



Qscan User's Guide V1.43



SYMBOLS USED IN THIS MANUAL

 Informational

 Warning

CLASS 2 LASER



LASER LIGHT
WARNING¹



QSCAN CONTAINS A CLASS 2 LASER.

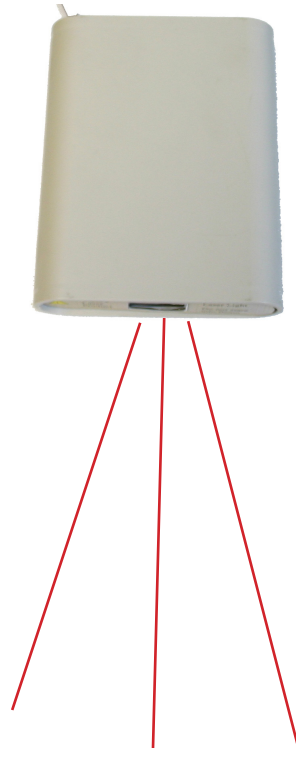
DO NOT STARE DIRECTLY INTO THE
LASER.

¹Laser aiming pattern can be turned off.

CLASS 2 LASER



LASER LIGHT
WARNING¹



QSCAN CONTAINS A CLASS 2 LASER.

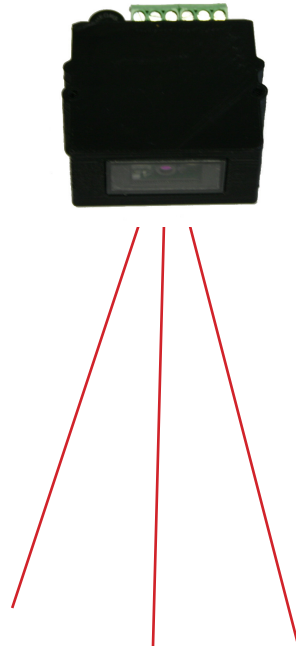
DO NOT STARE DIRECTLY INTO THE
LASER.

¹Laser aiming pattern can be turned off.

CLASS 2 LASER



LASER LIGHT
WARNING¹



QSCAN CONTAINS A CLASS 2 LASER.

DO NOT STARE DIRECTLY INTO THE
LASER.

¹Laser aiming pattern turned off by default in the Qscan Mini

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Qscan Features



Fast 2D scanner reads over 50 types of barcodes, including PDF and QR codes

Optional POE for easy powering over a network

Digital inputs for arming loop control

Reads barcodes from smartphone displays

User Defined Display Prompts based on digital inputs

Built-in proximity and/or iClass® reading

Wiegand, aba, 232, F2F, or tcp/udp interface

Fully weatherproofed for outdoor use

Mounting flanges on both sides

Optional 2x16 character display readable in direct sunlight

Extracts fields from Drivers Licenses

Optional Form C relay

Easily reads damaged and worn out barcodes

Reads barcodes as far away as 20 inches

Qscan Features



Built-in proximity and/or
iclass® standard, SR,
and SE reading

Wiegand, aba, 232, F2F, or
tcp/udp interface

Gang Box Mounting,
hidden screws

Extracts fields from Drivers
Licenses

Optional Form C relay

Easily reads damaged and
worn out barcodes

Reads barcodes as far away as
20 inches

Fast 2D scanner reads over 50
types of barcodes,
including PDF and QR codes

Optional POE for easy
powering over a network

Digital inputs for arming loop
control

Reads barcodes from
smartphone displays



Qscan Mini Features

Small form factor

Wiegand, and Aba interfaces

Extracts fields from Drivers Licenses

Easily reads damaged and worn out barcodes

Reads barcodes as far away as 20 inches

Fast 2D scanner reads over 50 types of barcodes, including PDF and QR codes

Digital inputs for arming loop control

Reads barcodes from smartphone displays

Mounting

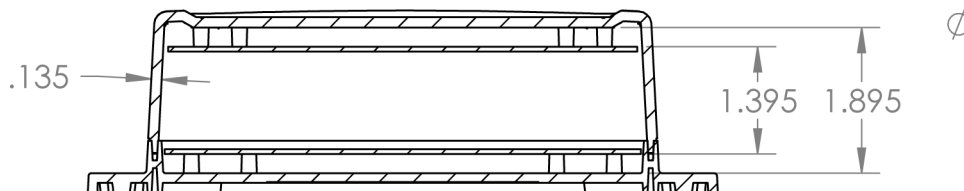
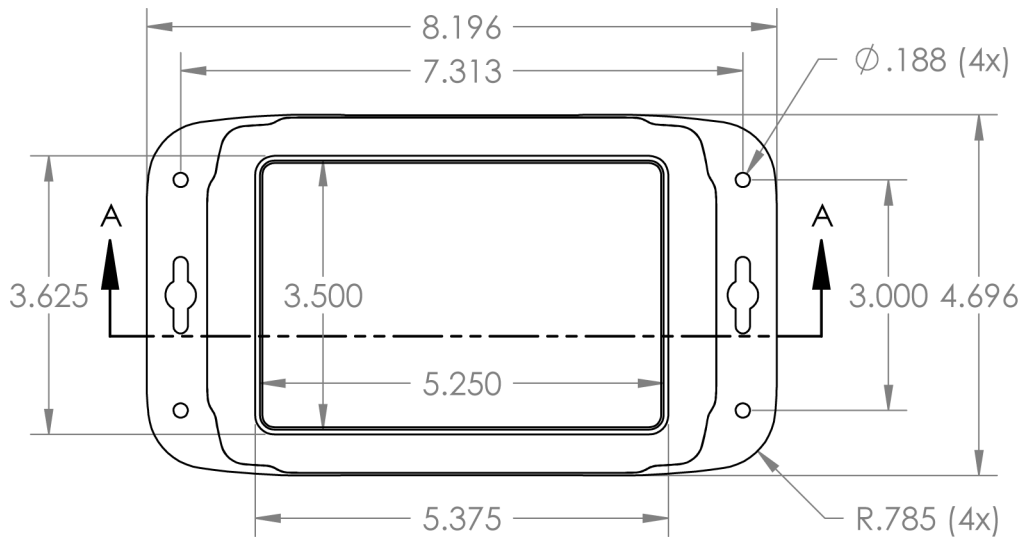


Qscan can be mounted using four screw holes located on the flanges.

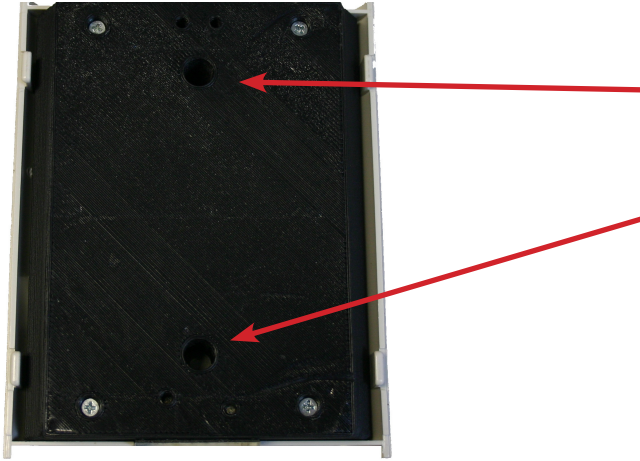
You can also mount using the keyholes on each flange.



Do not screw through the main body of the Qscan. Mount using the flanges only.



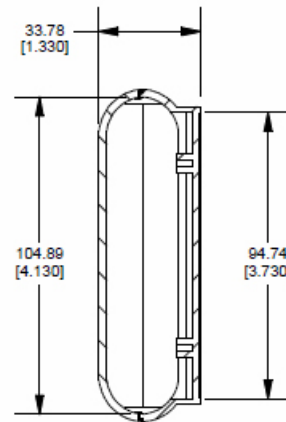
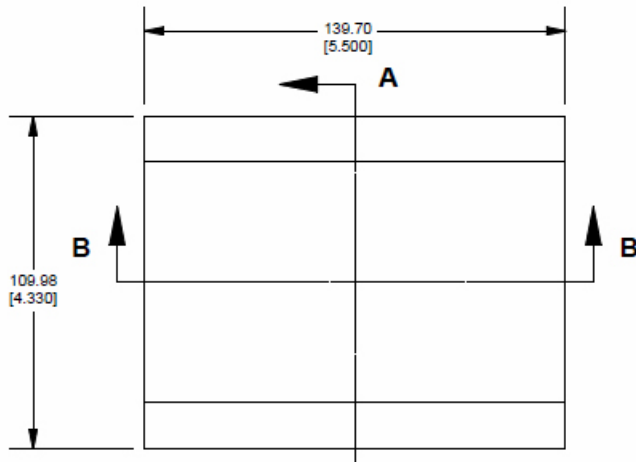
Mounting



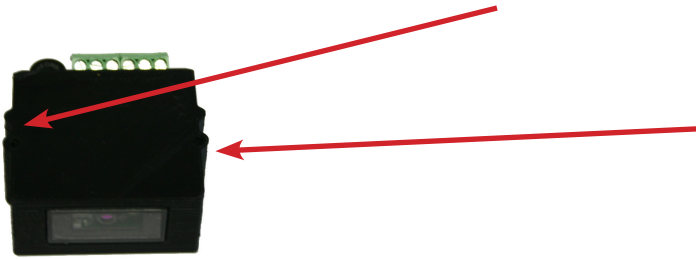
Qscan can be mounted to a gang box using two screws located under the cover.

