



AN1010 - Configuring custom Wiegand formats

Many access control systems use a Wiegand format for their user cards with as many as 50 bits of information stored. We need to filter out the parts of this data string that are useful to Net2 but ensure that we keep the unique user and security (site code) information.

Net2 already has a fixed format for 26 bit cards (the most common) but this combines the site and user code data into a single hybrid 8 digit number for Net2 to use. This makes it easy to set up but the 8 digit number has no relationship to any number printed on the card and may be unacceptable to the installer if they need to enroll a user by entering their card number.

We can configure the Net2 software to accept Wiegand formats by setting up filters. These use rules that are defined in the Net2 Server Configuration Utility.

It is important to know the exact format of the data on these cards before attempting to set up the configuration rules. If these are incorrect, the reader may simply ignore the cards and will make the setting up of rules a very time consuming business.

Configuring Wiegand formats

A Wiegand card will contain a site code (sometimes called the facilities code) and a user code. Many will also have additional facilities codes, distributor codes, date codes, etc.

Consider the following 37 bit Wiegand format example: (spaces added for clarity)

P SSSSSSSS FFFF AAAAAAAAAAAAAAAAAAAAAA P

P is a parity bit. These confirm to the reader that the data is complete - one at each end

S is the site code 8 bits

F is a facility code 4 bits

A is the card number 23 bits

For a card with the following information:

Site code	193	(11000001 in binary)
Facility code	12	(1100 in binary)
User number	1234	(00000000000010011010010 in binary)

The card data is:

1 11000001 1100 00000000000010011010010 0

We can set up a rule that will check the 193 site code and pass the Card number (1234) to Net2.

X 11000001 XXXX AAAAAAAAAAAAAAAAAAAAAA X

X - is ignored by the reader.

0 - must be zero (checked by the ACU but not passed to Net2)

1 - must be one (checked by the ACU but not passed to Net2)

A - is the card number (Passed to Net2)

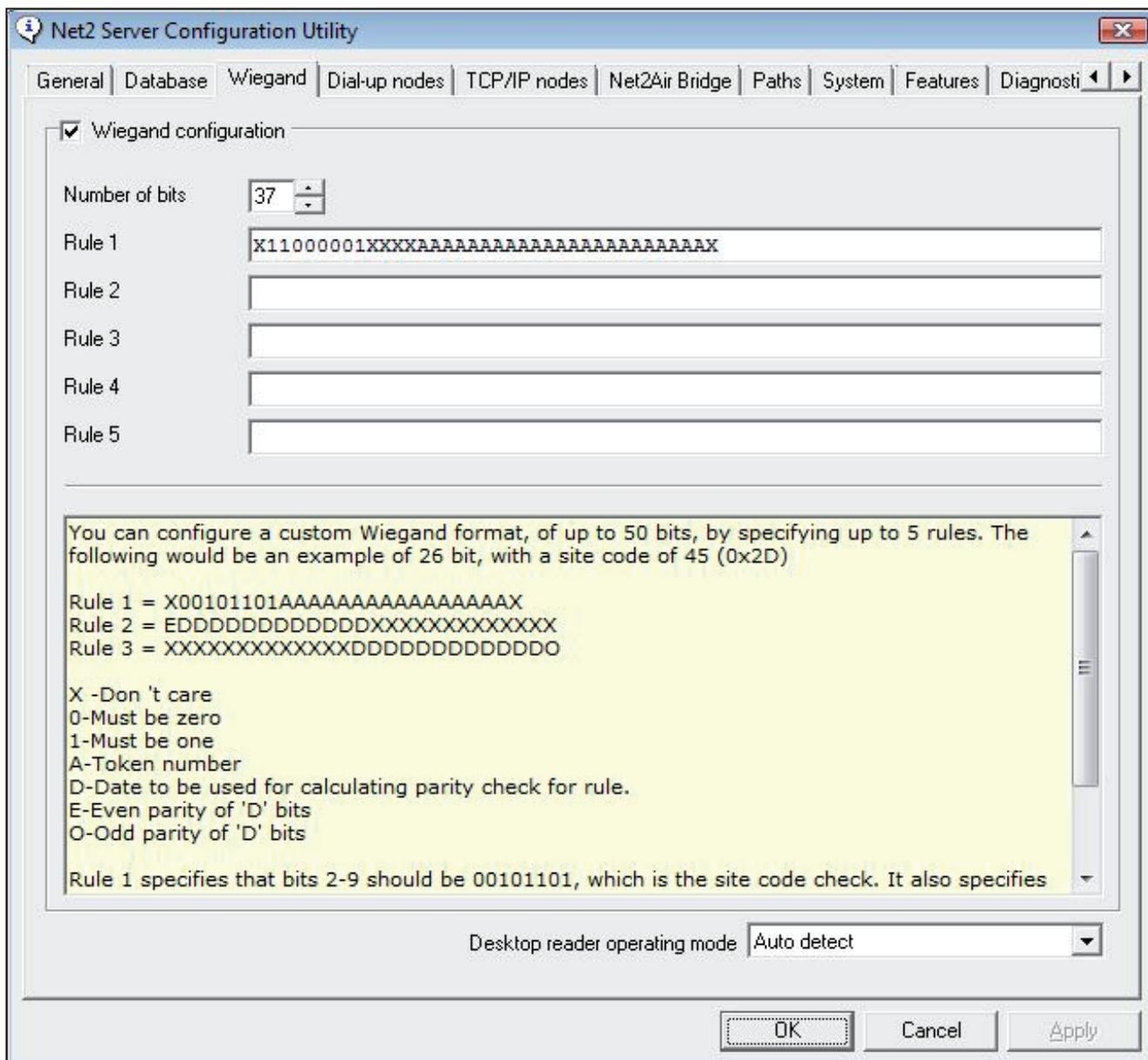
This rule is entered into the Wiegand filter as follows:

