, the desired ID into the `New DID` field, and then pressing **Write** to complete the update.
2. To assign a device ID to an unknown device or to all currently connected devices:
    a. Enter the specified device ID in the `Force DID` field.
    b. Press **Write** to complete the process.

    One use case for this is to give an ID to a device whose current device ID is not known. Another common use for this is to assign IDs by plugging individual devices into the network one at a time, for instance when device IDs may not be in a single range.

# Recipe Setup

A recipe describes the pick events to be taken. A pick event is when the indicator of a PICK-IQ device turns on to notify the operator where attention is needed, and waits for the operator to acknowledge that the required action has been performed by actuating the device. Each state in this process has unique customizable indication to clearly show the status of the operation.

*Recipe Setup Screen (Page 1)*





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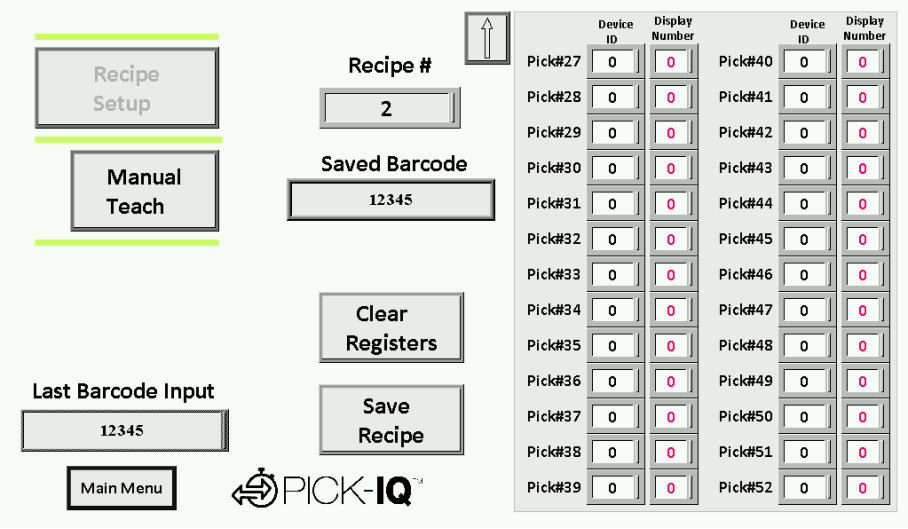
*Recipe Setup Screen (Page 2)*




A recipe can consist of up to 52 pick events. Each pick event is defined by the ID of the device to be activated, and optionally by a number that is shown on the device's display. A typical use for the display number is to indicate a quantity, but the number could mean anything specific to the application at hand. Any device ID can be assigned to any pick event, and the same device ID may be used multiple times.

To begin recipe creation:

1. Enter the numeric identifier of the recipe in the `Recipe#` field.
   This number is used to save and load the recipe for future use.
2. Define the pick events by entering each pick entry's `Device ID` and `Display Number` in their respective fields.
   The first pick entry with a device ID of 0 is used to indicate the end of the recipe.
3. After the recipe is defined, press **Save Recipe** to save the recipe to the solutions kit.

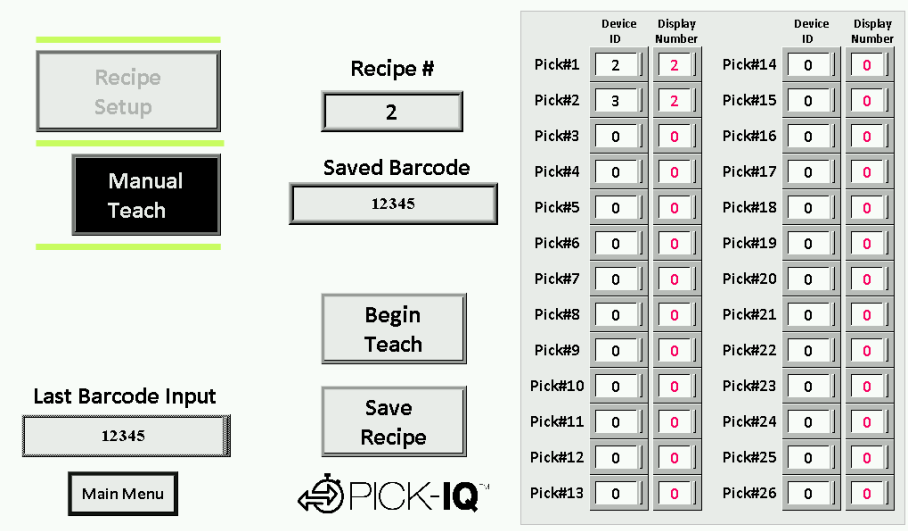
Alternatively, a recipe may be created interactively using a manual teach.

If desired, press **Clear Registers** to empty the recipe.

## Manual Teach

A manual teach is where the recipe is interactively defined by the user actuating the PICK-IQ devices involved in each pick event. From the Recipe Setup screen, press **Manual Teach** to enter the Manual Teach screen.

*Manual Teach Screen*




1. Press **Begin Teach**.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2. Actuate the device associated with the first pick event.

   The display number is initialized to 1. This can be increased by further actuating the device, or decreased by using the device's secondary actuation (for example, a PTL110 optical sensor).
3. Define the second pick event by actuating the next device.
4. Continue to define each subsequent pick event by actuating the devices.