Remove the cover to gain access to the mounting holes

MOUNTING

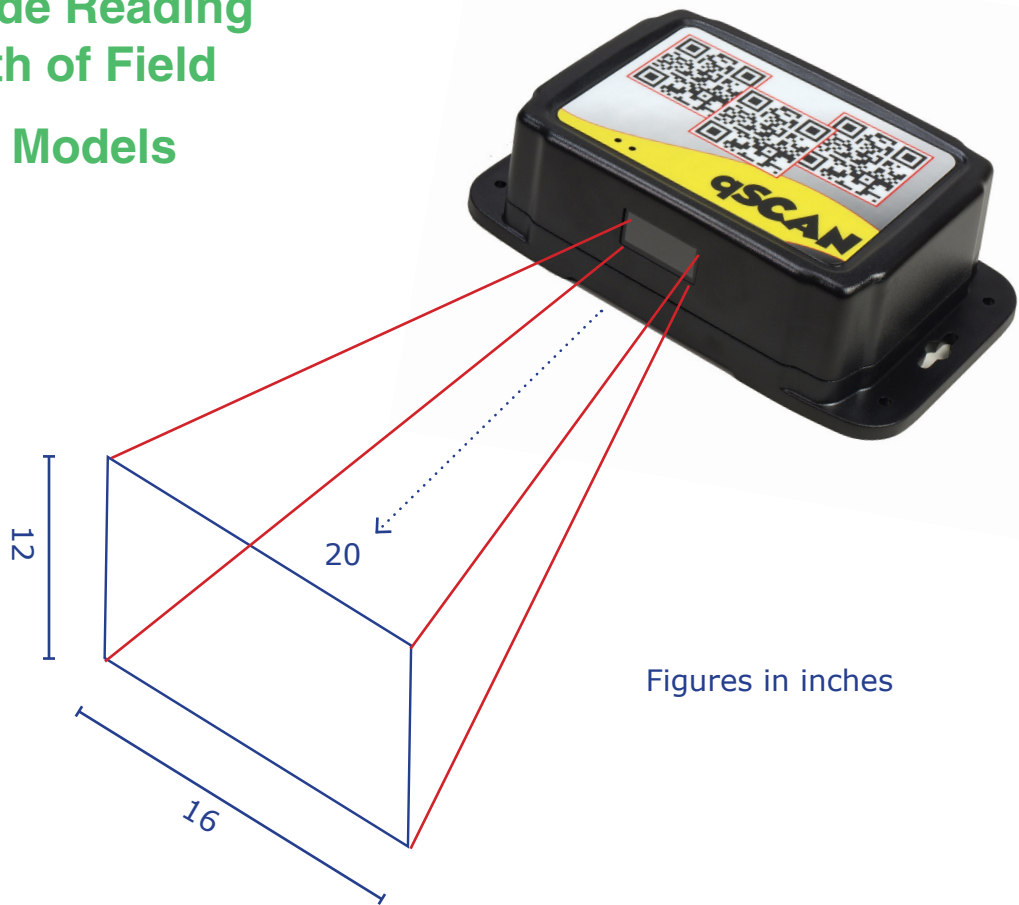


Mounting



Qscan Mini is mounted using 2 #4 screws at these locations.

**Barcode Reading
Depth of Field
All Models**



READING

Qscan can read barcodes up to 20" away depending on the type of barcode (sympology) and the density of the barcode.

Common reading distances:

PDF 417 driver's licenses	3.5" - 7.5"
Code39 7.5 mil	2" - 10"
UPC 13 mil	2" - 12"
Data Matrix 15 mil	2" - 12"
Code39 20 mil	1" - 20"

Barcodes do not have to be parallel to the reader. Qscan can read barcodes tilted as much as 60 ° both horizontally and vertically.

Qscan will also read barcodes as they are moving. You do not have to hold the barcode steady within the field of view.

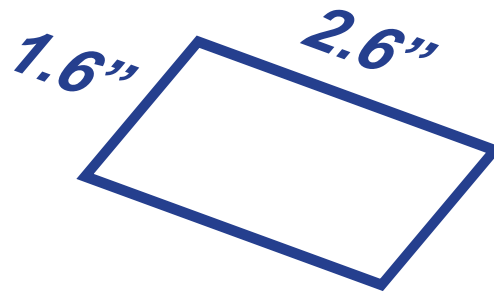
Qscan Barcode Read Area Size

READING

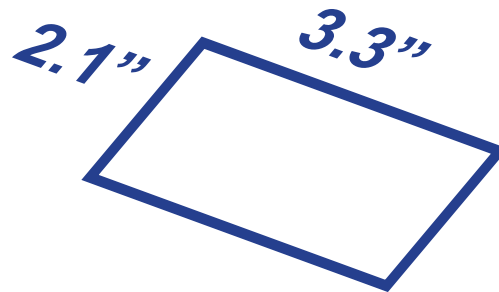
**Distance from front
face of Qscan**

Read Area

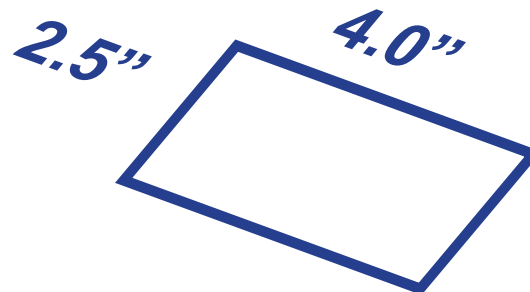
4"



5"



6"

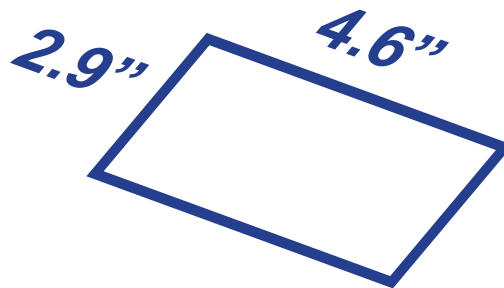


Qscan Barcode Read Area Size

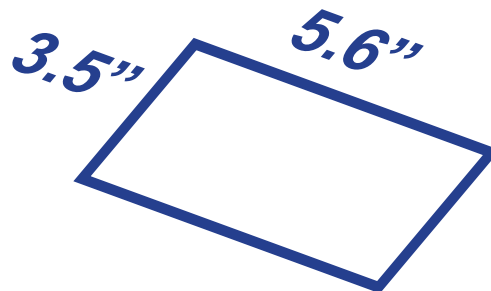
Distance from front face of Qscan

Read Area

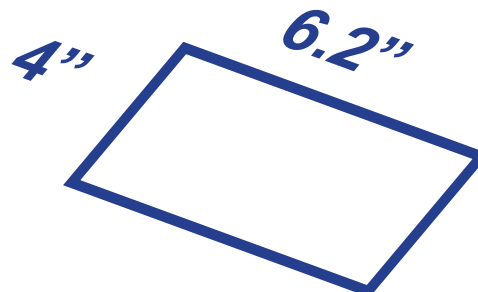
7"



8"



9"



Wiring - All Qscans except Qscan Mini

WIRING

RS232 with a DB9 connector

Green	->	Reader Transmit	->	DB9 Pin 2
Yellow	->	Reader Receive	->	DB9 Pin 3
Blue	->	Ground	->	DB9 Pin 5
				DB9 Pin 7
				DB9 Pin 8

A short wire (zip cord) extends from the DB9 connector. This wire contains a dc plug receptacle for connecting the ac adapter.

RS232 with flying leads

Red	+12vdc	Orange and White are reserved for digital inputs which can be used for an arming loop.
Blue	Ground	
Green Reader	Transmit	
Yellow Reader	Receive	
Orange	Input 1 (optional)	
White	Input 2 (optional)	

F2F

Red	+12vdc
Blue	Ground
Green	unused
White	unused
Brown	F2F*
Orange	Green Led / Input 1
Yellow	Bicolor Led / Input 2



*Qscan F2F circuitry supports connection to a system with a 5V or 12V pullup.

Wiegand

Red	+12vdc
Blue	Ground
Green	Data 0
White	Data 1
Orange	Green Led / Input 2
Yellow	Bicolor Led / Input 1

Wiegand output readers can be reprogrammed to transmit magnetic stripe emulation (both aba and track 1), wand emulation, or F2F. Input 1 and Input 2 can be used to control the led's or used as an arming loop control.

ABA

Red	+12vdc
Blue	Ground
Green	Clock
White	Data
Orange	Green Led / Input 2
Yellow	Bicolor Led / Input 1

Wiegand output readers can be reprogrammed to transmit magnetic stripe emulation (both aba and track 1), wand emulation, or F2F. Input 1 and Input 2 can be used to control the led's or used as an arming loop control.

Wand

Red	+12vdc
Blue	Ground
Green	unused
White	Wand
Orange	Green Led / Input 2
Yellow	Bicolor Led / Input 1

Wiegand output readers can be reprogrammed to transmit magnetic stripe emulation (both aba and track 1), wand emulation, or F2F. Input 1 and Input 2 can be used to control the led's or used as an arming loop control.

Ethernet (TCP/UDP)

Ethernet wiring consists of:

- 3' cable with an RJ45 connector on it for connecting to the network.
- 3' power cable with a barrel receptacle for connecting an ac adaptor.
- 3' flat cable for optional relay and digital input connections.

Qscan readers with POE may be powered through the Cat5/6 cable from a POE switch, or powered with the AC Adaptor.

Relay Wiring

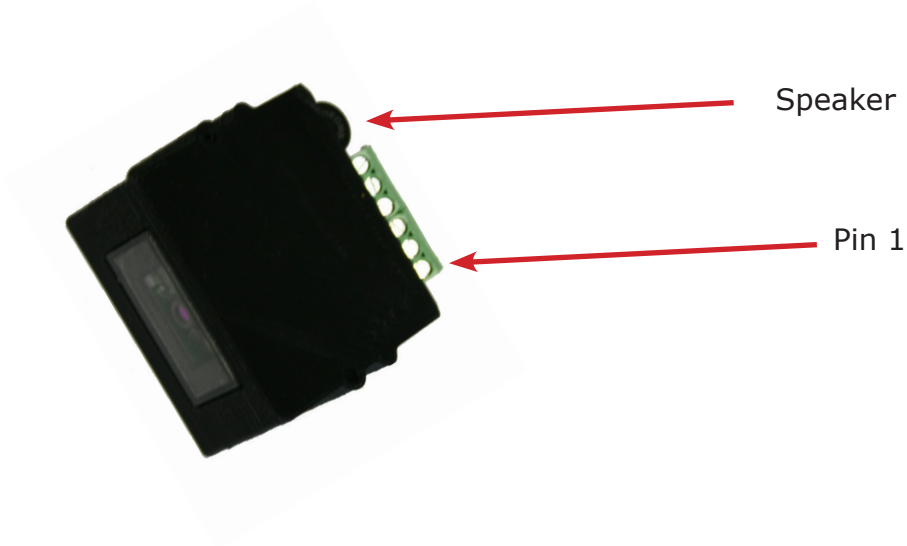
Relay wiring consists of 3 wires:

Red	Common
Green	Normally Open
Yellow	Normally Closed

Relay connections are independent.

