State of Maine

Department of Financial and Administrative Services

Maine Revenue Services

Software Developer's Guide

For Tax Years 2023 and 2024

PDF417 Formatted 2-D Bar Coded Tax Returns

Country codes have been updated/changed.

Change Number: Original

Date of Change: 09/19/2023

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Section 1: Maine Revenue Services includes 2-D Bar Coding of Tax Returns

After testing the use of PDF-417 barcodes on Maine's Individual Income Tax Return (1040ME) it was decided that this technology would be incorporated with several of Maine's substitute tax forms. In 2012 MRS' Administrative Rule 104 was changed to require the placement of 2D barcodes on all tax software developed substitute forms designated to contain the 2D barcode. Waivers may be requested and will be granted on a case by case basis. Forms received without the 2-D bar code will be delayed in processing and may result in reduced accuracy of the data captured with resulting delays in processing or un-necessary contact with taxpayers. For the 2023-2024 tax processing season the following forms will be mandated to contain the 2-D barcodes: 1040, 1120, FORMCR, MEUC1 (including MEUC1SCH2), 1040ES, 1040PV, 941P (including the 941P Schedules 2 and 3 forms) & 1040C.

Information on 2-D bar coding of tax forms is available on the Federation of Tax Administrators' web site at www.taxadmin.org.

Section 2: 2-D Barcode Content

The 2-D barcode will include all variable data fields contained on the primary form as well as all other supporting forms from which data is captured. All alphabetic characters must be capital letters only.

All data formats follow the criteria published in the "Tax Forms Processing 2-D Barcoding Standards Guidance" issued by the Federation of Tax Administrators (FTA). Note: hyphens and separators should not be used in dates, social security numbers, telephone numbers, etc. However, a leading hyphen ("-") is to be used for negative dollar amounts.

The name field on the return should be broken down by field as described in the tax form layout specifications. Check box fields should return the number "1" if checked and "0" if blank.

Dollar amounts, on non-payroll related forms, are required to be rounded to the nearest dollar and the bar code field must contain whole dollars only with no special characters except for the "-" in front of a negative dollar amount. On payroll reporting forms (currently the 941P and its schedules) all payroll values will contain cents except in the Sales and/or Income fields as stipulated in the 2D specifications for these forms.

Section 3: PDF417 Formatting Specifications

Developers are encouraged to also refer to Tax Forms Processing – 2D Barcoding Standards: Section 3 as found at www.nactp.org.

	Normal PDF417
Encode type	300 dpi
DPI	ON
Pixel shaving	Variable
Code word count	
Mils Encryption Error Correction Level	104
Data Columns	Variable
Module Aspect Ration	2.00 : 1
Data Rows	Variable
X Dimension	3
Location	Reserved area on page one of primary form

Reserved space	3.75" x 1.65" (may vary depending on amount of data)
Max Characters	1300
Field Delimiter	Carriage Return [<CR>]
End of File Delimiter	"*EOD*"

1. PDF 417 has error detection and correction capabilities. The more error correction is used, the less data can be communicated in the barcode. Complete barcode read failures are very uncommon. The tax Application Programming Interface (tax API) sets parameters for correction/detection. These parameters should be observed and not altered.
2. Based on the experience of other taxing authorities' 2-D barcode use, the error correction level in the current market-provided DLL will be set to level 4.
3. A general rule that can be used to determine if a printer is capable of producing a 2-D barcode is if the printer can produce a graphic such as a tax agency seal or business logo, then the printer should be capable of producing a 2-D barcode that can be scanned.
4. Pixel shaving is a technique that produces higher-quality barcodes when printed on lower-quality equipment like inkjet printers. Pixel shaving will result in improved read rates. In the DLL, pixel shaving will always be turned on.
5. Increasing the x (horizontal) dimension of the barcode elements from the minimum of 7.5 mils to the maximum of 25 mils will produce the most readable barcodes, especially on low quality ink/bubble jet printers. Whenever possible, software vendors will create a barcode that uses the largest possible x element value for the given space.
6. Users are advised that stretching or scaling the barcode (via copying the paper media or the like) changes its integrity and worsens readability; it should not be employed.
7. 2-D barcodes should never be rotated. Rotating a 2-D barcode increases processing difficulty and introduces the risk of errors. Since PDF-417 barcodes are read in both the x (horizontal) and y (vertical) directions on a portrait page, rotating them from their natural position can render the barcode unusable.
8. Unless otherwise noted in Part 2, any line item left unanswered or having a value of zero (blank, no data, null or 0) should not have a value on the printed page or in the 2D barcode. An inspection of the 2D barcode (raw data) should look something like this, which represents 2 consecutive line items having no data values, [<CR><CR><CR>].