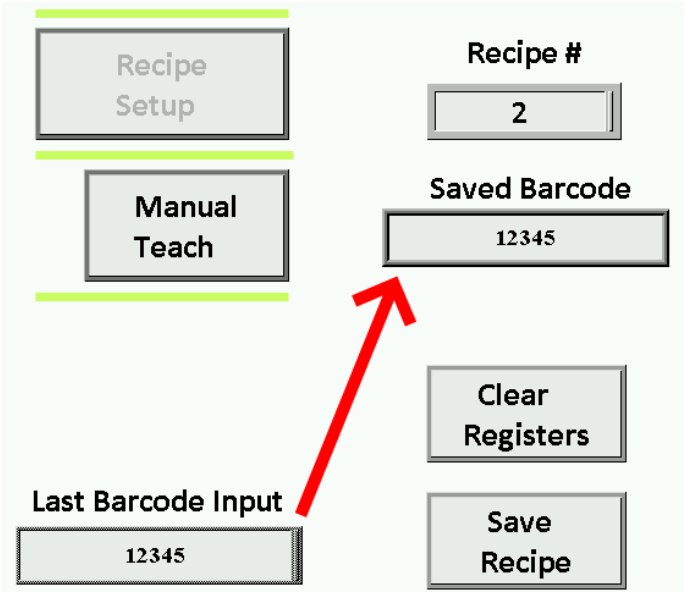
   The recipe table of the Manual Teach screen updates as the recipe is being built interactively.
5. Press **Save Recipe** once the required pick events for the recipe have been defined.

   The system is now ready to run the recipes.

## Barcode Control

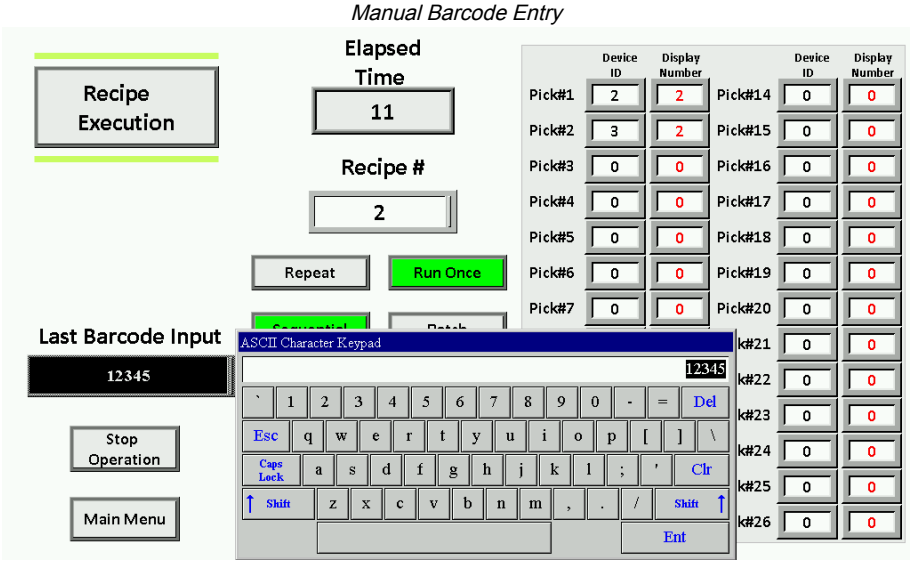
If a barcode reader is connected to the system, then any barcode that is read and sent to the system is displayed in the `Last Barcode Input` field. For more information about how to integrate an Ethernet Barcode reader, see ABR Barcode Reader.

*Recipe Setup - Barcode Detail*




The maximum length that can be received is 16 characters, and any further data is ignored. Data can also be manually entered into this same field using the touchscreen, and the system responds as if it was entered by a barcode reader.

*Manual Barcode Entry*




Whatever data is present in the `Last Barcode Input` field is saved into the current recipe when the **Save Recipe** button is pressed. This also means that if the field is empty, then the recipe's `Saved Barcode` field is cleared. Once a barcode is saved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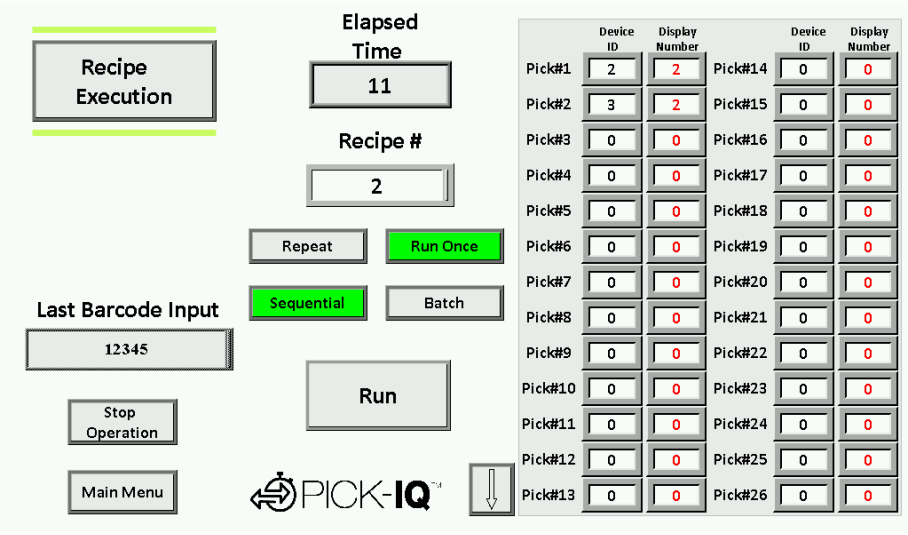
into a recipe's `Saved Barcode` field, then any time this string is entered again, the system automatically loads that recipe and runs it immediately.

> **NOTE:** A recipe initiated through a barcode string runs either a sequential or batch pick based on the recipe execution screen.

# Recipe Execution

Recipe Execution is the main operating screen of the system. From this screen, the user can choose which recipe to run and how to execute it. From the main screen, press **Recipe Execution** to enter the Recipe Execution screen.