Ethernet Qscans with POE cannot power external equipment using power from the POE. A separate power supply is required to power the device connected to the relay.

Wiring - Qscan Mini



Pin Definitions	
Pin 1	GND
Pin 2	8Vdc - 30Vdc
Pin 3	Data 0
Pin 4	Data 1
Pin 5	NC or S1
Pin 6	NC or S2

Barcode Masking

Barcode masking provides a way of extracting certain portions of a barcode for processing. The masking operations include selecting up to 2 substrings from the barcode, and also adding prefix and suffix characters. You program in a mask when you do not want to process all of the data from a barcode, but only a portion of it.

When a barcode is read, the reader checks to see if a mask should be applied. Masks are applied based on the barcode symbology, and length of the barcode.

For example, you can set up a mask to work only on 10 character code39 barcodes. If a code39 barcode is not 10 characters, you can elect to ignore it (don't process) or pass the barcode through without masking (psthru mode). It is also possible to program a mask to work on all lengths of a specific symbology.

After masking, the barcode data will look like this:

prefix character + substring 1 + inter character + substring 2 + suffix character

The mask needs to include only 1 of the above items.

A total of 10 masks can be programmed in the reader. The masks can be for different symbologies, or all for the same symbology.

When programming a mask, 3 commands need to be processed by the reader (see page 21).

For wiegand output Qscans, the masking is performed prior to the wiegand extractions which create the wiegand output (see page 48).

Proximity & iClass Masking

Proximity and Iclass masking works in a similar way to the barcode masking explained above. Characters can be inserted into the data and substrings can be extracted.

There are three programmable masks that can be programmed for prox and iClass card reading. Each mask is associated with a programmed bit length for a specific card. When programming the input format (card definition) for a specific card, the masks (if any) are also programmed in.

This differs somewhat from the barcode masking. With the barcode masking you program the masks independently of the barcode symbologies, and the masks are triggered by both symbology and length. With the prox/iClass masking, the masks are triggered by the length (bit length) only.

Relay

The Relay (optional) allows you to control external equipment, such as a door or indicator. It can be activated and deactivated by sending serial commands to the reader. The maximum allowable relay time is 99 seconds, and maximum allowable power that can be pushed through the relay is 500ma, 30VDC. The relay is a Form-C with common, normally open, and normally closed connections.

Power over Ethernet

Qscans can optionally be ordered with Power over Ethernet. With Power over Ethernet, you do not need a separate power supply or ac adapter.

Hid 5352 Emulation

Qscans with an rs232 interface can be programmed to simulate the output from an Hid 5352 reader, using the 37 bit format.

Arming Loop

Either of the 2 digital inputs in the Qscan can be programmed to operate as an armed loop. In the armed loop mode, if the arming loop is not activated, the Qscan will not transmit any data. Arming loops are typically used in parking applications. If there is no car present, the arming loop will not be active, therefore all barcode reads will be ignored.

Leds

There are two leds on the Qscan. The led to the left is a bi-color led, and can be programmed to operate in one of three modes - off to red, off to green, red to green. The right led is a green led only. Typically, Qscans with a wiegand interface will be connected to a device (a controller) which will control one or both of the leds. For Qscans with a serial interface, the leds will be controlled by sending serial commands to the reader.

Serial Emulation/Firmware Updates

Qscans with an emulations-style interface (wiegand, mag, f2f) can be wired in a way which allows serial communications. You can go into this operating mode to send commands to the Qscan for programming, and also for firmware updates.

Data Flow

The following explains the data flow in the reader for a better understanding of how data is processed.

Barcode:

Read Barcode

If symbology (barcode type) not allowed - ignore

If pdf417, check for driver's license parsing and parse if required.

If masking is on, mask the barcode according to the mask specifications.

If rs232, tcp/ip, f2f, aba, or wand output - transmit data (finished)

If wiegand output - generate the wiegand output data (bits). If successful, transmit the wiegand data (finished). If not successful, ignore data.

Prox/iClass:

Read Card

If a wiegand output reader, and passthru is turned on - pass the prox/iClass data to the wiegand output undisturbed.

If card bit length matches a defined format, extract the numbers for each defined field. If it does not match a defined format - ignore. If any of the field descriptions cause an overflow to occur - ignore.

If masking is on, mask the resulting data according to the format.

If rs232, tcp/ip, f2f, aba, or wand output - transmit data (finished)

If wiegand output - generate the wiegand output data (bits). If successful, transmit the wiegand data (finished). If not successful, ignore data.

Programming

Qscans can be programmed in two ways:

- 1) Scanning control barcodes.
- 2) Sending commands to the reader serially.

Scanning Control Barcodes:

Make a Code39 barcode starting with %U followed by the command and scan the barcode. Note that control card processing can be turned off by either a serial command or a control barcode.

Serial commands:

Send the command to the reader serially by making a direct connection to the reader and then sending the command, followed by a carriage return (hex 0D). If using a terminal emulation program, the 0D is sent by hitting the enter key.




Qscan readers that have a wiegand output can be connected to a serial port for sending commands. See page 55 for further information.

Command Format:

All programming commands are detailed in the following format:

Command Description			
Command Format (spaces for clarity only, do not use them)			
parameter	meaning	values	values
Special Instructions			

Symbology Setup 1			
X001 a b c d e f g h			
a	Code 39	0=off	1=on
b	Code 39 full ascii	0=off	1=on
c	Code 39 trioptic	0=off	1=on
d	Code 39 to code 32	0=no	1=yes
e	Code 39 check digit	0=off	1=on
f	Upc A	0=off	1=on
g	Upc E	0=off	1=on
h	Ean8 / Jan8	0=off	1=on
<p>Use this command to turn the listed symbologies and features on or off.</p> <p> If code39 full ascii is turned on, the reader will no longer respond to control barcodes. Programming can be achieved using serial commands only.</p>			

Symbology Setup 2			
X002 a b c d e f g h			
a	Ean13 / Jan 13	0=off	1=on
b	Code 128	0=off	1=on
c	Gs1	0=off	1=on
d	Ibst 128	0=off	1=on
e	Code 93	0=off	1=on
f	Code 11	0=off	1=on
g	Code 11 check digit	0=off	1=on
h	Interleaved 2 of 5	0=off	1=on
<p>Use this command to turn the listed symbologies and features on or off.</p>			

Symbology Setup 3			
X003 a b c d e f g h			
a	I 2 of 5 check digit	0=off	1=on
b	2 of 5	0=off	1=on
c	Codabar	0=off	1=on
d	Codabar clsi	0=off	1=on
e	Msi / Plessy	0=off	1=on
f	Chinese 2 of 5	0=off	1=on
g	Matrix 2 of 5	0=off	1=on
h	M 2 of 5 check digit	0=off	1=on
Use this command to turn the listed symbologies and features on or off.			

Symbology Setup 4			
X004 a b c d e f g h			
a	Korean 3 of 5	0=off	1=on
b	Postnet	0=off	1=on
c	Planet	0=off	1=on
d	Postal	0=off	1=on
e	Japan Post	0=off	1=on
f	Australia Post	0=off	1=on
g	Kix	0=off	1=on
h	Usps Onecode	0=off	1=on
Use this command to turn the listed symbologies and features on or off.			

Symbology Setup 5			
X005 a b c d e f g h			
a	UPU fics	0=off	1=on
b	GS1 14	0=off	1=on
c	Composite cc	0=off	1=on
d	Composite ccab	0=off	1=on
e	Composite tlc39	0=off	1=on
f	Pdf417 (2d)	0=off	1=on
g	Micropdf (2d)	0=off	1=on
h	Datamatrix (2d)	0=off	1=on
Use this command to turn the listed symbologies and features on or off.			

Symbology Setup 6			
X006 a b c d e f g h			
a	Datamatrix inverse (2d)	0=off	1=on
b	unused	always 0	
c	Maxicode (2d)	0=off	1=on
d	QR (2d)	0=off	1=on
e	QR inverse (2d)	0=off	1=on
f	Micro QR (2d)	0=off	1=on
g	Aztec (2d)	0=off	1=on
h	Aztec inverse (2d)	0=off	1=on
Use this command to turn the listed symbologies and features on or off.			

Symbology Setup 7			
X007 a b c d e f g h			
a	Bookland	0=off	1=on
b	Postbar	0=off	1=on
c	Macro Pdf (2d)	0=off	1=on
d	UCC coupon	0=off	1=on
e	unused	always 0	
f	unused	always 0	
g	unused	always 0	
h	unused	always 0	
Use this command to turn the listed symbologies and features on or off.			

Length Settings for 2 of 5 Symbologies			
X040 aa bb cc dd ee ff			
aa	I 2 of 5 length 1	2 digit length	00=any length
bb	I 2 of 5 length 2	2 digit length	00=any length
cc	M 2 of 5 length 1	2 digit length	00=any length
dd	M 2 of 5 length 2	2 digit length	00=any length
ee	D 2 of 5 length 1	2 digit length	00=any length
ff	D 2 of 5 length 2	2 digit length	00=any length
<p>Because of the structure of 2 of 5 barcodes, it is possible that reading only part of the barcode will result in a valid decode, with undesired results. To suppress this problem, it is best to use check digits with 2 of 5 symbologies (if available) or restrict the lengths for these barcodes so that partial decodes cannot occur. You can program up to two different lengths for each of the supported 2 of 5 symbologies. If you prefer to leave it wide open, then you can set the lengths to 00.</p>			

General Barcode Options			
X013 a m k c			
a	alpha delete	0=off	1=on
m	masking	0=off	1=on
k	Kronos mode	0=off	1=mode1, 2=mode2
c	Usic/Cac	0=off	0=off, 1=on, 2=required
<p>Turn on Alpha Delete to delete any alpha characters from the barcode. This is useful when a numeric only output is required such as wiegand.</p> <p>Masking allows you to mask out information from the barcode, leaving only that portion of the barcode that you wish to process.</p> <p>Kronos mode autodiscriminates Kronos cards (17 digit code 39 and 18 digit I 2of5). Kronos mode 1 extracts the first 2 digits of the site code and the lowest 5 digits of the ID. Kronos mode 2 forces a site code of 0, and extracts the lowest 9 digits of the ID.</p> <p>Usic/Cac sets the options for processing DOD Usic cards and Cac cards. Set to 0, Usic and Cac barcodes are processed like any other barcode. If set to 1, Usic and Cac cards are processed according to the parameters that you have programmed. If set to 2, all barcodes are ignored unless they meet the characteristics for Usic and Cac cards.</p>			