Section 4: Quality Assurance

The software must ensure that Name, Address and Entity ID (Social Security, Federal Entity Identification Number, Account Number, etc.) information is present prior to printing the return.

Also, the software must contain a brief explanation of what a 2-D barcode is and inform taxpayers that any changes made to a return after printing will not be reflected in the 2-D barcode unless they print a new return. Handwritten changes on computer-generated returns are not acceptable and may not be detected during processing resulting in original data being applied to the account. Failure to print a new return after making changes will severely impact MRS processing and introduce errors.

The software must ensure that printed data and encoded data in the 2-D barcode are an exact match with the exception to rounding of dollar amounts. Any updates to data must be reflected in the 2D barcode prior to a return being printed. This becomes especially important when a return is updated after its initial creation. Changes to any document within a return must flow to every other area of the return, as appropriate.

For their own internal purposes, the vendor may choose to print company name, an identification number, control number, version number, etc. on the form or schedule. Row 64 of the paper form may be used for this purpose. When trying to research a problem, some vendors have found this information to be helpful.

Section 5: Portable Document Format – PDF Files

IMPORTANT! When saving a form in PDF format, the ADOBE reader defaults to fit or shrink to printable area. There is a setting in the PDF specifications that can be set in each file that will force the document to print without being shrunk. When using PDF files to save and/or print tax returns, the following PDF Viewer Preferences or properties <u>must</u> be set by the vendor application:

      PrintScaling = None   **Duplex = Simplex**

The standard Adobe Reader when installed, defaults to Page Scaling set to "shrink to printable area" causing all documents to be scaled. This causes two problems: 1.) 2D barcodes become unreadable and 2.) Fixed location printing is shifted and also becomes unreadable.

Setting the PrintScaling property to none will override the local setting and force the document to print without scaling.

Setting the Duplex property to Simplex will override local settings and force the documents to be printed single sided. Simplex printing is a requirement for 2D bar coded returns.

These settings are explained in section 8.1, Viewer Preferences, page 577 of the following manual:
               PDF Reference sixth edition Adobe®
               Portable Document Format Version 1.7
               November 2006
               Adobe Systems Incorporated

The following are excerpts from that manual.
      PrintScaling The page scaling option to be selected when a print dialog is displayed for this document. Valid values are **<u>None</u>**, which indicates that the print dialog should reflect no page scaling, and **AppDefault**, which indicates that applications should use the current print scaling. If this entry has an unrecognized value, applications should use the current print scaling. Default value: AppDefault. Note: If the print dialog is suppressed and its parameters are provided directly by the application, the value of this entry should still be used.
      Duplex - The paper handling option to use when printing the file from the print dialog. The following values are valid:
      Simplex - Print single-sided
      DuplexFlipShortEdge - Duplex and flip on the short edge of the sheet
      DuplexFlipLongEdge - Duplex and flip on the long edge of the sheet

Section 6: Maine Testing Procedures

The Maine 2-D test package will be available online at https://taxadmin.kiteworks.com/ as soon as is practical. You will need a account to log in to the site and permissions to get access tot the Maine PDF files. If you need either contact Michelle.M.Andrews@maine.gov for assistance. The same scenarios used for OCR readability testing will be used for 2-D barcode testing whenever possible.

Vendor registration requirements, forms approval guidelines and MRS contact information is published in our "Guidelines for Developing Substitute Tax Forms" located on the SES. MRS has a

email address for vendors to use to contact members of the Forms Management Team and should be used for submission of all test forms and approval requests. This email address is: VendorForms.MRS@maine.gov

While all tax software vendors have been assigned a four digit identification number by FTA, Maine has been assigning two digit vendor identification numbers for several years and will continue to use these. Therefore all 2-D bar codes will contain both the FTA assigned identification as well as the Maine assigned identification numbers. There locations are identified within the respective specifications.

