



# "J" SERIES User's Guide

# |||ibc "J" SERIES USER'S GUIDE

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This manual provides information on how to setup, program, and interface the "J" Series readers, including the Smart Slot J, Smart Mag J, Magbar J, and 610 series wedges.

Additional copies of this manual can be obtained by contacting IBC or an authorized distributor. This manual may not be copied or duplicated in any way without the express written consent of IBC.

Revision pages of this manual are marked in the lower center of each page, noting the current revision level, and revision date.

Any errors or omissions from this manual should be noted and sent to the Technical Services dept. of IBC for correction.

If you need any additional information concerning the J series readers, contact IBC's Technical Support department from 08:00 to 17:00 Eastern Standard Time, at 860-659-9660, or e-mail us ([webmaster@interbar.com](mailto:webmaster@interbar.com)). Technical information and update information is also available on the internet at our home page <http://interbar.com>, and on our Bulletin Board @ 860-659-5859.

This manual contains information on all interfaces and options available with the "J" series readers. These commands are also applicable to the SA and STA readers as well; however these commands are only a subset of the commands available for those readers. For additional commands for the SA and STA readers, consult the SA/STA User's Guide.

Some options and programming commands may not be applicable to your particular reader. If you are having problems using these commands with your reader, contact IBC technical support.

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## *Product Description*

This manual pertains to all "J" series readers from IBC, including:

- Smart Slot J
- Smart Mag J
- Magbar J
- 610 Series Wedges

Each of these products is available in one of the following interfaces:

- Serial
- PC Wedge
- Emulation
- Dtmf
- Rs232 Wedge
- DEC VT320 Wedge

Information on the programming, usage, and wiring for all interface styles is contained in this manual.

Serial Interface readers are provided with either RS232, RS422/485, or TTL level outputs. Baud rate and parity is programmable. Serial interface readers may be networked and each reader addressed using a networking polling scheme. Serial readers are available with flying leads (no connectors), a DB9 connector, a DB25 connector, or an integral RJ11 jack. The pinouts for each of the different connectors is defined later in this manual.

PC wedge readers are provided with either a 5-pin din connector compatible with AT-style keyboards, or 6-pin minidin connectors compatible with PS2 style keyboards. Only the AT keyboard is supported (XT keyboards are no longer supported). All international keyboards are also supported.

Emulation interface readers are provided with flying leads (no connectors) and are used primarily for connection to controllers or other devices requiring emulation inputs.

DTMF output readers are provided with two RJ12 jacks for direct connection to the phone line. A DTMF reader can output only in DTMF.

RS232 wedge units are provided with a dual DB25 connector for "inline" connection between your terminal and host.

VT320 wedge readers are provided with two cables containing RJ12 jacks, for connection to the keyboard and to the terminal.

## *Programmability*

All "J" series readers are programmable in the following ways:

- Reading "control" barcodes
- Reading "control" magstripes
- Using "serial" commands

Units which have both barcode and magnetic stripe (Magbar J) may be programmed using either the control barcodes or control magstripe cards. Both single and dual track magnetic stripe readers are programmable using magnetic stripe cards encoded on either track 1 or track 2. All readers which have a bi-directional serial interface may be programmed by sending serial commands to the reader using the serial interface.

Control barcodes and magstripes are not supplied by IBC. These must be made by the customer.

Programming options in each reader are stored in non-volatile memory so these options are not lost when power is removed from the reader.

Each of the "J" series readers can be returned back to it's original factory defaults by using a control card (barcode or magnetic stripe).

If you need certain factory defaults set in

the reader before shipment, contact IBC and we'll be happy to set up a special default for you in each reader.

## ***Powering the Reader***

The "J" series readers are available with any of the following power configurations:

- 5 Volt DC
- 8-15V DC
- 15-30V DC

5 Volt DC units are standard, with the reader being powered through the communications line cable.

When you cannot guarantee a regulated 5V at the reader, then it is best to use a variable voltage unit - either 8-15V, or 15-30V.

For installations where there will be a long cable run to the reader, it is possible that there will be some voltage drop on the cabling to the reader. Variable voltage units (8-15V, or 15-30V) are therefore recommended when there will be a considerable voltage drop on the power line to the reader.

For cable runs which are under 500 feet it may be possible to use 18 guage wire without considerable voltage drop.

All 5V IBC readers require a minimum of 4.7 Volts of power, and should not be given more than 5.25 Volts of power. Variable voltage units can be given any amount of voltage within their specifications.

Readers which are powered by an IBC supplied AC adaptor are actually variable voltage units (8-15V) because the supplied AC adaptor is a 9V adaptor.

When utilizing an IBC supplied AC adaptor for power, the adaptor will be connected either to a jack inside the DB9 or DB25 connector, or to an inline jack provided with the cabling.

If your unit is supplied with an AC adaptor, use only the supplied AC adaptor for your reader. Use of another adaptor may void your warranty.

## ***DC Current Requirements***

The DC Current requirements for the "J" series readers are listed below. These are approximate figures and will vary from time to time depending on the status of the reader (flashing leds, for example, will use more power). These current approximations are for a 5V unit:

RS232 Units	100ma
RS422/485 Units	120ma
Emulation Units	100ma
PC Wedge Units	100ma
DTMF Units	100ma
RS232 Wedge Units	100ma
VT320 Wedge Units	70ma (12V)

Current usage at 12V or 24V is considerably less.

Please note that 5V readers which are supplied with a magnetic stripe emulation output require much more current than a typical non-decoded magnetic stripe reader. If you are connecting a reader with magnetic stripe emulation to an access control panel, make sure that you can draw the amount of current which is required.

## ***RS232 Interface***

The RS232 interface allows transmission of scanned barcodes and magnetic stripes using RS232 levels. Characters are transmitted using the ASCII character set.

The RS232 interface is a bi-directional interface. You can therefore program a reader with an RS232 interface using serial commands, as well as sending serial commands to the reader to control special reader operations, such as turning leds on and off.

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RTS and CTS flow control are not implemented in standard readers. These signals are, however, available upon special request.

RS232 readers can be reprogrammed to run at baud rates from 1200 baud to 19200 baud. Parity can be even, odd, or none.