Barcode Masking			
X010 xx ctt llnn r			
X011 xx ppp sss1 b lll			
X012 xx iii sss2 y ll2 sss			
xx	mask number	01 thru 10	
ctt	barcode type	see list on next page	
llnn	barcode length	0000=all lengths	max=1500
r	passthru	0=off	1=on
ppp	prefix character	000=none	
sss1	start position 1	0000=none	
b	backwards	0=no	1=yes
lll	extraction length	000=all	max=200
iii	inter character	000=none	
sss2	start position 2	0000=none	
y	backwards	0=no	1=yes
ll2	extraction length	000=all	max=200
sss	suffix character	000=none	
<p>All 3 commands need to be processed by the reader to properly set a mask.</p> <p>Masking must be explicitly turned on with the X013 command on page 20.</p> <p>The value for prefix, suffix, and inter character is represented in decimal ascii form (041 = "A", 039 = "9").</p> <p>If b (or y) is set to a 1, then the extracted data starts at a position "start position" relative to the end of the barcode.</p> <p>See the following pages for a detailed explanation and examples.</p> <p>If needed, all masks can be cleared with one command. See the X014 command on page 25.</p>			

Barcode Masking Symbology Codes	
These are the codes used for the ctt parameter	
2 of 5	004
Aus Post	035
Aztec	045
Bookland	022
Codabar	002
Code 11	012
Code 39	001
Code 39 full ascii	019
Code 93	007
Code 128	003
Datamatrix	027
Dutch Post (Kix)	036
Ean8 / Jan8	010
Ean13 / Jan13	011
Gs1	015
Gs1 databar	048
Interleaved 2 of 5	006
Japan Post	034
Maxicode	037
Micro Pdf	026
Micro QR	044
Msi/Plessy	014
Pdf417	017
Planet	031
Postbar	038
Postnet	030
QR	028
UK Post	039
UpcA	008
UpcE	009
Usps Onedec	052
All Symbologies	127 * added to firmware 1/15/14
Masking can be programmed only for the barcode types listed above.	

Notes on using the Barcode Masking Commands:

If ("ctt") matches the type of barcode read, and the length of the barcode matches ("lnn") then the barcode is masked according to the programmed parameters. If the length ("lnn") is set to 0000, then the mask will apply to all barcodes of the specific symbology specified by ("ctt").

If any of the parameters causes the mask to be invalid, the barcode is not processed and the reader acts as if it has read a disallowed barcode (bad beep indicator). For example, attempting to extract 10 digits starting at position 5, on a barcode that is only 12 digits in length, is invalid.

The passthru option allows you to specify what to do when a barcode that is read matches the selected barcode symbology ("ctt") but does not match the required length ("lnn"). In this case, you have the option of disallowing the barcode (option 0), or passing the barcode through so that the other masks may be tested.

An example would be where you want to restrict barcode reading to two different lengths of code 39 barcodes, namely 10 digits and 15 digits. You will set up the first mask to operate on a length of 10, with the passthru option on ("r=1"). Code 39 barcodes with a length other than 10 will not be processed by this mask, but passed through to the next (2nd) mask. Set the 2nd mask to operate on code 39 barcodes with a length of 15, with no passthru ("r=0"). In this case, 10 digit code 39 barcodes are handled by mask 1, 15 digit code 39 barcodes are handled by mask 2, and all other code 39 barcodes are ignored by the reader.

The start positions ("sss1,sss2") are the positions in the barcode where the data extraction starts. This position can be relative to the beginning of the barcode (b=0 or y=0), or the end of the barcode ("b=1 or y=1"). If you want to take the last "x" characters in the barcode, set the backwards indicator ("b or y") to a 1.



The wiegand processing routines contain their own form of masking. If processing a barcode for wiegand output, the programmable masking within the weigand commands may be sufficient. Using the general masking commands may not be necessary for simplified masking (see page 48).

Masking Examples:

For code 39 barcodes of any length , take the first 5 positions only:

```
X010 01 001 0000 0
X011 01 000 0001 0 005
X012 01 000 0000 0 000 000
```


For code 39 barcodes of any length , take the first 5 positions only but prefix with a "A":

```
X010 01 001 0000 0
X011 01 065 0001 0 005
X012 01 000 0000 0 000 000
```

For code 39 barcodes of length 10, take the last 5 characters. For all other code 39 barcodes, pass thru and do not mask:

```
X010 01 001 0010 1
X011 01 000 0005 1 005
X012 01 000 0000 0 000 000
```

For code 39 barcodes of any length, take all characters after position 4:

```
X010 01 001 0000 0
X011 01 000 0005 0 000
X012 01 000 0000 0 000 000
```

For code 39 barcodes of length 10, take the last 5 characters. For code 39 barcodes of length 15, take the last 10 characters. Ignore all other code 39 barcodes (don't pass thru):

```
X010 01 001 0010 1
X011 01 000 0005 1 005
X012 01 000 0000 0 000 000
X010 02 001 0015 0
X011 02 000 0010 1 010
X012 02 000 0000 0 000 000
```

Clear All Barcode Masks	
X014 b p	
b	set to any value
p	set to 0
Use this command to clear all of the programmed masks for barcodes.	

Wiegand Output Format # 1 (for barcode data)			
X015 a mmmm ssss sd bbbb			
X016 bd iiii id ss bb ii			
X017 x y z lpp rpp h i j k			
a	active indicator	0=inactive	1=active
mmmm	barcode length	0-1500	0000=any
ssss	site code start	0000=no site	
sd	site code digits	00=remaining	
bbbb	id start	0000=no id	
bd	id digits	00=remaining	
iiii	issue code start	0000=no issue	
id	issue code digits	00=remaining	
ss	site code bits	00=none	
bb	id code bits	00=none	
ii	issue code bits	00=none	
x,y,z	backwards indicators	0=off (msb)	1=on (lsb)
lpp	left parity bits	000=none	
rpp	right parity bits	000=none	
h,i,j	field numbers for xmit	1=site,2=id	3=issue,0=none
k	site override	0=no	1=yes
see comments on the following pages.			

Wiegand Output Format # 2 (for barcode data)			
X019 a mmmm ssss sd bbbb			
X020 bd iiii id ss bb ii			
X021 x y z lpp rpp h i j k			
see Wiegand Output Format # 1 for parameter descriptions			

Programming the Wiegand Output Formats (barcode)

The standard wiegand output permits the transmission of wiegand formats of up to 194 bits, containing up to three fields (site, id, and issue). Each field can contain up to 64 bits each. Two parity bits may also be programmed.

Different wiegand output formats can be defined. The format that is used is dependent on the data which is read by the reader. There are 2 definable formats for barcode data.

For barcode data, the format that is used depends on the final length of the barcode data after masking. You can specify a barcode length to be matched for each of the formats. If the barcode length matches the format's length, then that format is used. A length of 0 can be used to define one format as the default format to be used for all barcode reads. Note that a format needs to be active ("a=1") to be recognized.

Each format contains the definitions of how the data is to be transmitted. These definitions include:

- The number of bits to be used for the site, id, and issue fields ("ss,bb,ii")

- A setting to organize each field as msb or lsb ("x,y,z")

- The location(s) in the barcode where the data for each field is to be extracted ("ssss,bbbb,iiii")

- The number of characters to use for each of those fields ("sd,bd,id")

- Which fields are to be included in the output format ("h,i,j")

- Number of bits to be used for left and right parity ("lpp,rpp")

- An indicator to force an override of the site code ("k").

An example of programming a standard 26 bit wiegand output follows. The format will be set up to work on all barcodes that are read, regardless of the length of the barcode. The first 3 digits of the barcode will be used for the site code, and the next 5 digits will be used for the id. No issue code will be present:

```
X015 1 0000 0001 03 0004
X016 05 0000 00 08 16 00
X017 0 0 0 012 012 1 2 0 0
```

An example of the same format, this time restricting this format for use only with 10 character barcodes:

```
X015 1 0010 0001 03 0004
X016 05 0000 00 08 16 00
X017 0 0 0 012 012 1 2 0 0
```

An example of the same format, this time selecting 0 site code digits, which has the effect of forcing the site code to 0 (because the format still has 8 bits specified for the site code), and taking the first 5 digits of the barcode:

```
X015 1 0000 0000 00 0000
X016 05 0000 00 08 16 00
X017 0 0 0 012 012 1 2 0 0
```

An example of a 50 bit format, using 32 bits for the id, 8 for the site, 8 for the issue code, and 2 parity bits. The site code will be taken from the first 3 digits of the barcode. The next 5 digits will be used for the id, and the next digit for the issue code. The first bit of the output will be a left parity bit calculated from the following 24 bits. The last bit (bit 50) will be a parity bit calculated from the preceding 24 bits:

```
X015 1 0000 0001 03 0004
X016 05 0009 01 08 16 18
X017 0 0 0 024 024 1 2 3 0
```

Command Notes:

If site code start ("ssss") is 0000, then no site code is extracted from the barcode data. You may still include bits in the output format for the site code, except the site code data will not come from the barcode. It will default to 0, unless you have programmed a site override.

If site code digits ("sd") is set to 00, then all remaining digits in the barcode are used for the site code.

If id start ("bbbb") is 0000, then no id is extracted from the barcode data. You may

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still include bits in the output format for the id, except the id will not come from the barcode. It will default to 0.

If id digits ("bd") is set to 00, then all remaining digits in the barcode are used for the id.

If issue code start ("iiii") is 0000, then no issue code is extracted from the barcode data. You may still include bits in the output format for the issue code, except the issue code data will not come from the barcode. It will default to 0.

If issue code digits ("id") is set to 00, then all remaining digits in the barcode are used for the issue code.

If site code bits ("ss") is set to 00, then there will be no site bits in the output.

If id bits ("bb") is set to 00, then there will be no id bits in the output.

If issue code bits ("ii") is set to 00, then there will be no issue bits in the output.

If the lsb indicator ("x,y,z") is on for any specific field, then the output data for that field is set up using the least significant bit first. The default for most wiegand formats is to use msb (most significant bit first).

The number of parity bits used for left parity is set by ("lpp"). If set to 000 then there is no left parity bit.