Section 7: Address Formatting Guidelines

Maine has a number of taxpayers who live outside of Maine and the United States. For this reason it is important that the taxpayer's address be complete with State abbreviations, zip/postal codes, and country codes. MRS is reviewing its address format with respect to foreign addresses and how they will appear on the printed form but, there is no place, currently, on the paper return to enter a country code even though it is a required field and must appear within the 2-D barcode.

For addresses within the United States, its Territories, and U.S. Military addresses use United States Postal Service approved state abbreviations and the country code of "USA". For addresses in Canada the below listed Canadian Province abbreviations are to be used in the State Code field, place the Postal Code in the Zip Code field and "CAN" in the Country Code field.

Canadian Provinces:

Alberta	AB	Newfoundland	NL	Prince Edward Islands	PE
British Columbia	BC	Northwest Territories	NT	Quebec	QC
Labrador	NL	Nova Scotia	NS	Saskatchewan	SK
Manitoba	MB	Ontario	ON	Yukon Territory	YT
New Brunswick	NB	Nunavut	NU		

For addresses, outside either the United States Place "XX" the State Code Field, place the Foreign Country code in its respective field, place the first two letters of the Foreign Province in the Foreign State field and the Foreign Zip Code placed in the foreign zip field needs to also be the same in the US Zip field.

Appropriate Country Codes can be found in the table below. The Codes found on the IRS website are no longer valid for our systems.

Country Code	Country Name	Country Code	Country Name
AFG	AFGHANISTAN	CHE	CHILE
ALA	ÅLAND ISLAND	CHI	CHINA
ALB	ALBANIA	CHR	CHR
ALG	ALGERIA	CIV	IVORY COAST
AME	AM. SAMOA	COC	COC
ANA	ANGUILLA	COG	CONGO
ANB	ANB	COL	COLOMBIA
AND	ANDORRA	COM	COMOROS
ANG	ANGOLA	COO	COOK ISLANDS
ANT	ANTARCTICA	CRA	COSTA RICA
ARG	ARGENTINA	CRO	CROATIA
ARM	ARMENIA	CUB	CUBA
ARU	ARUBA	CUW	CURAÇAO
AUA	AUSTRIA	CYO	CYPRUS
AUS	AUSTRALIA	CZE	CZE
AZE	AZERBAIJAN	DEN	DENMARK
BAG	BANGLADESH	DJI	DJIBOUTI
BAH	BAHAMAS	DOM	DOMINICA
BAN	BAHRAIN	DON	DOMINICAN
BAR	BARBADOS	ECU	ECUADOR
BEL	BELGIUM	EGY	EGYPT
BEN	BENIN	ENG	ENGLAND
BER	BERMUDA	EQU	EQU
BES	BELARUS	ERI	ERITREA
BEZ	BELIZE	ESR	EL SALVADOR
BHU	BHUTAN	EST	ESTONIA
BLM	ST. BARTS	ETH	ETHIOPIA
BOL	BOLIVIA	FAL	FAL
BOS	BOSNIA	FAR	FAROE ISLAND
BOT	BOTSWANA	FIJ	FIJI
BOU	BOUVET ISLAN	FIN	FINLAND
BQS	BONAIRE	FRA	FRANCE
BRA	BRAZIL	FRG	FRG
BRI	BIOT	FRP	FRP
BRU	BRUNEI	FST	FST
BUL	BULGARIA	GAB	GABON
BUP	BURKINA FASO	GAM	GAMBIA
BUR	BURUNDI	GEO	GEORGIA
CAA	CAMBODIA	GER	GERMANY
CAI	CAI	GHA	GHANA
CAM	CAMEROON	GIB	GIBRALTAR
CAN	CANADA	GRA	GRENADA
CAR	CAR	GRD	GREENLAND