Standard signals and wiring colors provided with RS232 units are:

Green	Txd	Transmit data
Yellow	Rxd	Receive data
Red	+VDC	+ Voltage
Blue	GND	Power ground & signal ground

Standard wiring for RS232 interfaces is a female DB9 connector with the following pinouts:

1	Signal Ground
2	Slot Txd
3	Slot Rxd
5	Power Ground
9	+ Voltage

Pins 2 and 3 are already set up to talk directly with a PC (you do not need a null modem connector). In addition, pins 7 and 8 are connected together inside the connector to satisfy RTS/CTS.

If your reader is provided with the optional AC adaptor, then the AC adaptor will connect either to the DB9 connector (on the side) or to an inline DC jack pigtailed with the connector, and of course, PIN 9 is no longer used for the voltage.

## ***RS232 Wedge Interface***

The RS232 wedge interface allows transmission of scanned barcodes and magnetic stripes using RS232 levels, in an "inline" mode between a RS232 terminal, and a host computer. The RS232 wedge interface is provided with a dual DB25 adaptor, one side which attaches to the

host cable, and another side which attaches to the terminal or terminal cable.

RS232 wedge units are programmable through the serial line only with the use of an adaptor, because data from the host computer cannot be intercepted by the reader normally. To program an RS232 wedge unit serially, send your serial command data to PIN 19 on the host side of the connector, and that data will be intercepted and interpreted by the reader. Of course, RS232 wedge units can also be programmed using control barcodes or magnetic stripes.

Power for RS232 wedge units is supplied by an optional AC adaptor, connected to the dual DB25 connector, or to a pigtail connector.

## **RS422/485 Interface**

The RS422/485 readers are similar to the RS232 readers, except the hardware interface uses a 4-wire differential pair, consisting of the following:

Green	TX+	Transmit data +
White	TX-	Transmit data -
Yellow	RX+	Receive data +
Orange	RX-	Receive data -

Power and Ground are wired as follows:

Red	+VDC	+ Voltage
Blue	GND	Power ground

RS422/485 units are provided standard with flying leads (no connectors). Connectors can be ordered on a special basis.

The RS485 hardware standard used in the "J" series readers meets both RS485 and RS422 specifications. RS422/485 readers are the readers typically used for networking.

For RS485/422 units which have been ordered with externally controlled leds, the led control lines are as follows:

Yellow GRN Green Led  
Orange RED Red Led

Externally controlled leds are normally wired for external pull-down to light the leds.

## TTL Interface

The TTL and Inverted TTL interface is similar in every respect to the RS232 interface, except the transmission signals are at a TTL level, rather than at RS232 levels.

All other programming, functionality, and wiring is similar to RS232 units.

## PC WEDGE Interface

The PC Wedge interface allows you to connect directly between your PC and keyboard. Power for the reader is taken from the PC and therefore no special power wiring is required.

When barcode or magnetic stripes are read, the data is transmitted directly to the PC using keyboard emulation, just as if you are typing something in on the keyboard. The "wedge" is therefore invisible to the PC other than the fact that the reader is deriving power from the PC.

When transmitting to the PC, the reader assumes that the PC keyboard is in "caps lock" mode - no shift character is therefore sent in front of alphanumerics. If your PC is not in "caps lock" mode, then lower case alphanumerics will be sent as upper case, and vice versa. The only way to ensure that lower case will remain in lower case, and upper case will remain in upper case is to program the reader to the PC "alt" mode, which is a special form of transmission available in IBC wedge readers. In this mode, the case of alphanumerics will always be correct.

PC Wedge readers are ordered with the

standard AT style 5-pin connector, or the 6-pin PS/2 minidin style. Only the AT keyboard is supported. XT support has been discontinued.

## Emulation Interfaces

The Emulation Interface models transmit data on the output wires at TTL levels, emulating one of the following:

- Magstripe Emulation
- Weigand
- Wand Emulation

A "J" series reader can be re-programmed at any time to change the type of emulation transmission on the data lines.

The types of barcodes and/or magnetic stripes which you can read will vary depending on the interface mode you have selected.

In the Wand Emulation mode, the reader emulates a bar code wand, sending data at a TTL level which emulates a Code 39 barcode. Any scanned data, barcode or magnetic stripe must therefore be able to be converted to the Code39 character set (0..9, A..Z, %,\$,+,space,hyphen, period) in order to be transmitted as Code 39 data.

Please note that lower case characters are not contained in the standard Code39 character set.

In the Magnetic Stripe emulation mode, the scanned data is transmitted emulating magnetic stripe Track 2 data, so the scanned data must be in the Track 2 character set (0..9,semicolon,question-mark,forward slash, equal sign). "C" start magnetic stripe emulation is also supported.

In the standard Weigand emulation mode, all scanned data must be numeric because standard weigand supports only numeric data. In the Alphanumeric Weigand mode, any character from the ASCII character set may be sent.

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The Signal lines for emulation readers are:

For Magnetic Stripe Emulation:

Red	+VDC	+ Voltage
Blue	GND	Power ground
Green	Media	Card Present
White	Clock	Magstripe Clock
Orange	Data	Magstripe Data

For Wand Emulation:

Red	+VDC	+ Voltage
Blue	GND	Power ground
Green	Data	Barcode Data

For Weigand Emulation:

Red	+VDC	+ Voltage
Blue	GND	Power ground
White	Data1	"1" data
Green	Data0	"0" data

For Weigand Emulation units with two externally controlled leds, the leds are wired as follows:

Orange is the Green Led, and Yellow is the Red Led. When two leds are used, the reader cannot be programmed for a different emulation mode unless it has been specifically ordered with a 7-wire interface, in which case the yellow wire is the Red led, and Brown wire is the Green led.

For magnetic stripe emulation, the clock line goes low when data is valid. The data signal is inverted, and media goes low when media is valid. Most magnetic stripe controller inputs conform to this standard.

Magnetic stripe emulation units may be programmed to raise the "data" line when the clock line goes high. This format emulates the way some older magnetic stripe units worked.

Magnetic stripe emulation data is sent out as Track 2 data, with a standard start sentinel, data, a stop sentinel, and LRC. The "J" series also supports the transmission of a "C" start sentinel as well.

For weigand emulation, both data 0 and data 1 go low when they are valid.

For wand emulation, data goes high to represent black, low to represent white. Barcode data is always at TTL level, not an open collector signal.