The number of parity bits used for right parity is set by ("rpp"). If set to 000 then there is no right parity bit.

Parity bits are calculated using sequential bits starting at the beginning of the output bitstream for left parity, and starting at the end for right parity. Parity is even on the left and odd on the right, unless changed using the X026 or X027 commands.

You do not have to include all of the fields (site, id, issue) in the wiegand output data stream. The ("h,i,j") parameters define which fields are to be output and in which order. A 1 refers to the site code field, 2 refers to the id field, 3 refers to the issue code field, and 0 means no field. To generate a wiegand output stream with only an id field, the values will be 2 0 0. To generate a stream with site and id, the values will be 1 2 0. To generate a field with id first, then site, then issue, it would be 2 1 3.

A site override can be programmed using the X018 and X022 commands. To turn site override processing on, ("k") must be set to a 1.

Wiegand Format # 1 (barcode) Site Override			
X018 ssss			
sss	site override	hexadecimal	
This command sets the site override value for wiegand format # 1 for barcode data.			

This command specifies the site override value for wiegand format # 1 for use with barcode data. If the site override option is on, then the site field data is replaced with the ("sss") value. ("sss") is programmed as 4 hexadecimal characters, representing 16 bits. If the site field is larger than 16 bits, the ("sss") data will be right justified in a zero filled field. If the site field is smaller than 16 bits, then the lowest bits in the override value are used up to the size of the site field.

Wiegand Format # 2 (barcode) Site Override			
X022 ssss			
sss	site override	hexadecimal	
This command sets the site override value for wiegand format # 2 for barcode data.			

Aamva Control			
X032 a b			
a	Aamva required	0=no	1=yes
b	Field Masking	0=off	1=on
<p>Aamva is the standard for drivers licenses in the US and Canada. Turn the Aamva Required option on (a=1) to restrict the reading of pdf417 barcodes to Aamva only. If on, no pdf417 barcodes will be read unless they meet the Aamva format. This setting has no effect on other barcode symbologies.</p> <p>When Aamva field masking is on (b=1) , each field from the Aamva drivers license is parsed. You can then use the Aamva field commands to concatenate fields together.</p>			

Aamva Field Commands			
X033 ff ll ttt ff ll ttt			Extractions 1-2
X034 ff ll ttt ff ll ttt			Extractions 3-4
X035 ff ll ttt ff ll ttt			Extractions 5-6
X036 ff ll ttt ff ll ttt			Extractions 7-8
X037 ff ll ttt ff ll ttt			Extractions 9-10
ff	Field to extract	see table next page	000=none
ll	Field length	1-20	0=actual
ttt	terminator character	000=none	
<p>These commands select the fields which will be extracted and processed. Fields are extracted in the order of extraction # (1 first, 10 last). If the field length is set to non 0, then if the field is larger than the value specified, it is truncated. If smaller, it is left justified and blank filled.</p> <p>The terminator character (if non 0) is appended to the field value. ttt is entered as a 3-digit decimal ascii value (065="A", 053="5").</p>			

Aamva Field Numbers	
These are the codes used for the ff parameter	
00	Ignore, no extraction
01	First Name
02	Last Name
03	Name Suffix
04	Street Address
05	City
06	State
07	Zip Code
08	License Number
09	Birthdate
10	Expiration Date
11	Issue Date
12	Sex
13	Name (version 1, Last, Middle, First)
<p>Version 1.0 Aamva licenses do not have separate fields for first and last names. Only one field is used (field # 13 above) which includes both the last and first names. Qscan automatically parses the Version 1.0 "name" field into a first and last name, however the parsing is contingent upon the field being encoded properly on the license. If you will be reading only version 1.0 licenses, then the Name (field #13) field can be used.</p>	


Clear Aamva Fields	
X038 1	
Use this command to clear all of the programmed fields	

Aamva Programming Example:

Extract license # and state. Pad the license # to a 20 character field, insert a tab character between the two fields, add a carriage return at the end.

```
X033 01 20 008 09 00 013
X034 00 00 000 00 00 000
X035 00 00 000 00 00 000
X036 00 00 000 00 00 000
X037 00 00 000 00 00 000
```

Selection of Output Style		
X023 a		
a	Type of Output	1=wiegand, wieaba, alphawie 2=magstripe, aba, f2f 3=wand emulation
<p>This command is used to program the type of "emulation" output sent by the reader. Qscans with a "wiegand" ordering code can be reprogrammed to output any of the above formats.</p>		

Mag Emulation Control (firmware prior to 3/29/13)			
X024 c d t f b pp ss			
c	cstart	0=off	1=on
d	neuron mode	0=off	1=on
t	track emulation	1=track 1	2=track 2 (aba)
f	f2f	0=no	1=yes
b	time between pulses	1 - 5 ms	default=1 (1ms)
pp	pulse time * 50us	1 - 5 *50us	default=02 (100us)
ss	data settle time *10us	1 - 2 *10us	default=02 (20us)
<p>"c" applies to track 2 (aba) output only. When on, a C start sentinel is sent instead of a B start sentinel. Set "d" to 1 if your system requires data to go up at the same time as the clock signal.</p> <p>To transmit in f2f format, "f" must be set to 1.</p> <p> Qscan F2F circuitry supports connection to a system with a 5V or 12V pullup.</p>			

Mag Emulation Control (firmware after 3/29/13)			
X024 c d t f b pp ss l yy			
c	cstart	0=off	1=on
d	neuron mode	0=off	1=on
t	track emulation	1=track 1	2=track 2 (aba)
f	f2f	0=no	1=yes
b	time between pulses	1 - 5 ms	default=1 (1ms)
pp	pulse time * 50us	1 - 5 *50us	default=02 (100us)
ss	data settle time *10us	1 - 2 *10us	default=02 (20us)
l	lead/trail zero bits	0=yes, 1=no	default=0
zz	right justify zero fill	zz=# digits	00=no justify
This command is the same as the prior command except for the addition of the l and zz parameters.			

Magnetic stripe data is typically preceded with a number of 0 bits and appended with a number of 0 bits, for synchronization. The Qscan default is to send 10 zero bits before and after the data stream. These 0 bits can be turned off with the ("l") parameter.

Some controllers and software systems require fixed length magnetic stripe data. The ("zz") parameter can be set to right justify the aba data into a data field ("zz") characters long. The data is zero filled. To turn off this option, set ("zz") to 00.

Wiegand Emulation Control			
X025 o b p			
o	output style	0=standard	1=wieaba, 2=alphawie
b	time between pulses	1 - 5 ms	default=1 (1ms)
p	pulse time * 50us	1 - 5	default=2 (100us)
This command sets the general output parameters for wiegand output.			

Wiegand Left Parity Style			
X026 s o			
s	Parity Style	0=even, 1=odd	default=even
o	unused	must be 0	
This command sets the left parity for all wiegand outputs to even or odd.			

Wiegand Right Parity Style			
X027 s o			
s	Parity Style	0=even, 1=odd	default=even
o	unused	must be 0	
This command sets the right parity for all wiegand outputs to even or odd.			

Proximity and iClass General Settings			
X047 c m b p s			
c	card style	1=wiegand	2=aba
m	masking	0=off	1=on
b	good read beep	0=off	1=on
p	parity check (26 & 28)	0=off	1=on
s	passthru	0=off	1=on
<p>This command sets the general settings for proximity and iClass input. If passthru ("s") is turned on, and the output mode is set to wiegand, then no interpretation of the prox or iClass data is done. The card data is transmitted exactly as it is on the card.</p>			

Proximity and iClass Input, Format # 1, Part 1*			
X048 bbb sss sl b bss bl x			
bbb	# card bits		max=250
sss	site start bit	000=no site	
sl	# bits for site code	00=none	
b	site is lsb	0=off	1=site is lsb
bss	id start bit	000=no id	
bl	# bits for id	00=none	
x	id is lsb	0=off	1=id is lsb
<p>This command is the first part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 1, Part 2*			
X049 iss il b sc ic uc			
iss	issue code start bit		max=250
il	# bits for issue code	000=no issue	
b	issue code is lsb	0=off	1=issue is lsb
sc	site characters	00=none	max=20
ic	id characters	00=none	max=20
uc	issue characters	00=none	max=20
<p>This command is the second part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 2, Part 1*			
X050 bbb sss sl b bss bl x			
bbb	# card bits		max=250
sss	site start bit	000=no site	
sl	# bits for site code	00=none	
b	site is lsb	0=off	1=site is lsb
bss	id start bit	000=no id	
bl	# bits for id	00=none	
x	id is lsb	0=off	1=id is lsb
<p>This command is the first part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 2, Part 2*			
X051 iss il b sc ic uc			
iss	issue code start bit		max=250
il	# bits for issue code	000=no issue	
b	issue code is lsb	0=off	1=issue is lsb
sc	site characters	00=none	max=20
ic	id characters	00=none	max=20
uc	issue characters	00=none	max=20
<p>This command is the second part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 3, Part 1*			
X052 bbb sss sl b bss bl x			
bbb	# card bits		max=250
sss	site start bit	000=no site	
sl	# bits for site code	00=none	
b	site is lsb	0=off	1=site is lsb
bss	id start bit	000=no id	
bl	# bits for id	00=none	
x	id is lsb	0=off	1=id is lsb
<p>This command is the first part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 3, Part 2*			
X053 iss il b sc ic uc			
iss	issue code start bit		max=250
il	# bits for issue code	000=no issue	
b	issue code is lsb	0=off	1=issue is lsb
sc	site characters	00=none	max=20
ic	id characters	00=none	max=20
uc	issue characters	00=none	max=20
<p>This command is the second part of a 2 part command, for setting up an input proximity or iClass format.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 1 Mask, Part 1*			
X054 p1 ll1 p2 ll2			
p1	start position		00=ll1 is a constant
ll1	length or constant		
p2	start position		00=ll2 is a constant
ll2	length or constant		
<p>p1 and p2 refer to the start position in the data to start an extraction of data. The data is extracted for a length of ll1,ll2. If p1 or p2 is 00, then ll1 or ll2 refers to a constant value which will be inserted into the data value. The constant value is a 3-digit ascii decimal value of the character to insert ("A" = 065). If both p1 and ll1 (or p2 and ll2) are 0, then that portion of the mask is ignored. See the examples at the end of this section.</p> <p>Note this mask applies only to prox/iClass cards with a bit length defined by prox/iClass format # 1.</p> <p>* added to firmware 5/22/13</p>			

