



701-09 Converter User's Guide

|||ibc 701-09 SERIES USER'S GUIDE

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This manual provides information on how to setup, program, and interface the IBC 701-09 RS232 to wiegand convertor.

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 701-09 series convertors, 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). Technical information and update information is also available on the internet at our home page <http://interbar.com>.

The commands in this manual, although similar, should not be confused with the command set for the "J", "SA", "STA", or "DC" series readers.

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

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Contents

Product Description	4
Programmability	4
Powering The Convertor	4
DC Current Requirements	5
RS232 Input Interface	5
Wiegand Interface	5
Masking	6
Table Processing	6
Programming	7
Factory Defaults	11

Product Description

This manual pertains to the 701-09 convertor only, and not other versions of the 701 convertor family.

The input into the convertor is RS232 serial. The RS232 data is converted inside the convertor according to user-defined parameters, and is output as a wiegand signal.

The standard connector for the serial input is a DB9 connector, wired as a DCE device (can be connected directly to a PC for testing). The standard wiring for the wiegand emulation outputs are flying leads.

Programmability

Certain functions in the convertor are programmable by using serial commands.

The command set is defined later in this manual.

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

The convertor can be returned back to its' original factory defaults by sending a special serial command.

If you need certain factory defaults set in the convertor before shipment, contact IBC and we'll be happy to set up a special default for you in each convertor.

Powering the Convertor

The convertors 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 convertor being powered through the interface line cable.

When you cannot guarantee a regulated 5V at the convertor, 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 convertor, it is possible that there will be some voltage drop on the cabling to the convertor. 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 convertor.

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

All 5V IBC products 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.

Products 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 convertor is approximately 100ma at 5VDC.

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

RS232 Interface (input)

The RS232 interface is an input-only interface. Data which is received in the rs232 port is converted automatically by the reader, and then transmitted using the output interface.

RTS and CTS flow control are not implemented.

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

Standard RS232 wiring colors 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
3	Convertor Receive
5	Power Ground
9	+ Voltage

Pins 7 and 8 are connected together inside the connector to satisfy RTS/CTS.

If your convertor 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 pig-tailed with the connector, and of course, PIN 9 is no longer used for the voltage.

Wiegand Interface

The Wiegand output consists of three wires, one for Data 0, 1 for Data1, and another for Ground. The signals are at TTL levels.

The output is fully programmable up to 64 bits. You can select the number of site id bits, number of badge bits, and parity.

The type of data which you can convert will vary depending on how the wiegand output is programmed.

In the standard Weigand emulation mode, all 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.

The wiegand output wiring is:

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

Please note that if you are using an ac adaptor and powering the convertor through the DB9 connector, then the red wire is unused, and the blue wire is ground.

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

are:

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 convertors 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 convertor 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.

Masking/Table Processing

You can mask and reorder any data which is received. This allows you to select only those characters from the serial stream that you want, and also to program in any additional characters (such as prefixes, etc) which you want to include with the data, or suffixes.

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 5 table processing entries into the reader. Each of these entries instructs the reader to perform some sort of preprocessing on the data which is received. The two types of operations which you can perform on the data

- 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.

Programming

The following are programming commands which can be programmed into the convertor by sending serial commands.

Programming commands are prefixed with a NULL character and must end with a CR.

Please note that a NULL character on a PC keyboard is achieved by keying in a ctrl 2.

Speaker Commands

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

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

Serial Control Commands

2BN Set to 8 bits no parity
2BE Set to 7 bits even parity
2BO Set to 7 bits odd parity
2Bx Set baudrate, where x =

1 = 300 buad
2 = 600 baud
3 = 1200 baud
4 = 2400 baud
5 = 4800 baud
6 = 9600 baud
7 = 19200 baud

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
IISOdd	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 data into the numeric weigand output format, that the numbers in the data stream 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 input data, 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 data information into a format which can be transformed into a numeric weigand output, you may have to "mask" the data by using the table entry programming feature.

To format data 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

|||ibc 701-09 SERIES USER'S GUIDE

Version 1.0 Rev 0.0 05 NOV 1998

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 data 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 a 7 digit input, 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 fit 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 data, and maybe use only the last 6 digits.

With the table processing entries, you can transform the data any way you want, by selecting only those characters in the data that you want to process. Once you have selected the portion(s) of the data 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 convertor 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.

You can 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.

Table(Mask) Commands

T0essll	Select data substring
e	= entry number (0 thru 4)
ss	= starting position in data
ll	= length of substring, use 00 for "all remaining characters"
T1eccrr	Insert Constant
e	= entry number (0 thru 4)
ccc	= decimal value of ASCII constant to insert
rr	= repeat count (number of times to insert constant)
TA	Activate table masking
TD	Deactivate table masking
TR	Clear table, and deactivate

The table entry commands are used to mask and reorder data. There are two commands, one to select specific substrings of the data, and another to insert specific characters. A maximum of 5 table entries can be programmed in. Whenever data is received by the convertor in the serial input, the convertor checks to see if any table entries exist, and then begins to transform the data based on the table entries you have programmed.

Table entries are executed, in order, from entry # 0 to entry # 4. 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 data, use the T0 command. Using that command, you specify the starting position in the data that 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 data stream, 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 the data starting at position 3

Table processing is the method that you use to extract portions of the data in order to create a "new" number from the inputted data.

Factory Default Command

U Return to factory defaults

The convertor can be reprogrammed to the factory defaults by sending this command. All programming parameters which you have entered in will default back to the original factory parameters.

Factory Defaults

The following are the factory default settings which all 701-09 convertors are set to when they leave the factory, unless you have specifically asked for different factory defaults. Whenever you enter in a "Return to Default" serial command to reset the convertor, these are the parameters the convertor will be set to.

Speaker	Beep on good conversion for 70ms
Baud Rate,etc..	9600 baud, 8 data bits, 1 stop bit, no parity
Weigand	26 bit output (1+8+16+1), site id=3 characters, badge id=5 characters, numeric mode, Site override off
Table Masking	Table disabled