In the Alphanumeric Weigand mode, each scanned character is transmitted in an 8 bit format. If you read a scanned barcode of 10 characters, for example, then 80 bits of information will be sent. The high bit (bit 7) is sent first and bit 0 is the last bit of each 8-bit sequence.

Parity may also be selectively turned on or off for the transmission.

In the standard weigand mode, data is transmitted as a binary code in a programmable bit stream, consisting usually of a left-hand parity, a site identification, a card number identification, and a right-hand parity bit.

Weigand emulation readers are fully programmable with respect to the output stream, from 16 bits of output, to 64 bits of output. The site identifier, and card number identifier may consist of any number of bits, and parity can be included or excluded, as well as computed from any number of the bits.

This makes the weigand emulation mode compatible with most weigand controllers in the marketplace, including many of the proprietary formats.

For all emulation formats, the output signals are at a 5V TTL level.

Special programming commands are available in the "J" series readers for the automatic transformation of Kronos barcodes, and for the forcing of site id numbers.

The Northern Computers "12-digit" mode is also supported, where the ABA character set is used, transmitted electrically as a weigand signal.

## DTMF Interface

The DTMF interface allows the reader to be connected directly to a phone line. Any barcode which is scanned (or any magstripe swiped), is converted over to a DTMF tone and transmitted over the

phone line. The green led is turned on during the transmission process. You cannot control the green led directly. The red led is used as a power on indicator.

The "J" series readers "connect" to the phone line immediately before sending the tones, and then disconnects from the line. In order to use the DTMF reader for dialing, you should first pick up the headset, and then scan in your information. The phone will then dial. For entering information into an "offhook" line, you simply have to scan the information in. The reader will connect to the line, transmit, and then disconnect.

Power for DTMF output style readers is obtained using the supplied AC adaptor. DTMF readers are not available which are phone line powered.

Only the digits 0 thru 9 may be scanned in, along with the characters A thru D. The character "E" is used to transmit an "\*", and the character "F" is used to transmit a "#".

The transmission timing and delay between each tone is programmable, as well as a prefix and suffix character.

## ***VT320 Wedge Interface***

The VT320 Wedge interface is similar to the PC wedge interface. Two cables are provided with the reader - one which connects to the keyboard, and another which connects to the VT320. All scanned data is transmitted to the VT320 as if it was typed in.

## ***RJ11 Jack***

Your reader may be supplied with the optional RJ11 jack on the rear of the reader. Pinouts were not available at the time of the printing of this manual.

## ***Relay/Trigger Output***

An optional relay (or Trigger Output) is available with all versions of the "J" series readers. If your unit contains a relay, then you can perform the following functions with the relay:

- Trigger the relay after a good read
- Trigger the relay using a serial command (serial readers only).

The internal relay located inside "J" series readers is rated for 30VDC, 500ma. It is suggested that you do not put any more than 30VDC through the relay, and do not draw more than 500ma through the relay.

The relay may be used to open doors by powering an electric strike. If your electric strike is a 12VDC or 24VDC strike, then it is recommended that you purchase one of the variable voltage "J" reader models, so that you can power both the door strike and the reader from the same power supply. Do not use the supplied a/c adaptor for this purpose.

Please be advised that a Metal Oxide Varistor should be used for protection at the door strike and also near the reader. Excessive backward voltage which occurs when electric strike solenoids turn off can cause damage to the reader.

Readers with an internal relay are supplied with an additional cable for relay control. This cable consists of three wires which are used to control the relay. The wiring color codes are as follows:

Red	Common
Yellow	Normally Closed
Green	Normally Open

Your reader may have been ordered with only a Trigger Output, rather than an internal relay. These units are programmed the same way as relay units and all relay commands refer to the trigger line.

Current may not be sourced through the trigger line. The trigger line is meant as a TTL output only to be used only for sensing (not to control a device).

## ***Leds***

Leds (one green and one red), are also available with the "J" series readers as an option.

For readers which contain a serial inter-

face, the leds are normally internally controlled (controlled by the reader) as a standard. You may; however, specially order leds to be externally controlled on serial units. In this case, the leds are controlled by your device or controller, by pulling the led lines low.

Leds are normally not available with PC wedge versions, and leds provided with emulation style readers must be externally controlled. As an option, one of the leds in an emulation style reader can be hard wired at the factory to be a "power on" indicator, if you wish.

For serial units, the leds can be programmed to be turned on after a good read. For units with a bi-directional interface, serial commands can be sent to the reader to control the leds, including turning them on or off, and blinking the leds. When leds are externally controlled, two of the output wires (or connections) are used for controlling the leds. The actual wire or connector colors used will be listed on the reader, as color codes for external led wiring will vary depending on the interface.

## ***Clock Display***

Any "J" series reader with a serial interface may be ordered with an optional clock display. The clock display is a 4-digit display located on the front of the reader, where the time of day can be displayed.

The display is an LED display, not an LCD display.

No internal time clock is located in these readers. In order to change the time which is displayed on the display, you must send a serial command to the unit containing the time of day to display. To keep the time constantly updated, you must of course send a new time every minute.

## ***Alphanumeric Display***

An 8-character LED alphanumeric display may also be ordered with any serial interface "J" series reader. On this display, you

can display up to 8 alphanumeric characters. The data to be displayed must be sent to the reader as a serial command.

## ***Sense Inputs***

Serial interface units may be optionally ordered with sense inputs. These are two TTL level inputs which are constantly monitored by the reader. These are provided using a separate wire, where the Black wire is the first sense input, and the Brown wire the second.

You can then query the reader to determine the status of the sense inputs (high or low). For units which are polled using the IBC networking protocol, you can optionally program the readers to return the status of the sense inputs automatically during a poll sequence.

## ***Barcode Reading***

The "J" series readers support bi-directional reading of the following barcode symbologies:

- Code 39
- Standard, Industrial, and Interleaved 2 of 5
- UPCA, EAN13
- Codabar
- Code 128

You can program the reader to read only specified barcode symbologies or lengths. In addition, extra bars which may be printed near your barcodes can be eliminated during reading by programming the reader.

For Magbar readers, magnetic stripe reading takes precedence over barcode reading if the magnetic stripe reading is turned on.

You can program the readers to tell you which direction the barcode was scanned in, as well as tell you what symbology it is.