*Recipe Execution Screen*




1. Press the `Recipe#` field to load a previously saved recipe.
   The recipe's pick entries can be reviewed in the table.
2. Select one of the following:
   - Select **Run Once** to run the recipe only one time and then stop
   - Select **Repeat** to immediately restart the recipe after it completes
3. Run the recipe by choosing either **Sequential** or **Batch**.
   - A **Sequential** run causes each pick entry to occur one at a time, sequentially in their pick entry order
   - A **Batch** run causes all pick entries to be enabled at the same time

   > **NOTE:** A **Batch** run does not work for recipes with the same device ID used in multiple pick entries.

4. Press **Stop Operation** to end a recipe execution early.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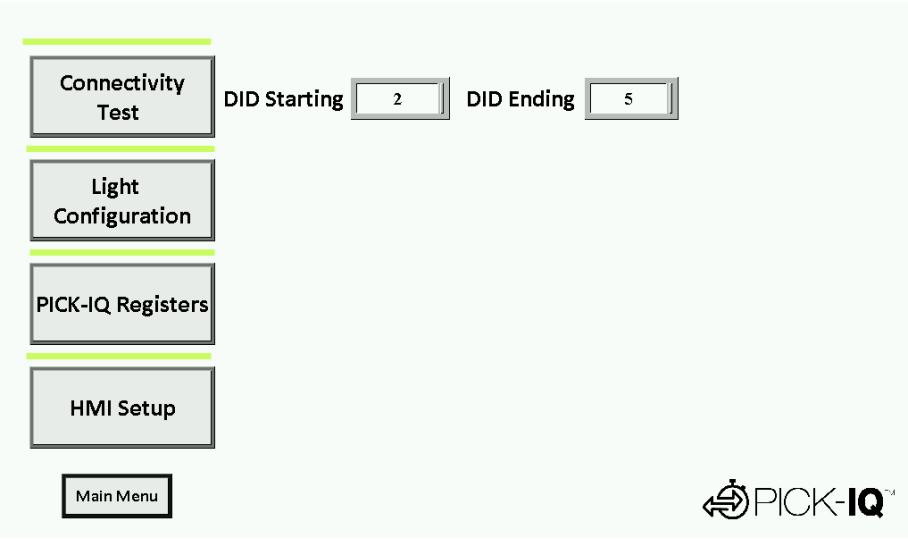
# Utilities

The Utilities menu contains additional diagnostic and configuration screens. From the main menu, press **Utilities** to enter the Utility submenu.

*Utilities Submenu*




## Connectivity Test

From the Utilities submenu, the **Connectivity Test** offers a way to verify that the PICK-IQ devices on your network are communicating and are using the expected device IDs.

*Connectivity Test Screen*




1. Enter the starting device ID in the `DID Starting` field.
2. Enter the last device ID in the `DID Ending` field.
3. Press **Connectivity Test**.

Each device in the device ID range flashes in sequence. Duplicate or missing device IDs cause a noticeable pause in the sequence of flashing devices due to a timeout.

Press **Connectivity Test** again to end the test.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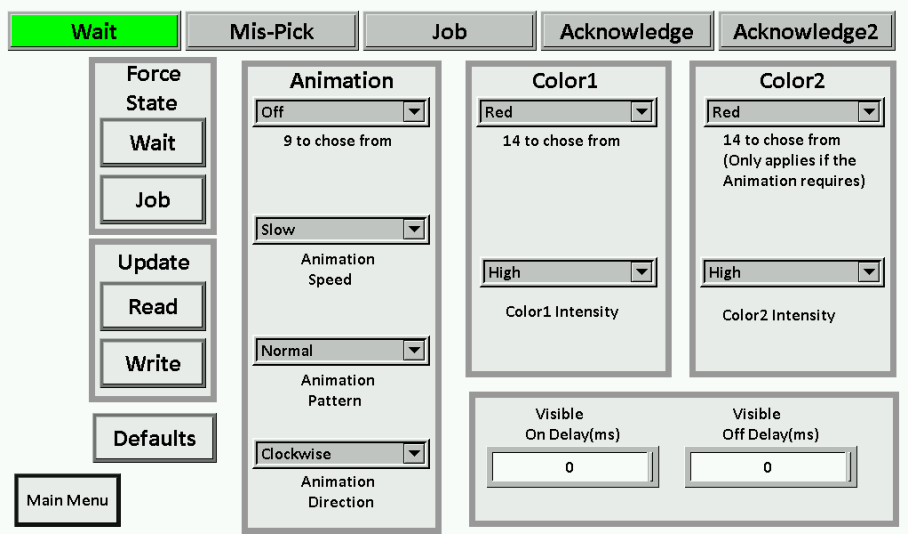
# Light Configuration

The Light Configuration screen allows indicator behavior customization for the devices on the PICK-IQ network. From the Utilities menu, press **Light Configuration** to go to the Light Configuration screen.

*Light Configuration Screen*




- The **Wait** state is used to define the behavior when a device is idle.
- The **Mis-Pick** state is used when a device has been actuated but it was not on an active pick event.
- The **Job** state defines how the lights look when they are associated with an active pick event, waiting for the user to process the event.
- The **Acknowledge** state is used when an active device is actuated by the user.
- **Acknowledge2** is an advanced configuration that can be used to differentiate the primary actuator from the secondary actuator.

See Understanding the Application Control for description of the states.

1. To define the animation of a state:
    a. Select the desired state by pressing the associated button.
    b. Press **Read** to see the current values for the state.
    c. Modify the behavior of the state as desired.
    d. When finished, press **Write** to send the current setting to all devices on the network.
2. To preview Wait or Job states on the network, press the associated **Force State** button to simulate a condition.
3. To start over, press the **Defaults** button to restore the default animation behaviors.