Proximity and iClass Input, Format # 1 Mask, Part 2*			
X055 p3 l13 p4 l14 p5 l15			
p3	start position		00=l13 is a constant
l13	length or constant		
p4	start position		00=l14 is a constant
l14	length or constant		
p5	start position		00=l15 is a constant
l15	length or constant		
All parameters have the same usage as the prior command.			
* added to firmware 5/22/13			

Proximity and iClass Input, Format # 2 Mask, Part 1*			
X056 p1 l11 p2 l12			
p1	start position		00=l11 is a constant
l11	length or constant		
p2	start position		00=l12 is a constant
l12	length or constant		
<p>p1 and p2 refer to the start position in the data to start an extraction of data. The data is extracted for a length of l11,l12. If p1 or p2 is 00, then l11 or l12 refers to a constant value which will be inserted into the data value. The constant value is a 3-digit ascii decimal value of the character to insert ("A" = 065). If both p1 and l11 (or p2 and l12) are 0, then that portion of the mask is ignored. See the examples at the end of this section.</p> <p>Note this mask applies only to prox/iClass cards with a bit length defined by prox/iClass format # 2.</p>			
* added to firmware 5/22/13			

Proximity and iClass Input, Format # 2 Mask, Part 2*			
X057 p3 ll3 p4 ll4 p5 ll5			
p3	start position		00=ll3 is a constant
ll3	length or constant		
p4	start position		00=ll4 is a constant
ll4	length or constant		
p5	start position		00=ll5 is a constant
ll5	length or constant		
All parameters have the same usage as the prior command.			
* added to firmware 5/22/13			

Proximity and iClass Input, Format # 3 Mask, Part 1*			
X058 p1 ll1 p2 ll2			
p1	start position		00=ll1 is a constant
ll1	length or constant		
p2	start position		00=ll2 is a constant
ll2	length or constant		
<p>p1 and p2 refer to the start position in the data to start an extraction of data. The data is extracted for a length of ll1,ll2. If p1 or p2 is 00, then ll1 or ll2 refers to a constant value which will be inserted into the data value. The constant value is a 3-digit ascii decimal value of the character to insert ("A" = 065). If both p1 and ll1 (or p2 and ll2) are 0, then that portion of the mask is ignored. See the examples at the end of this section.</p> <p>Note this mask applies only to prox/iClass cards with a bit length defined by prox/iClass format # 3.</p>			
* added to firmware 5/22/13			

Proximity and iClass Input, Format # 3 Mask, Part 2*			
X059 p3 l13 p4 l14 p5 l15			
p3	start position		00=l13 is a constant
l13	length or constant		
p4	start position		00=l14 is a constant
l14	length or constant		
p5	start position		00=l15 is a constant
l15	length or constant		
All parameters have the same usage as the prior command.			
* added to firmware 5/22/13			

Programming for Prox and iClass reading

Qscan can read proximity and iClass cards up to 250 bits in length. Prox and iClass card data can be passed through directly to the output (if the Qscan has wiegand output), or processed directly by the Qscan. If processed directly by the Qscan, the card format(s) need to be programmed into the Qscan so that it can correctly read the card. This involves programming the starting bit location and number of bits for each field to be processed from the card, and the number of digits to reserve for each of the fields.

Three prox/iClass formats can be programmed into the Qscan. Each format is identified by the number of bits defined in the format. When a card is read that matches the bit count defined in the format - that format is used by the Qscan to further process the data. When processing the format, Qscan will interpret the data on the card to produce the proper numeric value(s). The maximum size of the allowable numeric values is defined by the sc,ic,uc parameters. If the card data is too large to fit into any of the defined fields, the card is ignored.

Example programming Prox input Format # 1 for a standard 26 bit input:

```
X048 026 002 08 0 010 16 0
X049 000 00 0 03 05 00
```

In the above example, the format is set up for 26 bits, with the site code starting at bit 2 for a length of 8 bits. Site code data on the card is msb. The id starts at bit position 10 and is a length of 16 bits, also msb. The second

command defines an issue code field start at 000 which means do not process the Issue Code (there isn't one in the 26 bit format). Three digits are reserved for the site code, and 5 for the id.

After reading and processing by the Qscan, the site code is converted into a 3 digit number, and the id is converted into a 5 digit number. Both fields are concatenated together to form an 8 digit number in this example. Qscans always concatenate converted proximity/iClass data in the order of site, id, and issue code. The resulting length will be the total of the sc, ic, and uc parameters.

Reading a sample card containing site=5 and id=1025, the data created by the Qscan for transmission using the above example would be 00501025. If the sc,ic,uc parameters were 05,05,00, then the result would be 0000501025. If you have a Qscan with a serial output (rs232, tcp/ip), aba output, wand, or f2f output then this is the data you would see. If your Qscan has a wiegand output the data will be transmitted according to the output format you have programmed.

If masking is turned on for prox/iClass data, then the data produced above (00501025) would then be processed using the mask parameters.

Example programming Prox input Format # 1 for a standard 26 bit input, yielding a 3 digit site code and a 5 digit id, with a prefix of "A" put before the data:

```
X048 026 002 08 0 010 16 0
X049 000 00 0 03 05 00
X054 00 065 00 000
X055 00 000 00 000 00 000
```

Example programming Prox input Format # 1 for a standard 26 bit input, yielding a 3 digit site code and a 5 digit id, with a tab character put between the two values.

```
X048 026 002 08 0 010 16 0
X049 000 00 0 03 05 00
X054 01 003 00 008
X055 04 005 00 000 00 000
```

Wiegand Output Format (for prox/Iclass data Format # 1)*			
X060 ss sl is il us ul			
X061 sb ib ub a b c lpp rpp			
X062 1 2 3 oooo ss			
ss	site start position	00=no site	
sl	# digits for site	00=remaining	
is	id start position	00=no id	
il	# digits for id	00=remaining	
us	issue code start pos	00=no issue	
ul	# digits for issue	00=remaining	
sb	# bits for site code	00=none	
ib	# bits for id	00=none	
ub	# bits for issue code	00=none	
a	site is lsb	0=no	1=yes
b	id is lsb	0=no	1=yes
c	issue is lsb	0=no	1=yes
lpp	left parity bits	000=none	
rpp	right parity bits	000=none	
1,2,3	field numbers for xmit	1=site,2=id	3=issue,0=none
oooo	site override	4 hex characters	
ss	special format #	must be 00	
<p>The site code data in the wiegand output is taken from the data characters starting at position ss for a length of sl. Id and issue code data is also extracted the same way. If any of the fields are not used, or will be defaulted to 0, then 00 is used for the start position. A length of 00 for sl,il,ul is used to take all of the remaining characters in the data and put them into the field. sb,ib, ub are the bit counts to be used for each field in the output. If any of the fields are to be lsb, a,b,c are set to a 1. lpp is the number of bits to use for left parity, 000 if no left parity. rpp is the number of bits to use for right parity, 000 if none. oooo is a 4-character hexadecimal value used as a site override (right justified). To be active, the site override must be turned on usng the X069 command. ss should be left at 00.</p> <p>* added to firmware 5/22/13</p>			

Wiegand Output Format (for prox/Iclass data Format # 2)*			
X063 ss sl is il us ul X064 sb ib ub a b c lpp rpp X065 1 2 3 oooo ss			
All parameters are the same as the prior command.			
* added to firmware 5/22/13			

Wiegand Output Format (for prox/Iclass data Format # 3)*			
X066 ss sl is il us ul X067 sb ib ub a b c lpp rpp X068 1 2 3 oooo ss			
All parameters are the same as the prior command.			
* added to firmware 5/22/13			

Wiegand Output Site Override Control (for prox/iClass formats)*			
X069 a b c			
a	site override, format 1	0=off	1=on
b	site override, format 2	0=off	1=on
c	site override, format 3	0=off	1=0n
If any site overrides are specified for any of the three formats, they must be activated using this command, otherwise the overrides are not used.			
* added to firmware 5/22/13			

Wiegand Special Output Options*			
X070 aa bb cc dd ee			
aa	special, prox format 1	00= no special format	
bb	special, prox format 2	01= corporate 1000	
cc	special, prox format 3	02= Andover 37 bit	
dd	special, barcode fmt 1		
ee	special, barcode fmt 2		
<p>For any of the three prox/iclass formats, or the 2 barcode formats, you can specify one of the predefined special formats. Specify 00 for any format which will not utilize one of the special formats.</p> <p>To use the corporate 1000 format, you must also set the site bits to 12, id bits to 20, with parities turned off. The field order should be 1,2,0.</p> <p>To use the Andover 37 bit format, set the site bits to 12, id bits to 19, issue bits to 4, with no parities. Set the field order to 3,1,2.</p> <p>* added to firmware 6/13/13</p>			

Programming the Wiegand Output Formats (prox/iClass cards)

The standard wiegand output permits the transmission of wiegand formats of up to 194 bits, containing up to three fields (site, id, and issue). Each field can contain up to 64 bits each. Two parity bits may also be programmed.

Different wiegand output formats can be defined. The format that is used is dependent on the data which is read by the reader. There are 3 definable formats for proximity/Iclass data.

For proximity and iClass cards, the format that is used is dependent on the number of bits on the card (each of the three input format definitions have their own output definition as well).

Each format contains the definitions of how the data is to be transmitted. These definitions include:

- The number of bits to be used for the site, id, and issue fields ("ss,bb,ii")

- A setting to organize each field as msb or lsb ("x,y,z")

- The location(s) in the barcode where the data for each field is to be extracted ("ssss,bbbb,iiii")

- The number of characters to use for each of those fields ("sd,bd,id")

- Which fields are to be included in the output format ("h,i,j")

- Number of bits to be used for left and right parity ("lpp,rpp")

- A site override ("oooo").