Also, barcodes which are read in may be masked and reordered.

## Magstripe Reading

Single track units can read magnetic stripe track 2 only. 2 track units can read either tracks 1 and 2, or tracks 2 and 3.

For magbar readers, magnetic stripe reading takes precedence over barcode reading, if the magnetic stripe tracks are programmed ON.

Each track can be programmed to use the standard character set for the track, or another character set. Magnetic stripe readers with track 1 data on track 2, for example, may still be read.

The "J" series readers with magnetic stripe support the reading of "C" start cards on track 2.

An enhanced magnetic stripe decoding algorithm contained in the "J" series readers automatically searches for the start sentinel on each track. In this way, cards which have been re-encoded will still be able to be read, even if there is extra data encoded on the magnetic stripe.

Track 2 magnetic stripe data may also be masked and reordered. Track 1 data cannot be masked or reordered.

For Units which have tracks 2 and tracks 3, as opposed to tracks 1&2, all Track 1 commands and features listed in this manual refer to track 3.

## Network Protocol

Serial units can be programmed to use a network protocol, which allows you to communicate with multiple readers on a RS422/485 network.

Using this protocol, up to 127 readers may be addressed individually within the network. Readers are addressed by specifying their unit address within each command. The unit addresses range from

address 0 thru 126. Address 127 is reserved as a *global* address, which is intercepted by all readers on the line.

When using the multidrop protocol, the data communications must be set to 8 data bits, 1 stop bit, and no parity (this is the IBC default), because the 8th data bit is used to signify addressing.

Communication to and from each reader is done within a predefined ack/nak protocol as follows:

<u>Host</u>	<u>Reader</u>
UA+command -->	
	<-- Ack/Nak

The reader always responds with an ack or a nak when a command is sent, unless it is a command to change the baud rate, or a global command (address 127).

Commands which require data to be returned from a reader to the host are done in the same way, except that the reader will also respond with the data following the ack or nak, and then the host must respond back to the reader with an ack or nak to inform the reader that the transmission was accepted.

<u>Host</u>	<u>Reader</u>
UA+command -->	
	<-- Ack/Nak
	<-- Data
Ack/Nak -->	

If a reader receives an ACK from the host, it assumes that the transmission was completed successfully. If the reader receives a NAK from the host, then it will retransmit the last transmission.

The unit address, which is used as a prefix to any data transmission to a reader, is an 8-bit byte consisting of the following bits:

1AAAAAA

where the eighth bit (bit # 7) is always a one, and bits 0 thru 6 is the readers' address. 11111111 refers to unit address 127 (global address), and 10000000 refers to unit address 0.

It is important to note that all data which is sent to the reader (other than the unit address) must have the 8th bit set to 0.

Each command sent to a reader, and all data sent from a reader, must be bracketed by STX and ETX. To poll a reader for data, for example, you would send the poll command "?" to the reader within the STX and ETX as follows:

UA + STX + ? + ETX

Acks and Naks are not sent within the STX/ETX bracket.

Whenever you poll a reader with the poll command, the reader will either return data which has been scanned in, or send a null, which means that the reader has no data in it. The null of course is sent within the STX/ETX bracket so the actual return data will be STX + NULL + ETX.

You must poll the reader and acknowledge the reader's transmission before another barcode or magnetic stripe can be scanned in the reader. For this reason, it is imperative that you poll each reader with your software as quick as possible.

In order to program for the instance when a reader goes offline do to a loss of power or some other failure, it is necessary to wait a little bit of time in your software for the reader you have polled to return back a response. We suggest using a timeout value of approximately 50ms. Any reader which is polled and is online should always respond within 50ms with either data, or a null (no data indicator).

Note that whenever you are sending commands to a reader in order to program the reader (in protocol mode), that the C/R which is normally sent with serial commands is not used.

## **Barcode/Mag Masking Table Processing**

You can mask and reorder any barcodes or magstripes which are read in. This allows you to select only those characters from the barcode or magstripe that you want, and also to program in any additional characters (such as prefixes, etc) which you want to include with the scanned data, or suffixes (such as CR/LF which some systems require).

Table processing is also an important feature when you wish to reformat the data which is read in to prepare that data for a form of transmission which requires some sort of conversion, such as weigand emulation.

You can enter in up to 10 table processing entries into the reader. Each of these entries instructs the reader to perform some sort of preprocessing on the data which is scanned in. The two types of operations which you can perform on the data are:

- Select Substring from the data
- Add a "constant" to the data

When you select a substring of the data, you specify the starting position of the substring that you want, and the length of the substring.

When you specify a "constant" command, you instruct the reader to place a constant (any character), in the output string you are creating.

There are five table processing entries which can be stored for manipulating barcodes, and also 5 entries for track 2 magstripe.

## **Keypad**

An optional external keypad may be connected to the J series readers. The keypad contains the digits 0 thru 9, \*, and a # which is used as an "enter" key. Data may

be input from the keypad at any time, and is stored until the enter key is hit, at which time the data is made available for output.

Units with keypads may be programmed to beep whenever a key is hit. A maximum of 10 digits may be entered in at any time.

## ***Maintenance Mode***

Serial "J" series readers may be placed into a "maintenance mode". While in this mode, barcodes and magnetic stripes can still be read and verified, but will not be transmitted.

Maintenance mode is typically used when protocol is being used to talk with multiple readers in an RS422/485 network, when maintenance needs to be performed on the host computer and you cannot poll each unit for data.

While in Maintenance mode, the data scanned in each unit is not saved in the unit. The unit simply functions as if it had been polled and data was transmitted.

## *Programming*

The following are programming commands which can be programmed into the reader by scanning in control barcodes, control magstripes, or sending serial commands (if your reader has a bi-directional serial interface).

Control Barcode commands must be created using Code 39, and start with the sequence %U.

Control magstripe commands on Track 2 are defined in a separate manual.

Control magstripe commands on Track 1 must be prefixed with %U

Serial programming commands are prefixed with a NULL character and must end with a CR. If the reader you are programming is set to network protocol mode, then all programming commands must be sent within the defined protocol; however, the terminating carriage return is **not** used when in protocol mode. Please note that a NULL character on a PC keyboard is achieved by keying in a ctrl 2.