More information on how these settings affect the devices can be found in the PICK-IQ Instruction Manual (206185).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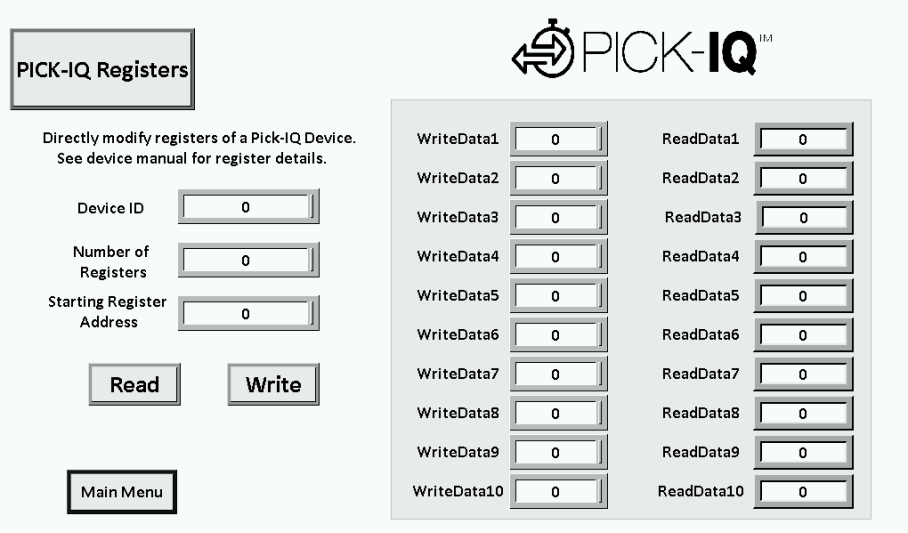
## PICK-IQ Registers

The PICK-IQ Registers is an advanced configuration screen that gives access to all functionality of the PICK-IQ protocol—for example, adjusting the sensitivity of the touch button to allow work with thick gloves. From the Utilities menu, press **PICK-IQ Registers** to go to the PICK-IQ Registers screen.

*PICK-IQ Registers*




Behind the scenes, many of the other screens are using the functionality of the PICK-IQ Registers. To send a message to a PICK-IQ device:

1. Enter its device ID in the `Device ID` field.
2. Enter the number of registers that you wish to communicate with in the `Number of Registers` field.
3. Enter the starting register address in the `Starting Register Address` field.
4. Press one of the following:
   - Press **Read** to load the current values from the device into the `ReadData` column
   - Press **Write** to send the values in the WriteData column to the device

   Using a Device ID of 4096 allows the Write to be broadcasted to all devices. Using a Device ID of 199 interacts with the local registers of the DXM700 controller.

   More information on the PICK-IQ protocol can be found in the PICK-IQ Instruction Manual (206185) and PICK-IQ Device Register Map (209995).

> **NOTE:** The register address expects an address with a 1 offset, as is common in PLCs.

## HMI Setup

The HMI Setup menu contains additional configuration screens. From the Utilities menu, press **HMI Setup** to enter the HMI Setup submenu.

Password Security may be **Enabled** or **Disabled** on this screen. If enabled, a password is required to enter any screen where changes can be made to the system. This includes Recipe Setup, Utilities, Assign a Group of IDs, and Assign a Single ID.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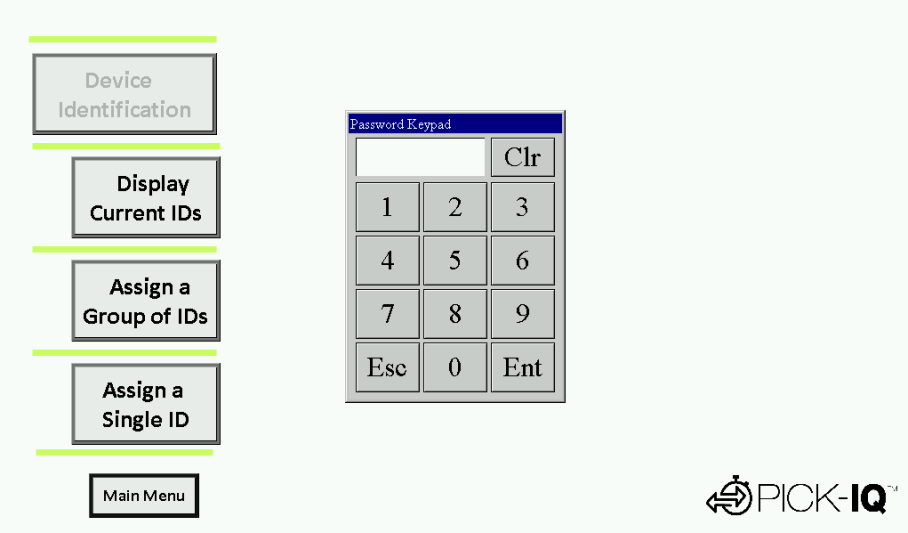
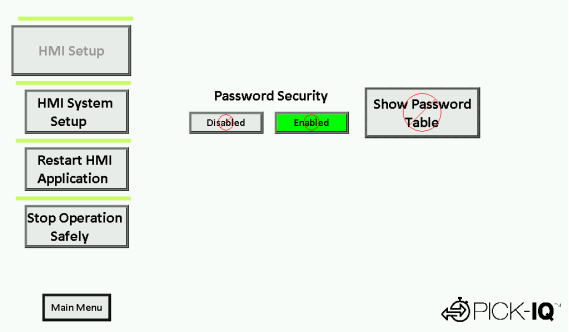
*Password Prompt*

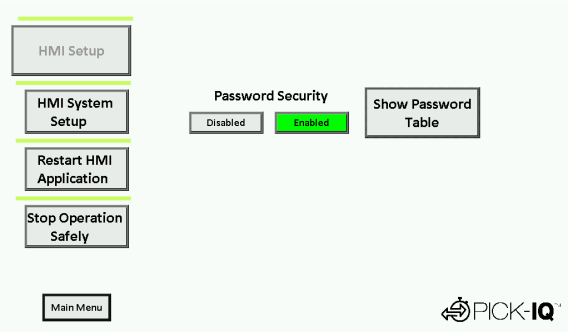



The default level 1 password is `1`. This or any other password grants access to all functionality except for the security settings.