Example programming Prox input Format # 1 for a standard 26 bit input to an 8 digit number (3 site, 5 issue) and then transmitting as a 32 bit number (16 site + 16 id):

```
X048 026 002 08 0 010 16 0
X049 000 00 0 03 05 00
X060 01 03 04 05 00 00
X061 16 16 00 0 0 0 000 000
X062 1 2 0 0000 00
```

Example programming two prox formats. The first format is a 26 bit input which will be transmitted as a 26 bit output. The second format will be a 34 bit input (1 parity, 16 site, 16 id, 1 parity) retransmitted as a 26 bit output. The passthru option cannot be used in this case because the passthru option applies to all bit formats. The transformation from 34 to 26 bits is ok in this case because all of the known cards in the field utilize site codes below 255.

```
X048 026 002 08 0 010 16 0
X049 000 00 0 03 05 00
X060 01 03 04 05 00 00
X061 08 16 00 0 0 0 012 012
X062 1 2 0 0000 00
```

```
X050 034 002 16 0 018 16 0
X051 000 00 0 03 05 00
X063 01 03 04 05 00 00
X064 08 16 00 0 0 0 012 012
X065 1 2 0 0000 00
```

Command Notes:

If site start position ("*ss*") is 00, then no site code is extracted from the intermediate data. You may still include bits in the output format for the site code, except the site code data will be 0, unless you have programmed a site override.

If site code digits ("*sd*") is set to 00, then all remaining digits in the intermediate data are used for the site code.

If id start position ("*is*") is 00, then no id is extracted from the intermediate data. You may still include bits in the output format for the id, except the id will default to 0.

If id digits ("*il*") is set to 00, then all remaining digits in the intermediate data are used for the id.

If issue code start position ("*us*") is 00, then no issue code is extracted from the intermediate data. You may still include bits in the output format for the issue code, except the issue code data will default to 0.

If issue code digits ("*ul*") is set to 00, then all remaining digits in the intermediate data are used for the issue code.

If site code bits ("*sb*") is set to 00, then there will be no site bits in the output.

If id bits ("*ib*") is set to 00, then there will be no id bits in the output.

If issue code bits ("ub") is set to 00, then there will be no issue bits in the output.

If the lsb indicator ("a,b,c") is on for any specific field, then the output data for that field is set up using the least significant bit first. The default for most wiegand formats is to use msb (most significant bit first).

The number of parity bits used for left parity is set by ("lpp"). If set to 000 then there is no left parity bit.

The number of parity bits used for right parity is set by ("rpp"). If set to 000 then there is no right parity bit.

The wiegand output bit structure can consist of 3 fields, plus parities. The ("1,2,3") parameters allow you to chose the fields to include and the order of the fields.

Example: 1,2,0 = transmit site and id
 2,0,0 = transmit id only
 1,2,3 = transmit site, id, and issue in that order
 2,1,0 = transmit id, then site

A site override ("oooo") can be programmed. This is a 4 character hexadecimal value (maximum of 16 bits, right justified) which will be used as an override for the site code if the override X069 is turned on.

("ss") refers to a special format number which may be assigned by ibc in future firmware upgrades. Leave this parameter as 00 unless you have special firmware assigned by IBC.

Digital Inputs for Led or Arming Loop use			
X029 i p a b			
i	input 1	0=off 1=bicolor led	2=right led 3=arm loop 6=dps
p	input 1 polarity	0=normal	1=reverse
a	input 2	0=off 1=bicolor led	2=right led 3=arm loop 6=dps
b	input 2 polarity	0=normal	1=reverse
<p>The digital inputs can be used to control either of the leds, used for an arming loop, or as a door position switch monitor.</p> <p>Normal polarity is active low.</p>			

Serial Settings (rs232 only)			
X028 b p tt1 tt2			
b	baud rate	1 thru 8	see table below
p	parity	1 thru 3	see table below
tt1	terminator 1	000 thru 255	
tt2	terminator 2	000 thru 255	
<p>Baud Rate settings can be: 1-1200 2-2400 3-4800 4-9600 5-19200 6-38400 7-57600 8-115200</p> <p>Parity can be 1=8 bits no parity, 2=7 even, 3=7 odd. The terminator character(s) can be any decimal ascii character, i.e. 065="A". 000 means no terminator.</p>			

Special Processing Mode			
X030 xx			
xx	special mode	00=off	01=HID 5352 37 bit emulation (rs232)
Programs special output modes.			

Bicolor Led Mode			
X031 x			
x	led style	0=red / green	
		1=off / red	
		2=off / green	
Controls the color modes of the bicolor led.			

Control Card Programming Lockout			
X039 x			
x	lockout	0=unlocked	
		1=locked	
If set to 1 (locked), IBC control cards cannot be used to reprogram the reader.			

Aiming Pattern Control			
X071 x			
x	aiming pattern	0=on	
		1=off	
<p>The laser "crosshair" aiming pattern can be turned on or off. By default, the pattern is on. Shutting off the aiming pattern does not reduce readability.</p>			

Restart Command			
X0721			
<p>Restarts the reader. This command is used to restart the reader when parameters (which require a restart) have been changed in the reader.</p>			

Auto Display String Options			
X073 a b yy			
a	auto display on sense	0=off,1=on	
b	auto display, good read	0=off,1=on	
yy	good read time, seconds	01-99	seconds
<p>Sets the Auto Display options. If a is set to 1, the 4 programmed auto display strings will be shown on the displayed based on the value of the digital inputs. If b is set to a 1 then every time a barcode is read, the good read string will be shown. The string will be shown for yy seconds.</p>			

Mobile Mode			
X074 x			
x	mobile mode	1=on	
		0=off	
<p>Depending on the lighting conditions, placing the reader into "mobile mode" may result in better read rates when reading from a smartphone screen. Use only if you are experiencing difficulties in reading from smartphone screens.</p>			

Define a User Character (for the display)			
X075 y 11 22 33 44 55 66 77			
y	character number	0 thru 4	
11	row 1 value	0 thru 31	
22	row 2 value	0 thru 31	
33	row 3 value	0 thru 31	
44	row 4 value	0 thru 31	
55	row 5 value	0 thru 31	
66	row 6 value	0 thru 31	
77	row 7 value	0 thru 31	
<p>Use this command to define a User Character for the display. There are 5 available user characters, numbered 0 thru 4. For an example of how to use the X075 command go to page 62.</p>			

Relay Autotrigger on Good Read			
X076 a n l tt			
a	auto trigger relay	0=no	1=yes
n	RFU	0	
l	RFU	0	
tt	time in seconds	00-99	
<p>This command applies to serial units only (RS232 and Tcp/ip). If this option is turned on, the relay will automatically trigger on a good read of a barcode.</p>			

Speaker Setup			
X077 s ffff d y gg			
s	startup beep	0=no	1=yes
ffff	speaker frequency setting	default=2240	
d	speaker duty time ON	0-9	
y	speaker duty time OFF	0-9	
gg	beep on a good read	gg*40ms	00=none
<p>This command controls the speaker settings. You can change the frequency and duty cycle of the speaker, enable or disable the startup beep, and also enable or disable a beep for a good read.</p>			

Automatic Door Position Switch Transmission			
X078 1 2 3 4			
1	Xmit on Sense 1 High	0=no	1=yes
2	Xmit on Sense 1 Low	0=no	1=yes
3	Xmit on Sense 2 High	0=no	1=yes
4	Xmit on Sense 2 Low	0=no	1=yes
<p>This command applies to serial units only (RS232 and Tcp/ip). If any of the sense Xmits are turned on, then the reader will send a message when the sense event occurs. The reader can send any of the following based on the settings:</p> <p>:S10 Sense Input 1 High :S1C Sense Input 1 Low :S20 Sense Input 2 High :S2C Sense Input 2 Low</p> <p>There is approximately a 3/10 second delay before transmission.</p>			

Led Control			
X079 s t 0 gg s t 0 gg			
s	Led Control	0=internal	1=external
t	Startup Mode	0=off	1=on
gg	Good Read Time	# seconds	00=off
<p>The first set of s,t,gg refers to led # 1. The second set to led # 2. If t is set to 1, then the led is on when power is applied. If gg is non 0, then when a good scan occurs, the led is turned on for gg seconds. If s is set to 1 (external) then the led is controlled by the sense input lines. Note that the standard operation for a good scan is to turn led # 2 on, however this action can be modified with the X080 command.</p>			

Led # 2 Good Read Setting			
X080 a			
a	Good Read Action	0=turn off	1=turn on
<p>Typically, if led # 2 is set up as a good read indicator, it is turned on when a good read (scan) occurs. You can change this to turn off when a good read occurs by using this command.</p>			

Aamva Field Mask Prefix*			
X082 a			
a	Ascii Prefix value in decimal	000=none	
<p>Prefixes may be inserted in front of barcode data to be transmitted by using the mask tables. The mask tables, however, are not implemented for Aamva barcodes if the Aamva field masking is turned on. In order to place a prefix character in front of field masked Aamva data, this command must be used.</p> <p>*added to firmware 12/22/14</p>			

Serial Commands (online mode)

Version Command
V
Returns the firmware identification.
Speaker Command
& xx
Turns the speaker on for xx * 10ms
Led Commands
} xx
Turns the bicolor led on for xx seconds, then leaves it off
{ xx
Turns the bicolor led off for xx seconds, then leaves it on
) xx
Blinks the bicolor led for xx seconds, then leaves it on
(xx
Blinks the bicolor led for xx seconds, then leaves it off
] xx
Turns the green led on for xx seconds, then leaves it off
[xx
Turns the green led off for xx seconds, then leaves it off
> xx
Blinks the green led for xx seconds, then leaves it on
< xx
Blinks the green led for xx seconds, then leaves it off
Relay Commands
! xx
Turns the relay on for xx seconds
*
Turns the relay off

Display Commands	
D xxxxxxxxxxxxxxxxx	
	Displays up to 16 characters on line 1 of the display. Note the display is not cleared prior to displaying data, so any character position not overwritten will remain as it was. You can send any number of characters, up to 16. IBC extended characters and User characters cannot be used (see the next page for detailed information on using the display).
d xxxxxxxxxxxxxxxxx	
	Displays up to 16 characters on line 2 of the display. Note the display is not cleared prior to displaying data, so any character position not overwritten will remain as it was. You can send any number of characters, up to 16. IBC extended characters and User characters cannot be used (see the next page for detailed information on using the display).
S xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	
	Displays up to 32 characters on both lines of the display. Unused positions will be blank filled. IBC Extended characters and User defined characters can be used (see the next page for detailed information on using the display).
Digital Input Commands	
%	
	Returns the status of Input 1 (ON or OFF)
\$	
	Returns the status of Input 2 (ON or OFF)

Using the Display

The optional 2x16 display is used to display messages to the user.