### **Code 39**

AO	Code 39 Enable
AF	Code 39 Disable
ACE	Enable Code 39 Check Digit
ACD	Disable Code 39 Check Digit
ATE	Transmit Check Character (if check character enabled)
ATD	Don't transmit Check Character
ALxx	Set length to xx (maximum 24). If this is set, then code39 barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
ASE	Enable start/stop character transmission.
ASD	Disable start/stop character transmission.
ADE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
ADD	Disable the direction indicator.
AEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
AED	Disable extra bars.
AEx	Set "extra" bars maximum to x. "X" can be 1 thru 4.
APxxx	Set Code39 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any code39 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

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## S 2 of 5

GO	S 2 of 5 Enable
GF	S 2 of 5 Disable
GCE	Enable S 2 of 5 Check Digit
GCD	Disable S 2 of 5 Check Digit
GTE	Transmit Check Character (if check character enabled)
GTD	Don't transmit Check Character
GLxx	Set length to xx (maximum 24). If this is set, then S 2 of 5 barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
GDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
GDD	Disable the direction indicator.
GEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
GED	Disable extra bars.
GEx	Set "extra" bars maximum to x. "X" can be 1 thru 4.
GPxxx	Set S2of5 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any S 2of5 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

## Ind'l 2 of 5 Commands

FO	Industrial 2 of 5 Enable
FF	Industrial 2 of 5 Disable
FCE	Enable Industrial 2 of 5 Check Digit
FCD	Disable Industrial 2 of 5 Check Digit
FTE	Transmit Check Character (if check character enabled)
FTD	Don't transmit Check Character
FLxx	Set length to xx (maximum 24). If this is set, then Industrial 2 of 5 barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
FDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
FDD	Disable the direction indicator.
FEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
FED	Disable extra bars.
FEx	Set "extra" bars maximum to x. "X" can be 1 thru 4.
FPxxx	Set Industrial 2of5 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any Ind. 2of5 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

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## UPCA Commands

NO	UPCA Enable
NF	UPCA Disable
NDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
NDD	Disable the direction indicator.
NEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
NED	Disable extra bars.
NEx	Set "extra" bars maximum to x. "X" can be 1 thru 2.
NPxxx	Set UPCA prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any UPCA barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

## EAN13

EO	EAN13 Enable
EF	EAN13 Disable
EDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
EDD	Disable the direction indicator.
EEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
EED	Disable extra bars.
EEx	Set "extra" bars maximum to x. "X" can be 1 thru 2.
EPxxx	Set EAN13 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any EAN13 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

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## Code 128 Commands

BO	Code 128 Enable
BF	Code 128 Disable
BCE	Enable Code 128 Check Digit
BCD	Disable Code 128 Check Digit
BTE	Transmit Check Character (if check character enabled)
BTD	Don't transmit Check Character
BLxx	Set length to xx (maximum 24). If this is set, then code 128 barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
BDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data, showing the direction of the scan.
BDD	Disable the direction indicator.
BEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode.
BED	Disable extra bars.
BEx	Set "extra" bars maximum to x. "X" can be 1 thru 2.
BPxxx	Set Code 128 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any code 128 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

Please note that the "shift" character, as well as the append function and FUNC1..FUNC3 are not supported. All three character sets are supported.

## Codabar Commands

CO	Codabar Enable
CF	Codabar Disable
CCE	Enable Codabar Check Digit (mod 16)
CDE	Disable Codabar Check Digit
CTE	Transmit Check Character (if check character enabled)
CTD	Don't transmit Check Character
CLxx	Set length to xx (maximum 24). If this is set, then codabar barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
CDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
CDD	Disable the direction indicator.
CEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode.
CED	Disable extra bars.
CEx	Set "extra" bars maximum to x. "X" can be 1 thru 2.
CPxxx	Set Codabar prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any codabar barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.
LE	Enable CLSI interpretation.
LD	Disable CLSI interpretation.

If CLSI is enabled, then 14 character Codabar barcodes will be translated to CLSI format.

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## I 2 of 5 Commands

HO	I 2of5 Enable
HF	I 2of5 Disable
HCE	Enable I 2of5 Check Digit
HCD	Disable I 2of5 Check Digit
HTE	Transmit Check Character (if check character enabled)
HTD	Don't transmit Check Character
HLxx	Set length to xx (maximum 24). If this is set, then I 2 of 5 barcodes will not be accepted unless they are of length xx. Use 00 to reset the length to "any".
HDE	Enable direction indicator. If this is set, then a prefix of 'f' or 'r' is placed in front of the barcode data prior to transmission, signifying the direction of the scan.
HDD	Disable the direction indicator.
HEE	Enable extra bars. When this is set, the decoding algorithm will ignore a certain number of bars (or marks) which are near the barcode. On some barcodes, it is possible that there may be writing near the barcode, or there may be a change in the background of the card which makes the reader believe it is seeing a black bar. In this case, this deficiency in the card can be corrected by setting this option.
HED	Disable extra bars.
HEx	Set "extra" bars maximum to x. "X" can be 1 thru 4.
HPxxx	Set I 2of5 prefix. "XXX" refers to the decimal value of the prefix character which you want to precede any I 2of5 barcodes which are scanned. The prefix character is placed before the direction indicator (if set). To disable the prefix, set xxx to 000.

## Keyboard Commands

KSE	Enable Beep when hitting a key
KSD	Disable Beep when hitting a key
KPxxx	Set keyboard prefix. "XXX" refers to the decimal value of the prefix character which you want to precede keyboard data with. To disable the prefix, set xxx to 000.

## Sense Input Commands

DA1	Sense Input 1 Automatic sense
DA2	Sense Input 2 Automatic sense
DA0	Disable Auto Sense
Dxx	Sense delay time

Sense inputs may be set to automatic for serial units using protocol. In this mode, whenever the reader is polled for data, rather than sending the standard NULL character which signifies there is no data, the reader will send either a CTRL-A (meaning that sense 1 is high), a CTRL-D (meaning sense 2 is high), or a CTRL-E (meaning both sense inputs are high).

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If the sense delay time is set, then the reader will wait xx seconds after a relay opening before providing the automatic sense status. The only way to clear the status indication (after it is set), is to trigger a relay opening.