*HMI Setup - Password Locked*

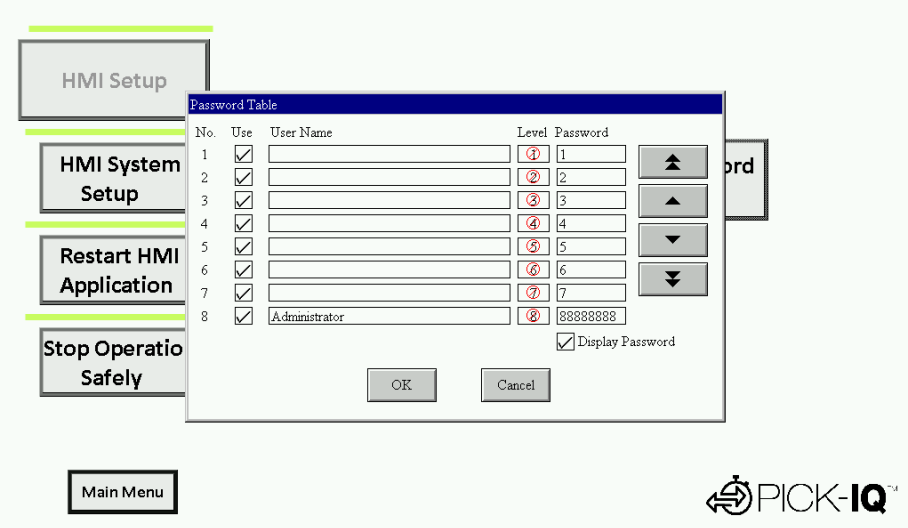



*HMI Setup - Password Unlocked*




Press **Show Password Table** to edit the passwords. The default administrator level 8 password is `88888888`. This password or any new user-added level 8 password is required to access the password table, or to enable/disable security. Up to 32 passwords can be stored, but the first 8 passwords are locked into levels 1-8 and their level cannot be changed.

*Password Table*





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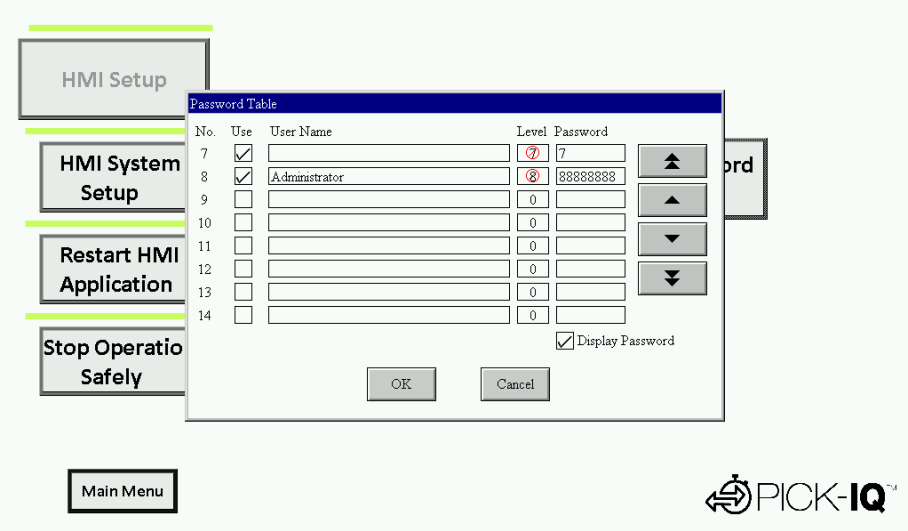
*Password Table (continued)*




**NOTE:** The other buttons on the HMI Setup screen are available for future upgrades. These should not be used without specific directions because it may limit the functionality of the system.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# Chapter 2 System Information

## Definition of PICK-IQ®

The Pick-to-Light Solutions Kit allows users to interface with PICK-IQ® products. PICK-IQ is a modified usage of the Modbus RTU protocol that allows for quick responses in large serial networks. Each Pick-to-Light device is assigned a common ID and a unique device ID. This allows a unique device to be written with specific information, but a controller to only monitor a single ID point for the speed of a two-node network.

## Understanding the Application Control

Pick-to-Light, also known as light-directed or light-guided picking, refers to the use of colored LED indicators to guide assemblers and operators to the correct part or product location. Pick-to-Light solutions can also be used to indicate the number of parts to pick and proper pick order.

These solutions make manual picking processes faster and more accurate in a wide variety of applications including assembly, kitting, and order fulfillment.

The four main states of a pick device are:

*PTL110 Pick-to-Light Sensor*



**Wait State**

The device is either inactive or the bin is not selected in the current pick group (default = color and animation off).

**Mispick State**

While in Wait State, when the primary or secondary sensor becomes active, the state changes to Mispick after the on-delay is met, and stays on for the duration of the sensor actuation. Mispick on-delay is used to filter unintended activations (default = red flash).

**Job State**

When the Job Status is not zero, the individual device goes into the Job State, indicating that it is in the current pick routine. Animation, color, intensity, speed, pattern, and direction are controlled for maximum efficiency (default = green steady).

**Acknowledge State**

The Acknowledge State is activated when either of the sensors are actuated in the Job State. A secondary Acknowledge State (2) is included to distinguish between touch and optical sensor interaction (default = yellow steady).