Rule 1: **X11000001XXXXAAAAAAAAAAAAAAAAAAAAAX**

This represents the best option for Net2. (site code and card number)

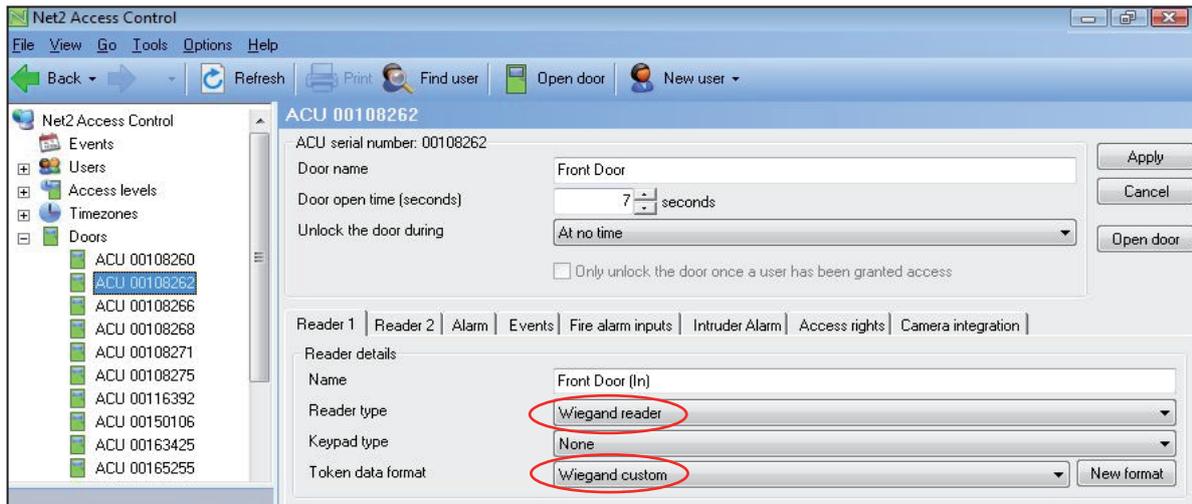
NOTE: It is good practise to include the site code check on Wiegand cards as they are often supplied to customers in a batch starting at number 001. This gives the possibility that any 37bit card numbered 001 will work on this system.

The Net2 Server Configuration Utility should look like this:



NET2
V4

Once a custom Wiegand format has been entered into the Net2 Server Configuration Utility, a new format called 'Wiegand Custom' will appear in the 'Token data format' option. As below:



The filter information is stored in each ACU controller. Any changes to the Wiegand filter will require the Net2 server to be restarted so that it can update the system.

Net2 systems after v4.06 should restart the server automatically.

Configuring Wiegand formats

In most cases, the manufacturer of the card will be able to advise how many bits of data are encoded on the card (26, 34, 37, etc). They will not reveal the data layout or any site code information.

To read the card, run the Net2 software and set the Wiegand door reader to a 'Desktop reader'.

26 bit tokens

If it is a 26 bit card, set the format to 'Wiegand 26 bit' When you present the token, the reader should beep and the 'Add user' screen should display with a Paxton 8 digit number in the bottom right corner. Note this is a 24 bit number as the Paxton 26 bit converter ignores the two Parity bits located at each end. This number needs to be converted into Binary. (Windows has a Calculator with a Scientific view)

Enter the number displayed (13175734 for example) and then select the Binary display (Bin). This converts the decimal number into Binary. (110010010000101110110110).

The layout is normally Site Code (8 bits) and Card Number (16 bits)

Therefore: 110010010000101110110110 gives:

11001001 (First 8 bits - Site Code = 201)
0000101110110110 (Last 16 bits - Card Number = 02998)

A filter set to 26 bits - Rule1: X11001001AAAAAAAAAAAAAAAAAX will ignore parity, check the site code (201) and then pass the card number (02998) to Net2.

More than 26 bits

If we have a card has more than 26 bits we need two operations to discover all the data bits. For example, for a 32 bit card:

Firstly, set a Wiegand filter with 24 A's at the start, and then X's to the end.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAXXXXXXXXX.

Apply this change and present the card to the reader. The 'Add user' software will display an 8 digit number. Copy this number into a text document for reference.

Now change the filter rule so the last 24 digits are A's and the start is 8 X's

XXXXXXXXAAAAAAAAAAAAAAAAAAAAAAAAAAAAA.

Repeat the process of reading the number and then convert the two numbers into binary.

If the two number read and converted were:

13067029	11000110110001100010101
6493574	011000110001010110000110

By placing them one above the other, we can see where these overlap.

11000110110001100010101
011000110001010110000110

We can then deduce that the 32 bits on this card are:

1100011011000110001010110000110

If the card we were using also has a number printed on it, for example 3246787, we can use this to confirm the position of the card number within the 32 bit data string.

32 bit card:	1100011011000110001010110000110
3246787:	01100011000101011000011
Filter:	X1000111AAAAAAAAAAAAAAAAAAAAAAAAAX

The above filter should be fine for this card set. To confirm this, we need to repeat the whole process with at least two more cards. The site code will always be the common bits to the left of any card number. Note that any 0's will be missing from the left end of any card number when displayed on the PC screen.

We can see that the site code appears to be 1000111 (or 71) but without the exact definition, the actual position where the site code ends and the card number begins can only be assumed.

It is possible to set the filter to allow more than one site code; for example 70 and 71) To do this, check for the common bits in both codes and then use X for the bits that differ.

Code 70:	1000110
Code 71:	1000111
Filter:	100011X