## LED Commands

LRO	Red led ON at power on
LRF	Red led OFF at power on
LGO	Green led ON at power on
LGF	Green led OFF at power on
LRExx	Red led ON for xx seconds after a good read
LGExx	Green led ON for xx seconds after a good read
LRD	Disable red led on after good read
LGD	Disable green led on after good read

## Relay/Trigger Commands

RTExx	Relay/Trigger on for xx seconds after a good read
RTD	No Relay ON after a good barcode read

## Speaker Commands

STExx	Beeper on for xx*10 milliseconds after a good read
STD	No Beep after a good barcode read

Note the maximum setting for xx is 49 (490ms).

## Serial Control Commands

IAxxx	Set unit address (valid addresses are 000 thru 126)
ICE	Send carriage return terminator
ICD	Don't send carriage return terminator
IBN	Set to 8 bits no parity

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IBE	Set to 7 bits even parity
IBo	Set to 7 bits odd parity
IBx	Set baudrate, where x =
	1 = 300 baud
	2 = 600 baud
	3 = 1200 baud
	4 = 2400 baud
	5 = 4800 baud
	6 = 9600 baud
	7 = 19200 baud
IME	Set "permanent" maintenance mode
IMD	Reset "permanent" maintenance mode
ITP	Turn Protocol Mode ON
ITN	Turn Protocol Mode OFF
IDxxx	Set Interchar Delay to xxxms, maximum of 200ms
ILE	Enable Linefeed Terminator
ILD	Disable Linefeed Terminator

Maintenance mode is a mode you can place the reader in where the reader will read in a barcode or magnetic stripe, but not transmit anything. This is valid in serial readers only, and is used normally in protocol mode, so that you can allow the reader to continue reading and functioning even if it is not polled. The Linefeed Terminator is mutually exclusive from the Carriage Return terminator, so if you specify both, you will get a c/r and a linefeed.

## PC Wedge Commands

ICE	Send ENTER key after data
ICD	Don't send ENTER key
IA	Set "AT" mode
IX	Set "XT" mode
II	Set "ALT" mode
ITxx	Set interkey delay to xx ms

Use the "ALT" mode on non-US keyboards to ensure compatibility with your keyboard. In this mode, all ascii keys are transmitted undisturbed to the keyboard. You do not have to re-program the reader for the type of foreign keyboard you are using, if you are in the "ALT" mode.

If the transmission to your PC is too fast, it is possible that you may lose some of the scanned data. Use the interkey delay to slow the transmission if this occurs.

## Track 1/3 Commands

M1O	Enable Track 1
M1F	Disable Track 1
M1R	Require Track 1
M1N	Don't require Track 1
M1TE	Transmit LRC character
M1TD	Don't transmit LRC character

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M1Ldd	Require Track 1 magstripe length to be dd characters long. dd includes the start and stop sentinels, and the LRC. Set dd to 00 to accept any length.
M1SE	Transmit start and stop characters
M1SD	Don't transmit start and stop characters
M1Pddd	Set Track 1 prefix to ddd, where ddd is the decimal value of an ASCII character. The prefix is placed in front of the magstripe data and the direction indicator if present.
M1Dxxx	Set Track 1 delimiter to ddd, where ddd is the decimal value of any ASCII character. To disable transformation of the delimiter character, set ddd to 000. The standard delimiter character used on track 1 is a "^".
M1C2	Use the Track 2 character set on Track 1
M1C1	Use the Track 1 character set
M1DE	Transmit the direction indicator "f" or "r" to show the direction of the scan.
M1DD	Don't transmit the direction indicator

If your reader is a two track reader, containing tracks 2 and 3 rather than tracks 1 and 2, then all commands for track 1 refer to track 3.

Note for multitrack units, if you "require" any specific track, then that track must be read and validated under your programming constraints before any magnetic stripe data is considered for transmission, otherwise the swipe is ignored.

## Track 2 Commands

M2O	Enable Track 2
M2F	Disable Track 2
M2R	Require Track 2
M2N	Don't require Track 2
M2TE	Transmit LRC character
M2TD	Don't transmit LRC character
M2Ldd	Require Track 2 magstripe length to be dd characters long. dd includes the start and stop sentinels, and the LRC. Set dd to 00 to accept any length.
M2SE	Transmit start and stop characters
M2SD	Don't transmit start and stop characters
M2Pddd	Set Track 2 prefix to ddd, where ddd is the decimal value of an ASCII character. The prefix is placed in front of the magstripe data and the direction indicator if present.
M2Dxxx	Set Track 2 delimiter to ddd, where ddd is the decimal value of any ASCII character. To disable transformation of the delimiter character, set ddd to 000. The standard delimiter character used on track 2 is a "/".
M2C1	Use the Track 1 character set on Track 2
M2C2	Use the Track 2 character set
M2DE	Transmit the direction indicator "f" or "r" to show the direction of the scan.
M2DD	Don't transmit the direction indicator
M2CO	"C" Start On
M2CF	"C" Start Off

## Multitrack Commands

M11	Transmit track 1 first, if two tracks read
M21	Transmit track 2 first, if two tracks read
MSddd	Set intertrack delimiter to ddd, which is the decimal value of any ASCII character. To disable an intertrack delimiter, set ddd to 000.

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## Weigand Commands

ISCdd	Set site ID character count to dd characters, dd=00 if no site characters
ISBdd	Set site ID bit count to dd bits
IICdd	Set Badge ID character count to dd characters, dd=00 for all remaining chars
IIBdd	Set Badge ID bit count to dd bits
ILdd	Set left hand parity computed with leftmost dd bits
IRdd	Set right hand parity computed with rightmost dd bits
IAO	Set weigand ALPHA mode ON
IAF	Set weigand ALPHA mode OFF
IPO	Set parity on for ALPHA mode
IPF	Set parity off for ALPHA mode
IKE	Set Kronos Mode 1 ON
IKD	Set Kronos Mode 1 OFF
IOE	Set Kronos Mode 2 ON
IOD	Set Kronos Mode 2 OFF
ISOdd	Override Site ID to dd, and turn override ON
ISOF	Turn OFF Site Override
IBO	Set "12 digit mode"
IBF	Set "12 digit mode" off

Three different Weigand output modes are available - numeric, alphanumeric, and the "12-digit" mode used by Northern Computers. The numeric mode is the traditional weigand output, where a number of bits are sent to the controller - each bit representing a one or zero. In the numeric mode, the bit pattern usually consists of a left parity bit, a number of bits for the site id, a number of bits for the badge id, and a right parity bit. In a standard 26 bit mode, the 26 bits consist of 1 left parity, 8 site id bits, 16 badge id bits, and a right parity bit. This constitutes the total of 26 bits.