*Primary Output Logic Tables*

| Job Input Logic | Touch or Sensor Not Activated | Touch or Sensor Activated |
|---|---|---|
| Not Active | Wait State | Mispick State |
| Active | Job State | Acknowledge State |


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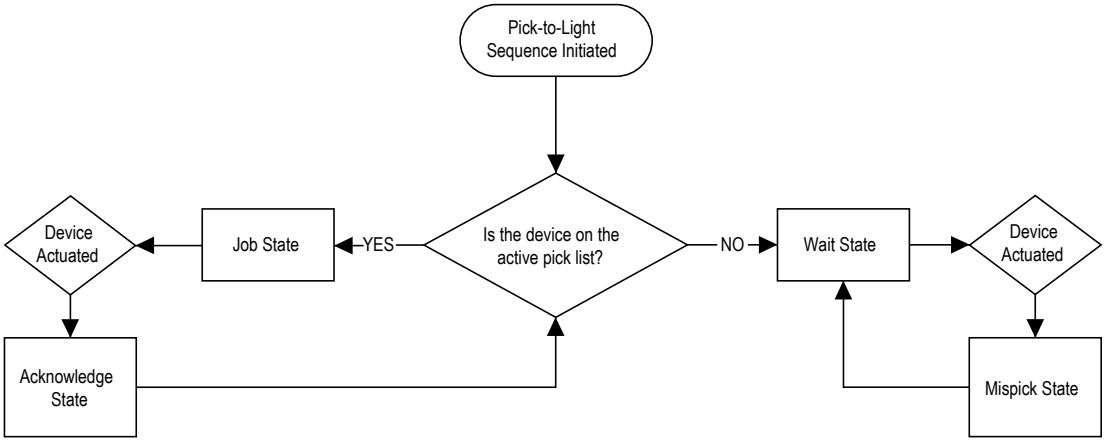
*Pick-to-Light Flowchart*




# Solution Components

## DXM700

*DXM700-B1-PTL*



The DXM700 Controller with the ScriptBasic Solution completes all of the low-level logic for a Pick-to-Light device and provides access to supervisory systems. The internal Modbus master controls the main Pick-to-Light network, while the interface to the control system is either through an ethernet port or a high-speed serial port.

| Model | Description |
|---|---|
| DXM700-B1-PTL | Pre-Programmed DXM700 for Pick-to-Light Integration |

DXM700- **B1** (Base) **R1** (Radio Configuration)

B1 = Modbus controller for data aggregation of sensors and wireless networks
Power: 12−30 V DC
Comms: RS-485, secondary RS-485
Outputs: Four PNP

B2 = Modbus controller for data aggregation of sensors and wireless networks
Power: 12−30 V DC
Comms: RS-485, secondary RS-485
Outputs: Four PNP
Connection: Barrel jack power connector

Blank = None
PTL = Pre-programmed DXM700 for Pick-to-Light integration (no radio)
R1 = 900 MHz PE5 Performance Radio (North America)
R2 = 900 MHz HE5 MultiHop Data Radio (North America)
R3 = 2.4 GHz PE5 Performance Radio (Worldwide)
R4 = 2.4 GHz HE5 MultiHop Data Radio (Worldwide)

Custom products are available and are designated with a 6-digit number following the standard model number, such as DXM700-B1R1-123456. Not all model configurations are available. For more information about ordering a product customized for your specific needs, contact Banner Engineering.

Reference the following documents for further information about the DXM700: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| | |
|---|---|
| DXM700-B1 Wireless Controller Datasheet | Original document PN 207893 |
| DXM700-Bx Wireless Controller Instruction Manual | Original document PN 207894 |


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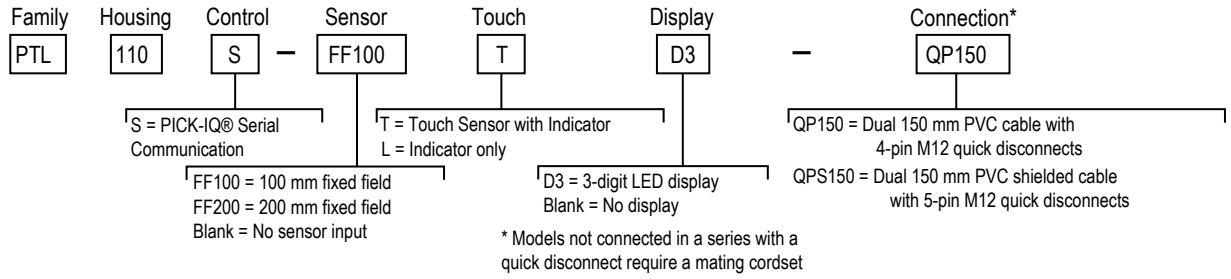
# Chapter 3 Compatible Hardware

## PTL110

The PTL110 with PICK-IQ® is an indicator with the ability to change colors and animation styles to bring active attention to a bin. The addition of the optional 3-digit LED display allows for quantities or scrolling messages. Optional inputs can be a touch sensor on the indicator and/or a fixed-field sensor in the base. Low power methods allow for 64 devices to be wired on one 24 V DC power source.




**NOTE:** Address initialization requires a touch sensor. Adding the display option allows you to view the device ID, which makes set-up and maintenance easy.

Reference the following documents for further information about the PTL110:

| | |
|---|---|
| PTL110S Pick-to-Light -- Datasheet | Original document PN 206183 |
| PTL110S Pick-to-Light -- Instruction Manual | Original document PN 206185 |
| PTL110S Pick-to-Light Device Registers | Original document PN 209995 |

## ABR Barcode Reader

The Banner ABR series Barcode Readers are an accessory to the PTL Solutions Kit system, and allow the automated launching of pick sequences by reading a pre-configured barcode. Any ABR model with Ethernet can connect to the DXM as a Modbus/TCP Client over an Ethernet connection.

To write barcode data into the DXM, the reader must write into Modbus/TCP registers 40240-40247. The DXM Modbus/TCP Server accepts connections on port 502, at IP address 192.168.10.11. There are no spare Ethernet ports available, so users must connect the HMI, DXM, and ABR to their own Ethernet switch.