CAV	CAPE VERDE	GRE	GREECE
CDR	CDR	GUA	GUATEMALA
CHA	CHAD	GUB	GUB
GUE	GUADELOUPE	MAR	MARTINIQUE
GUI	GUINEA	MAS	MALDIVES
GUM	GUAM	MAU	MAURITANIA
GUS	GUERNSEY	MAW	MALAWI
GUY	GUYANA	MAY	MAYOTTE
HA	HAITI	MEX	MEXICO
HMI	HMI	MIC	MICRONESIA
HOK	HONG KONG	MOA	MONGOLIA
HON	HONDURAS	MOC	MONACO
HOS	VATICAN CITY	MOL	MOLDOVA
HUN	HUNGARY	MON	MONTSERRAT
ICE	ICELAND	MOO	MONTENEGRO
INA	INDONESIA	MOR	MOROCCO
IND	INDIA	MOZ	MOZAMBIQUE
IRA	IRAN	MRS	MAURITIUS
IRE	IRELAND	MTA	MALTA
IRQ	IRAQ	MYA	MYANMAR
ISM	ISLE OF MAN	NAM	NAMIBIA
ISR	ISRAEL	NAU	NAURU
ITA	ITALY	NEC	NEC
JAM	JAMAICA	NEP	NEPAL
JAP	JAPAN	NET	NETHERLANDS
JER	JERSEY	NEZ	NEW ZEALAND
JOR	JORDAN	NIC	NICARAGUA
KAZ	KAZAKHSTAN	NIG	NIGERIA
KEN	KENYA	NIL	N IRELAND
KIR	KIRIBATI	NIR	NIGER
KOR	NORTH KOREA	NIU	NIUE
KOS	KOSOVO	NMI	NMI
KUW	KUWAIT	NOI	NOI
KYR	KYRGYZSTAN	NOR	NORWAY
LAO	LAOS	OMA	OMAN
LAT	LATVIA	PAK	PAKISTAN
LEB	LEBANON	PAL	PALAU
LES	LESOTHO	PAN	PANAMA
LIA	LIBERIA	PAR	PARAGUAY
LIB	LIBYA	PAT	PAT
LIE	LIECHTENSTEI	PER	PERU
LIT	LITHUANIA	PHI	PHILIPPINES
LUX	LUXEMBOURG	PIT	PITCAIRN
MAC	MACAU	PNG	PNG
MAD	MADAGASCAR	POL	POLAND
MAE	MACEDONIA	POR	PORTUGAL

MAH	MAH	QAT	QATAR
MAI	MALI	REU	RÉUNION
MAL	MALAYSIA	ROM	ROMANIA
RUS	RUSSIA	TAN	TANZANIA
RWA	RWANDA	TAT	TAT
SAA	SAUDI ARABIA	THA	THAILAND
SAF	SOUTH AFRICA	TIL	TIMOR-LESTE
SAM	SAMOA	TOG	TOGO
SAO	SAN MARINO	TOK	TOKELAU
SCT	SCOTLAND	TON	TONGA
SEN	SENEGAL	TUK	TURKMENISTAN
SER	SERBIA	TUN	TUNISIA
SEY	SEYCHELLES	TUR	TURKEY
SGS	SGS	TUV	TUVALU
SIL	SIERRA LEONE	UAE	UAE
SIN	SINGAPORE	UGA	UGANDA
SJM	SJM	UKR	UKRAINE
SKN	SKN	UNK	UK
SKO	SOUTH KOREA	URU	URUGUAY
SLA	SRI LANKA	USA	USA
SLO	SLOVAKIA	USM	USM
SLV	SLOVENIA	UZB	UZBEKISTAN
SOI	SOI	VAN	VANUATU
SOM	SOMALIA	VEN	VENEZUELA
SPA	SPAIN	VIB	VIB
SPM	SPM	VIN	VIET NAM
SSD	SOUTH SUDAN	VIU	VIU
STA	ST. LUCIA	WAF	WAF
STH	ST. HELENA	WAL	WALES
STP	STP	WSA	WSA
SUD	SUDAN	YEM	YEMEN
SUR	SURINAME	ZAM	ZAMBIA
SVG	SVG	ZIM	ZIMBABWE
SWA	ESWATINI		
SWE	SWEDEN		
SWI	SWITZERLAND		
SXM	SINT MAARTEN		
SYR	SYRIA		
TAC	TAC		
TAI	TAIWAN		
TAJ	TAJIKISTAN		