Please note that when attempting to transform a barcode or magnetic stripe into the numeric weigand output format, that the numbers in the barcode must transform within the limitations set by the weigand bit length which you are using. In the standard 26 bit mode, the 8 bits used for the site id limit the site id to the values 0 thru 255, and the 16 bit badge id field limits the badge number to the range 0 thru 65535. Attempting to read barcodes, for example, which are 9 digit social security numbers may pose a problem because the 9 digits cannot fit into the 26 bit format.

In order to transpose barcode and magnetic stripe information into a format which can be transformed into a numeric weigand output, you may have to "mask" the barcode or magnetic stripe by using the table entry programming feature of the "J" series readers, or use one of the standard weigand transformation programming options setup in the reader.

To format a barcode or magnetic stripe into a usable format for weigand, first select the number of bits which you will be transmitting for the site id, and the badge id. That will tell you what the maximum binary number you can send in that format. The table below lists the maximum binary numbers which can be sent in a specific number of bits.

Bits	Maximum Number	Bits	Maximum Number
8	255	14	16383
9	511	15	32767
10	1023	16	65535
11	2047	17	131071
12	4095	18	262143
13	8191	19	524287

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Bits	Maximum Number	Bits	Maximum Number
20	1048575	28	268435455
21	2097151	29	536870911
22	4194303	30	1073741823
23	8388607	31	2147483647
24	16777215	32	4294967255
25	33554431		
26	67108863		
27	134217727		

If the number you are reading in will fit within the number of bits, then you will not have to reformat or transpose the data. If not, then you may have to select certain numbers from the barcode to include in the site id field, and a certain number of digits to put into the badge id field. This is done with the table processing entries.

Say, for example, that you have 7 digit barcode numbers, the maximum number being 1234567, and your weigand controller is looking for 26 bits. 1234567 is too large to fit within the 16 badge id bits, so you will have to transpose the number somehow. The first step is to see if you can break down the number into a certain number of digits for the site id, and then a certain number for the badge id. If you select 2 characters for the site id, then "12" would be your site id, which can fit into the 8 bits with no problem, and "34567" would be the badge id, which can bit into the 16 bits with no problem. If the 7-digit number, however, was 9999999, then you couldn't do it this way because even though the "99" would work for the site id, the "99999" is too large to fit into 16 bits. In this case, you may have to ignore one number from the barcode, and maybe use only the last 6 digits.

With the table processing entries, you can transform the barcode or magstripe any way you want, by selecting only those characters in the barcode or magstripe that you want to process. Once you have selected the portion(s) of the barcode or magstripe which you want to transform, then you select how many characters you will use for the site id, and how many characters you will use for the badge id. The reader will then segregate these two digit streams and create the proper weigand output.

For more information on masking and table processing, see the section "Table Commands".

The Aphanumeric Mode for weigand emulation is a special mode developed by IBC which allows you to transmit any ASCII character using weigand. Each character is sent as 8 bits, starting at bit 7 down to bit 0. The firmware in the receiving controller must be able to accept this format. Using this format, you can send any number (or alphanumeric stream) to the controller undisturbed. Some controllers already support the IBC alphanumeric weigand transmission mode. If your controller does not support this mode, then the numeric mode is the mode you must use.

There are two special programming commands already set up for the processing and reformatting of Kronos barcodes. The Kronos barcodes normally are a 17 digit Code 39 barcode, or an 18 digit Interleaved 2 of 5 barcode. These barcodes are set up with the badge id in positions 6 thru 10 and the site id in positions 11 thru 14 (for the code39 barcode), and the badge id in positions 7 thru 11 and the site id in positions 12 thru 15 (for the Interleaved 2 of 5 barcode).

If you specify the Kronos Input mode 1, then the "J" reader will automatically select the proper 5 digits for the badge number, and select the first two digits of the site code. You do not need to do any other programming to the reader unless you need to change the number of bits being transmitted. Please note that when you select this format, the reader automatically sets the badge id character parameter to 5, and the site id charac-

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ter parameter to 2. If you reset the Kronos Mode 1 parameter, these values do not change automatically. You will have to reset them by sending the appropriate commands.

You can also override the site id which is transmitted at any time, by using the site id override command. If you override the Site id, then the site character count is automatically set to 2. Resetting the site override does not reset the site character count. Therefore, if you set the site override and then reset it, the site character count is still set at 2.

Kronos Mode 2 will set the reader as defined above for Mode 1, and will still transpose Kronos cards as defined above, but does not use a site code. Cards which are not of the Kronos format also can be read, with the badge id length set to variable.

## Mag Emu Commands

IMC Set magstripe emulation output to "C" start emulation  
IMF Set "C" start emulation off  
INO Set "data line high" mode (used by older readers)  
INF Set "data line high" mode off

## Emulation Commands

ITW Set emulation mode to Weigand  
ITM Set emulation mode to magstripe emulation  
ITB Set emulation mode to wand emulation

## Table(Mask) Commands

T0essll Select barcode/magstripe substring  
e = entry number (0 thru 4 for barcode, 5 thru 9 for magstripe track2, ; thru > (;<=>) for track 1)  
ss = starting position in barcode/magstripe  
ll = length of substring, use 00 for "all remaining characters"

T1eccrr Insert Constant  
e = entry number (0 thru 4 for barcode, 5 thru 9 for magstripe)  
ccc = decimal value of ASCII constant to insert  
rr = repeat count (number of times to insert constant)

T2essll Select magstripe field substring  
e = entry number (5 thru 9 for magstripe track2, ; thru > for track 1)  
ss = field number in magstripe  
ll = length of substring, use 00 for "all remaining characters"

TA Activate table masking  
TD Deactivate table masking  
TR Clear table, and deactivate

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The table entry commands are used to mask and reorder barcode or magnetic stripe data. There are three commands, one to select specific substrings of the scanned/swiped data, one to insert specific characters, and 1 for selecting a specific magstripe field. 5 table entries can be programmed in for barcode masking (entries 0 thru 4), 5 entries for magstripe track 2 masking (entries 5 thru 9), and 5 for magstripe track 1 masking (entries ;,;, <, =, and > in that order). Whenever a barcode or magstripe is swiped, the reader checks to see if any table entries exist for the barcode or magstripe, and then begins to transform the data based on the table entries you have programmed.