### Configuring the ABR Communications Parameters

For more information on any of the following steps, refer to PN 207637 ABR 3000 Series Barcode Reader Instruction Manual, or PN 207635 Barcode Manager Software Instruction Manual.

1. Set the PC LAN adapter IP address to an unused IP address starting with 192.168.10, such as 192.168.10.1.
   Refer to the section **Ethernet Device Discovery** in the ABR 3000 Series Barcode Reader Instruction Manual for more information.
2. Use the Barcode Manager software from Banner to detect the ABR model over the Ethernet connection.
   a. Click the **device wrench** icon to open the **Device Environment Configuration** window.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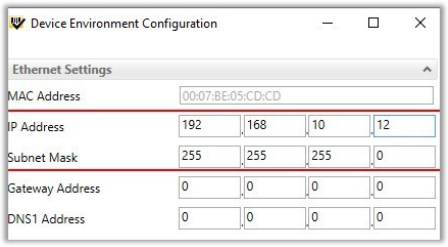
*Device Discovery in Barcode Manager*




b. Set the ABR's IP address to these values:
   - `IP Address:` 192.168.10.12
   - `Subnet Mask:` 255.255.255.0

*Ethernet Settings*




3. Double-click on the ABR to connect and configure the ABR to read the barcodes.
   If the barcodes will be hand-presented to the reader, the easiest way to start is to select **Presentation Mode** from the **Getting Started** page of Barcode Manager, and then use **Automatic Setup** to start reading the barcodes.
   Refer to the section **Automatic Setup** in the Barcode Manager Software Instruction Manual for more information.
4. In the **Options** drop-down menu, click **Change User › Installer-Expert**.
5. Click **Communications**.
6. Click **Add New Industrial Protocol** and select **Modbus/TCP Client**.
7. Click **Message1**.
8. Select the **Modbus/TCP Client** Output Channel and clear the `Header` and `Terminator` fields.

*Message 1 Communications Settings*




9. Click **Modbus/TCP Client** and configure the settings to these values:
   - `Start Register:` 239
   - `Number of Registers:` 8
   - `Remote Address:` 192.168.10.11
   - `Remote Port:` 502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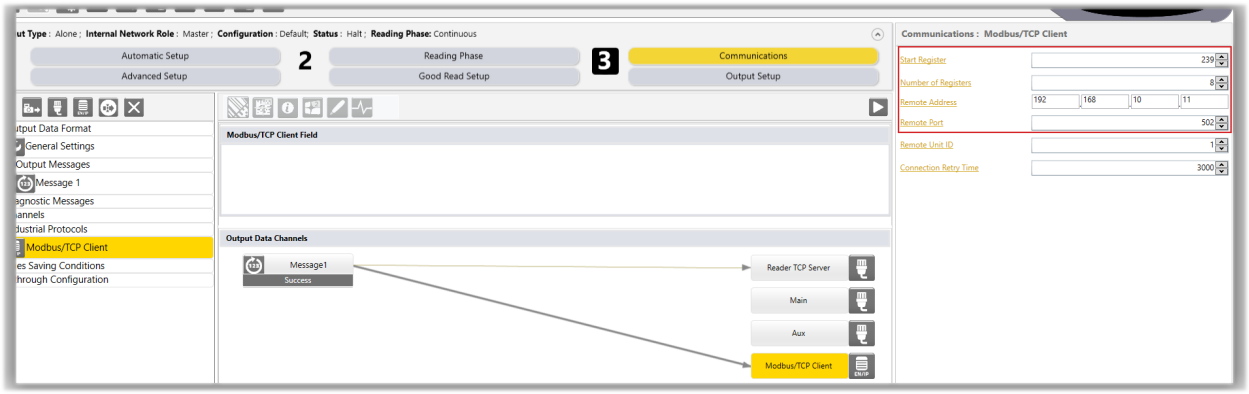
*Modbus/TCP Client Communications Settings*




10. Click **Save on Device** to save the configuration to the ABR and disconnect from Barcode Manager to test the system.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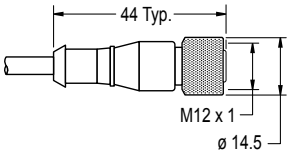
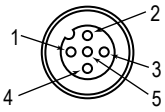
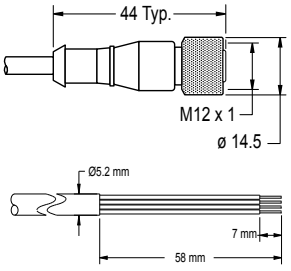
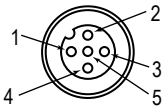
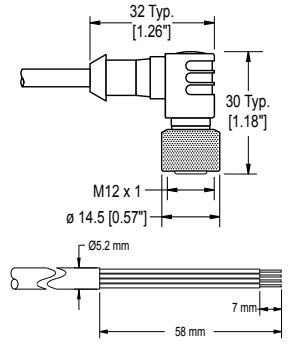
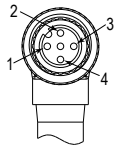
# Chapter 4 Accessories

## Cordsets

| 5-Pin Single-Ended M12 Female Shielded Twisted Pair Cordsets | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| **MQDC-STP-501** | 0.31 m (1 ft) | Straight |  |  1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Shield |
| **MQDC-STP-503** | 0.92 m (3 ft) | | | |
| **MQDC-STP-506** | 1.83 m (6 ft) | | | |
| **MQDC-STP-515** | 4.57 m (15 ft) | | | |
| **MQDC-STP-530** | 9.15 m (30 ft) | | | |

