

# MVAM GUIDANCE:

## PROCEDURE FOR CONVERTING RESPONDENTS PHONE NUMBERS TO AN ANONYMOUS MASK ID

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For security and safety measures all mobile phone numbers of mVAM survey respondents must be assigned with an anonymous ID. The purpose of this guide is to show the steps to be taken for creating a hash function to convert respondent phone numbers and producing a unique ID.

### Steps to be taken for Creating a Unique ID

1. Open excel
2. Enter in Visual Basic for Applications (VBA). If you are not familiar with VBA, please see link to see how you can enter in VBA with Windows and/or Mac: <https://exceljet.net/keyboard-shortcuts/open-vba-editor>
3. Copy and paste the following function<sup>1</sup> in VBA:

```
Function CRC16THRICE(s As String)
Dim l As Integer, l3 As Integer
Dim s1 As String, s2 As String, s3 As String

l = Int(Len(s) / 3)
s1 = Mid(s, 1, l)
s2 = Mid(s, l + 1, l + 1)
s3 = Mid(s, l + 1 + l + 1)

CRC16THRICE = hash4(s1) + hash4(s2) + hash4(s3)

End Function

Function hash4(txt)
Dim x As Long
Dim mask, i, j, nC, crc As Integer
Dim c As String

crc = &HFFFF

For nC = 1 To Len(txt)
    j = Asc(Mid(txt, nC))
    crc = crc Xor j
    For j = 1 To 8
        mask = 0
        If crc / 2 <> Int(crc / 2) Then mask = &HA001
        crc = Int(crc / 2) And &H7FFF: crc = crc Xor mask
    Next j
Next nC

c = Hex$(crc)

While Len(c) < 4
    c = "0" & c
Wend
hash4 = c
End Function
```

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<sup>1</sup> The algorithm has a 0.23% collision rate. This means that it could generate some duplicate IDs although the original phone numbers are different.

#### 4. Go to excel and Save

Go to excel

Save

The screenshot shows the Microsoft Visual Basic for Applications editor for a project named 'FUNCRES.XLAM'. The 'Project - VBAProject' window on the left shows the project structure, including 'RibbonX\_Code'. The 'Properties - RibbonX\_Code' window shows the 'RibbonX\_Code Module'. The main editor window displays the following VBA code:

```
'Entry point for RibbonX button click
Sub ShowATPDialog(control As IRibbonControl)
    Application.Run ("fDialog")
End Sub

'Callback for RibbonX button label
Sub GetATPLabel(control As IRibbonControl, ByRef label)
    label = ThisWorkbook.Sheets("RES").Range("A10").Value
End Sub

Function CRC16TWICE(s As String)

    Dim l As Integer, l3 As Integer
    Dim s1 As String, s2 As String, s3 As String

    l = Int(Len(s) / 2)
    s1 = Mid(s, 1, l)
    s2 = Mid(s, l + 1, l + 1)

    CRC16TWICE = hash4(s1) + hash4(s2)

End Function

Function hash4(txt)
    Dim x As Long
    Dim mask, i, j, nC, crc As Integer
    Dim c As String

    crc = &HFFFF

    For nC = 1 To Len(txt)
        j = Asc(Mid(txt, nC))
        crc = crc Xor j
        For j = 1 To 8
            mask = 0
            If crc / 2 <> Int(crc / 2) Then mask = &HA001
            crc = Int(crc / 2) And &H7FFF: crc = crc Xor mask
        Next j
    Next nC

    c = Hex$(crc)

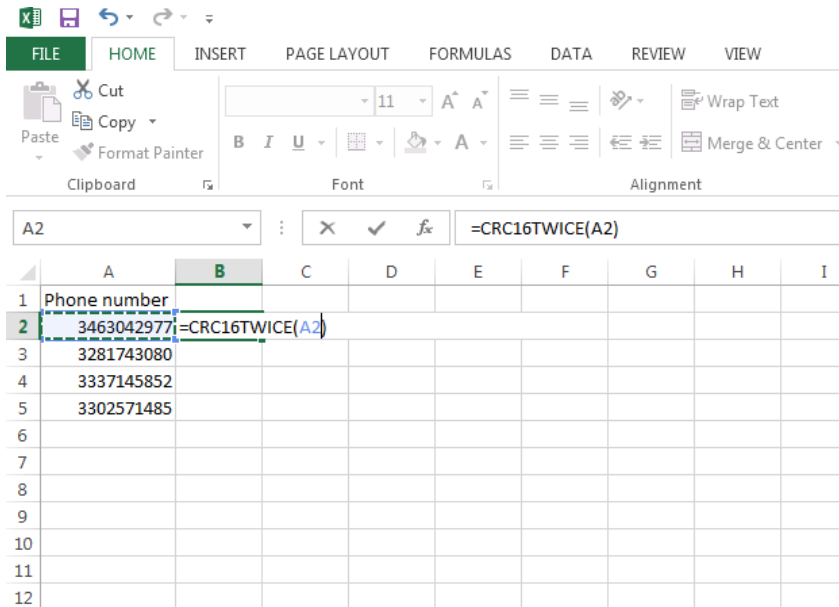
    While Len(c) < 4
        c = "0" & c
    Wend

    hash4 = c

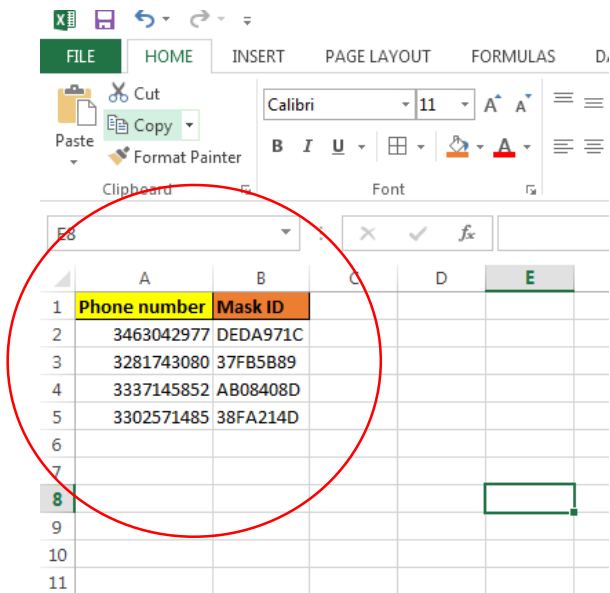
End Function
```

A red circle highlights the code in the main editor window. A red arrow points from a box labeled 'Code you copied and Pasted' to the code. The 'File' menu in the top-left corner is also circled in red.

5. Write: =CRC16TWICE(<column with phone numbers>)



*After you click OK, you'll have the mask ID.*



**END!**