Messages can be displayed by:

Sending a command to the reader using serial communications, or

Programming pre-defined strings to be displayed, based on the status of the two digital inputs.

Sending commands to the reader using serial communications

There are 3 different commands which can be used to place data on the display. The **D** command is used to send up to 16 characters to line 1 of the display. The **d** command is used to send up to 16 characters to line 2 of the display. The **s** command is used to send up to 32 characters to both lines of the display.

The **D** and **d** commands display only the data contained in the command. All other data on the display remains undisturbed. If you send the **D** command with only 5 characters, then only the first 5 characters of line 1 are written to the display. Any characters in positions 6 thru 16 remain on the display. If you want the remaining portion of the line to be blank, send 16 characters with blank fills. IBC Extended and User Defined characters are not supported with the **D** and **d** commands (see below).

The **s** command sends up to 32 characters to the display and automatically performs a blank fill up to the 32nd character. The first 16 are placed on line 1, while the remaining 16 are placed on line 2. IBC Extended and User Defined characters are supported with the **s** command (see below).

Character Mapping

Page 66 contains a character map for the display. Each character is represented using a 5x7 matrix. There are 190 characters native to the display, containing US-Ascii and Japanese characters. These native characters are shown in **black** on the character map. Note that because the display is set up to show 5x7 characters, the Japanese characters which use more than 7 rows (map position F0h for example) will show only the top 7 rows. The remaining rows are truncated.

Characters shown in **red** on the character map are not native to the display. These are characters which IBC has generated for use on the display. These characters include characters with diacritics, the pound character, and the euro character.

Using the Display (continued)

Characters shown as a **U** are user-definable characters. You can design your own characters to be shown on the display. Each user character is defined by sending the reader a command containing 7 digits, each digit representing a row of the 5x7 matrix (see below).

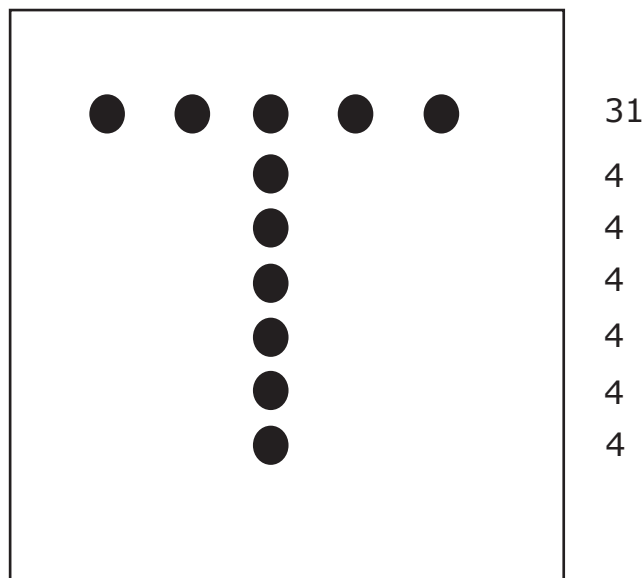
Character positions shown with an **X** are reserved for future use and are undefined.

The display is limited to displaying no more than 8 unique non-native characters. Because the IBC Extended characters and User Defined characters are not native to the display, you can use no more than 8 of them at the same time on the 32 character display. Using any one of the extended or defined characters more than once counts only as 1. The limitation of 8 means 8 unique non-native characters within the 32 characters shown on the display.

When using the **D**, **d**, or **s** commands, US-Ascii characters can easily be embedded in the command string within your program because they can be represented by standard keys on the keyboard. These keys are within the values of 20h and 7Fh. Values not within that range must be sent using their binary values, i.e chr\$(00) for user-defined character 1, chr\$(A0) for O with an umlaut.

Creating User Definable Characters

Each character shown on the display contains 35 individual blocks organized in a 5x7 matrix. This means 5 blocks across and 7 blocks down (7 rows of 5 each). To define your own character, you must send the reader (within the X075 command) 7 numbers, one number for each row (top to bottom). The number sent is the binary value of the 5 blocks (bits) across:



X075 numbers to make a "T" are 31,4,4,4,4,4,4
 X075 command (char pos 00) is X075 0 31 04 04 04 04 04 04

Using the Display (continued)

A maximum of 5 user-defined characters can be entered using the X075 command.

Using the Pre-Defined Strings

There are 4 programmable display message strings which can be programmed by using a QR barcode. The pre-defined strings are meant to be used when 2-way data communications is not possible because of the interface being used, i.e. wiegand or aba. In these cases, there typically is no feedback from the receiving device (controller) other than the signaling of one or two led control lines. In addition, when an arming loop is being used, you may want to show a specific prompt on the display when a vehicle is within the loop. The Pre-Defined strings allow you to do this.

If the Pre-Defined String option is ON, then at any one time one of the 4 Pre-Defined strings will be showing on the display. The string that is shown is dependant on the state of the 2 digital inputs. The 4 possible states are:

Digital (sense) Input 1	Digital (sense) Input 2
0	0
0	1
1	0
1	1

If an arming loop is being used and connected to Input 2, then a string such as "Plz scan ticket" could be placed on the display. If Input 1 is connected to the led line from a controller, then a status change on that line could be interpreted as an "access granted" condition, and that phrase could automatically show on the display.

There is one additional display line that can be programmed and optionally turned ON. This line can be displayed whenever a barcode is read in the scanner (good read display message).

The Pre-Defined strings and the Good Read string are turned ON or OFF using the X073 command. The Good Read string can also be programmed to stay on for a number of seconds, at which time the display will revert back to the string which should be shown based on the digital inputs. To program the Pre-Defined strings, contact IBC for programming information.

Updating Firmware and Serial Emulation

You can update Qscan readers using the ibc Flash Utility found on our website at <http://interbar.com>.

Rs232 and Tcp/ip readers can be updated directly through their serial connections.

To update Qscan readers with emulations interfaces you will need to make a cable to connect the reader to a pc or laptop. The wiring connections are:

- Red Power
- Blue Ground and DB9 pin 5
- Green DB9 pin 2
- Yellow DB9 pin 3

- Connect Orange and White together
- Connect DB9 pins 7 and 8 together

You must connect orange and white together before applying power. This is the signal to the Qscan reader that you want to start up in a serial mode so that you can download the new firmware. The reader will start up at 9600 baud, 8 data bits, no parity.

Besides updating firmware, Qscan readers with an emulations interface can be started up in the serial mode for the following purposes:

- Sending programming commands to the reader

- Viewing barcode data through the serial connection.

In case you are having issues with wiegand programming not working and you need to view what is encoded in a barcode, you can do this with a seial connection using the wiring pinout described above. Use the terminal mode from any of the ibc utility software programs to view the data.

Wiegand Bit Size Table

This table shows the number of bits required to encode a specific number into wiegand. This table can also be used to see how many characters are required to decimalize wiegand input fields.

BIT SIZE TABLE

Bits	Decimal Number	Bits	Decimal Number
1	1	33	8 589 934 591
2	3	34	17 179 869 183
3	7	35	34 359 738 367
4	15	36	68 719 476 735
5	31	37	137 438 953 471
6	63	38	274 877 906 943
7	127	39	549 755 813 887
8	255	40	1 099 511 627 775
9	511	41	2 199 023 255 551
10	1 023	42	4 398 046 511 103
11	2 047	43	8 796 093 022 207
12	4 095	44	17 592 186 044 415
13	8 191	45	35 184 372 088 831
14	16 383	46	70 368 744 177 663
15	32 767	47	140 737 488 355 327
16	65 535	48	281 474 976 710 655
17	131 071	49	562 949 953 421 311
18	262 143	50	1 125 899 906 842 623
19	524 287	51	2 251 799 813 685 247
20	1 048 575	52	4 503 599 627 370 495
21	2 097 151	53	9 007 199 254 740 991
22	4 194 303	54	18 014 398 509 481 983
23	8 388 607	55	36 028 797 018 963 967
24	16 777 215	56	72 057 594 037 927 935
25	33 554 431	57	144 115 188 075 855 871
26	67 108 863	58	288 230 376 151 711 743
27	134 217 727	59	576 460 752 303 423 487
28	268 435 455	60	1 152 921 504 606 846 975
29	536 870 911	61	2 305 843 009 213 693 951
30	1 073 741 823	62	4 611 686 018 427 387 903
31	2 147 484 647	63	9 223 372 036 854 775 807
32	4 294 967 295	64	18 446 744 073 709 551 615

Display Character Map

DISPLAY CHAR MAP

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	U	X		ø	ø	P	^	P	á	û	ö	一	ろ	ろ	ろ	ろ
0001	U	Æ	!	1	Q	a	9	à	Á	。	フ	チ	△	ã	q	
0010	U	Ú	"	2	R	b	r	â	À	「	イ	ウ	×	β	θ	
0011	U	Ù	#	3	S	c	s	é	Â	」	ウ	テ	ε	ε	ε	
0100	U	Û	\$	4	T	d	t	è	Ä	、	イ	ト	ト	μ	σ	
0101	X	Ü	%	5	E	e	u	ê	É	・	オ	大	1	ε	ü	
0110	X	ã	&	6	F	f	v	ë	È	ヲ	カ	ニ	ヨ	ρ	Σ	
0111	X	Ã	'	7	G	g	w	í	Ê	フ	チ	又	フ	g	π	
1000	X	Ñ	<	8	H	h	x	ì	Ë	イ	ウ	*	リ	ル	又	
1001	X	õ	>	9	I	i	y	î	Í	ウ	フ	ル	レ	レ	y	
1010	X	Ö	*	:	J	j	z	ï	Ì	エ	コ	△	レ	レ	レ	
1011	X	£	+	:	K	k	l	ó	Î	*	ウ	ヒ	□	*	レ	
1100	X	€	,	<	L	l	l	ò	Ï	ホ	ウ	フ	フ	*	レ	
1101	X	ç	-	=	M	m	n	ô	Ó	ユ	ズ	△	レ	レ	レ	
1110	X	Ç	.	>	N	n	n	ú	Ò	ヨ	ヒ	ホ	△	レ	レ	X
1111	X	B	/	?	O	o	e	ù	Ô	ウ	ウ	マ	"	ó	■	

T NATIVE DISPLAY CHARACTERS
 X UNUSED - RFU

á IBC EXTENDED CHARACTERS
 U USER DEFINABLE CHARACTERS

USER NOTES



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