| 4-Pin Single-Ended M12 Female Cordsets | | | | | |
|---|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** | |
| **MQDC-406** | 2 m (6.56 ft) | Straight |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Not used |
| **MQDC-415** | 5 m (16.4 ft) | | | | |
| **MQDC-430** | 9 m (29.5 ft) | | | | |
| **MQDC-450** | 15 m (49.2 ft) | | | | |
| **MQDC-406RA** | 2 m (6.56 ft) | Right-Angle |  |  | |
| **MQDC-415RA** | 5 m (16.4 ft) | | | | |
| **MQDC-430RA** | 9 m (29.5 ft) | | | | |
| **MQDC-450RA** | 15 m (49.2 ft) | | | | |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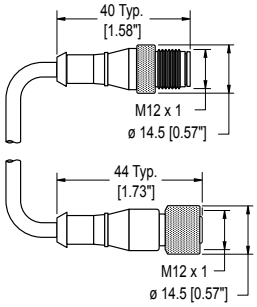
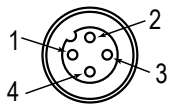
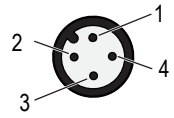
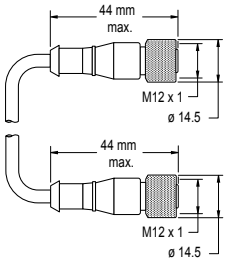
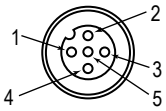
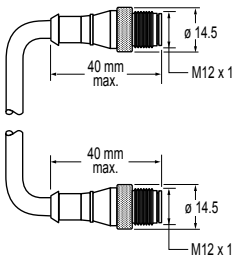
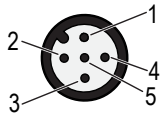
| 4-Pin Double-Ended M12 Female to M12 Male Cordsets | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout** |
| **MQDEC-401SS** | 0.31 m (1 ft) | Male Straight/Female Straight |  | Female<br><br>Male<br><br>1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |
| **MQDEC-403SS** | 0.91 m (2.99 ft) | | | |
| **MQDEC-406SS** | 1.83 m (6 ft) | | | |
| **MQDEC-412SS** | 3.66 m (12 ft) | | | |
| **MQDEC-415SS** | 4.58 m (15 ft) | | | |
| **MQDEC-420SS** | 6.10 m (20 ft) | | | |
| **MQDEC-430SS** | 9.14 m (30.2 ft) | | | |
| **MQDEC-450SS** | 15.2 m (49.9 ft) | | | |

| 4-Pin Double-Ended M12 Shielded Cordsets | | | | | |
|---|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout** | **Key** |
| **MQDEC-STP-501SS-FF** | 0.31 m (1 ft) | Female Straight/ Female Straight |  |  | 1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Shield |
| **MQDEC-STP-501SS-MM** | 0.31 m (1 ft) | Male Straight/Male Straight |  |  | |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Chapter Contents

# Chapter 5 Extending Functionality

The Pick-to-Light Solutions Kit offers a way for users to get a system up and running, with minimal need for programming knowledge. The solution kit offers some level of customization by way of the PICK-IQ registers. However, some pick-to-light solutions need more flexibility, such as multiuser picking, custom user interfaces, integration with ERP system or other networked equipment, etc. This Pick-to-Light Solutions Kit is built on top of the DXM700-B1-PTL controller that is preconfigured to solve pick-to-light problems using PICK-IQ devices. The solutions kit only uses a subset of the functionality offered in the DXM700-B1-PTL. For users who want to integrate a PICK-IQ system with their own infrastructure, the DXM700-B1-PTL offers a solution that handles some of the pick logic programming for the users. Banner provides a solution guide (214046) with instruction and best practices for using PICK-IQ with the DXM700-B1-PTL.

The PICK-IQ system is fully compatible with the industrial communication protocol Modbus RTU. It can fit into any supporting infrastructure for maximum control and customization. When needed, controllers such as the DXM can serve as a protocol converter between Modbus RTU and other wired or wireless communications technologies.


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# Chapter 6 Product Support and Maintenance

## Troubleshooting

| Issue | Method | Solution |
|---|---|---|
| Units are not responding as expected | **Verify Device IDs** | Make sure that each PICK-IQ device has the expected ID. This can be reviewed by **Device Identification › Display Current IDs**. |
| Device IDs on the network are unknown | **Reset Device IDs** | Use **Device Identification › Assign a Single ID › Force DID: 1 › Write** to reset all connected device IDs to their factory default of ID 1. |
| Network is not communicating as expected | **Verify Communications** | Use **Utilities › Connectivity Test** to spot any problem units. |
| Lights are not showing as expected | **Reset Indicator Settings** | Use **Utilities › Light Configuration › Defaults** to restore the lights to the standard indication values. |
| Want to reset to default settings | **Factory Reset** | Use PICK-IQ's Restore Factory Defaults feature to reset all settings of all devices to their default settings. Navigate to **Utilities › PICK-IQ Registers** and enter the following:<br>• Device ID: 4096<br>• Number of Registers: 3<br>• Starting Register Address: 6601<br>• WriteData1: 1<br>• WriteData2: 43690<br>• WriteData3: 21845<br>Press **Write** to complete the factory reset. |
| Want to put the system back into a known state | **Power Cycle** | Remove power from the entire system, wait a couple seconds, and then reapply power. |

## Clean with Mild Detergent and Warm Water

Wipe down the device with a soft cloth dampened with a mild detergent and warm water solution. Do not use any other chemicals for cleaning.

## Recommended Resources

| | |
|---|---|
| PTL110S Pick-to-Light Device Register Map | Original document PN 209995 |
| PTL110S Pick-to-Light Devices - Instruction Manual | Original document PN 206185 |
| DXM Configuration Software V4 - Instruction Manual | Original document PN 209933 |
| DXM700 Controller - Instruction Manual | Original document PN 207894 |
| ScriptBasic for DXM Controller | Original document PN 186221 |
| DXM Controller Protocol | Original document PN 186221 |


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For worldwide locations and local representatives, visit www.bannerengineering.com.

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# Chapter 7 Additional Information

## FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## Industry Canada ICES-003(B)

This device complies with CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(B). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.


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