Table Processing takes place before direction indicators or prefix characters are placed into the data. Any special processing, such as Kronos Weigand reformatting, etc., takes place after table processing and also after inserting direction indicators and prefixes. If you are using the table processing to reformat data for weignad output, or magnetic stripe emulation, be sure to turn off the direction indicators and the prefix characters for the particular symbology you are reading, if you have turned them on. The factory default for all readers is to have these indicators turned off.

Table entries for barcodes are executed, in order, from entry # 0 to entry # 4. For magnetic stripe track 2, they are executed in order from entry # 5 to entry # 9, and for magstripe track 1, in the following order ;;<=>. You should therefore program in your table entries in that order since that is the order the entries will be processed in.

To select specific substrings of the scanned or swiped data, use the T0 command. Using that command, you specify the starting position in the barcode/magstripe of the data you wish to extract, and the length (number of characters) to extract.

Use the T1 command to add characters at any time to the data you are extracting.

An example of table entries follows - say you have a 5 digit barcode, and you want to transmit only the last 3 digits, but precede the 3 digits with a '0', then the table entries would be:

T1004801	Table entry 0, insert the constant "0"
T010303	Table entry 1, select 3 characters of barcode data starting at position 3

Table processing is the method that you use to extract portions of a barcode or magnetic stripe in order to create a "new" number from the barcode or magstripe for weigand output.

## DTMF Commands

IPx	Set Prefix to x, where x='0'..'9','A'..'F', use a blank to set no prefix
ISx	Set Suffix to x, where x='0'..'9','A'..'F', use a blank to set no suffix
ITxxx	Set delay between tones to xxx * 10 milliseconds, 000=no delay

## VT320 Commands

ICE	Enable termination character
ICD	Disable termination character
IT	Set termination character to a TAB
IR	Set termination character to a RETURN

## Display Commands

(available on readers shipped prior to 1996 only)

J1	Set Display brightness to 6.6%
J2	Set Display brightness to 13%
J3	Set Display brightness to 20%
J4	Set Display brightness to 27%
J5	Set Display brightness to 40%
J6	Set Display brightness to 53%
J7	Set Display brightness to 100%

These commands set the brightness of the alphanumeric display.

## Factory Default Command

U	Return to factory defaults
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"J" series readers can be reprogrammed to their factory defaults by sending this command. All programming parameters which you have entered in will default back to the original factory parameters.

## ***Serial Control Commands***

The following are commands which you can send to "J" series readers serially, in order to command the reader. If you are in protocol mode, then these commands must be sent with the proper unit address and the STX/EXT brackets.

ALL commands must be sent with a Carriage Return unless you re in protocol mode, in which case no carriage return is sent. Do not group commands together into one string - make sure each command is sent by itself.

Note that these commands are not proceeded by a NULL character, because these are run-time commands, not programming commands.

!xx	Turn Relay ON for xx seconds, maximum 15
*	Turn Relay OFF immediately
&xx	Turn Beeper ON for xx*10 milliseconds, maximum 490ms
}xx	Turn Red led ON for xx seconds then turn off xx=00=leave on permanently
{xx	Turn Red led OFF for xx seconds, then turn on xx=00=leave off permanently
]xx	Turn Green led ON for xx seconds, then turn off xx=00=leave on permanently
[xx	Turn Green led OFF for xx seconds, then turn on xx=00=leave off permanently
)xx	Blink Red led for xx seconds, then leave on
(xx	Blink Red led for xx seconds, then leave off
>xx	Blink Green led for xx seconds, then leave on
<xx	Blink Green led for xx seconds, then leave off
?	Poll command, for multidrop mode
V	Return version identification string
Txxxx	Display xxxx (numeric only, or blanks) on time display
Dxxxxxxxx	Display message xxxxxxxx on alphanumeric display
%	Return status of Sense Input 1 (returns ON or OFF)
\$	Return status of Sense Input 2 (returns ON or OFF)
#	Place unit in Maintenance Mode
@	Place unit out of Maintenance Mode

## *Factory Defaults*

The following are the factory default settings which all "J" series readers are set to when they leave the factory, unless you have specifically asked for different factory defaults. Whenever you can in a "Return to Default" barcode of send the serial command to reset the reader, these are the parameters the reader will be sent to.

Code39	ON, No check digit, variable length, no start/stop, no direction indicator, 2 extra bars enabled, no prefix
I 2 of 5	ON, No check digit, variable length, no direction indicator, 2 extra bars enabled, no prefix
Standard 2 of 5	OFF
Industrial 2 of 5	OFF
UPCA	OFF
EAN13	OFF
Code 128	OFF
Codabar	OFF
Keyboard	'K' prefix, beep enabled
Sense Inputs	No automatic sensing, delay time=0
LED's	Red led on at power on, no leds after a good read
Relay/Trigger	No automatic trigger or relay on
Speaker	Beep on good barcode or magstripe read for 70ms
Unit Address	000
C/R terminator/ ENTER key	ON
LF termination	OFF
Serial Interchar delay	000
Baud Rate, etc..	9600 baud, 8 data bits, 1 stop bit, no parity
Maint Mode	OFF
Protocol Mode	OFF
Wedge Style	AT
Wedge ALT Mode	OFF
Wedge Interkey delay	10ms
VT320 termination	C/R enabled
Track 1	ON, not required, no s/s, no LRC, no prefix, delim='^', track 1 character set, no direction indicator
Track 2	ON, not required, no s/s, no LRC, no prefix, delim='/', track 2 character set, no direction indicator, no "C" start
Multitrack	If both tracks read, transmit track 1 first with no intertrack delimiter
Weigand	26 bit output (1+8+16+1), site id=3 characters, badge id=5 characters, numeric mode, Kronos format off, Site override off
Mag Emulation	"C" start emulation OFF, "data high mode" OFF
Emulation Type	Preset at factory to your emulation type
Table Masking	Table disabled
DTMF	No prefix, no suffix, 150ms delay between tones