State of Maine

Department of Financial and Administrative Services

Maine Revenue Services

Software Developer's Guide

For Tax Years 2020 and 2021

PDF417 Formatted 2-D Bar Coded Tax Returns

Change Number: Original

Date of Change: 10/07/2020

Record of Changes

Revision Date	Description of Change
10/07/2020	2020 1040ME has many changes along with 4 new pages. See spec sheet and test cases for more information.
10/07/2020	941P & SCH's has new 1D barcode, a few minor alignment changes & added a checkbox to first page and 2D barcode. See spec sheet and test cases for more information.
10/14/2020	2020 1120ME has several reordred line changes over most pages. A few lines have been added. Extra page added. See spec sheet and test cases for more information.
10/27/2020	2020 MEUC1 has a new line on first page. See spec sheet and test cases for more information.

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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 2017-2018 tax processing season the following forms will be mandated to contain the 2-D barcodes: 1040, 1120, FORMCR, MEUC1 (including MEUC1SCH2) and 941P (including the 941P Schedules 2 and 3 forms)

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.

Encode type	Normal PDF417
DPI	300 dpi
Pixel shaving	ON
Code word count	Variable
Encryption Error Correction Level	4
Mils	10
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

This document can be found at:
>http://www.aiim.org/documents/standards/pdf/Pdf_reference_1-7.pdf

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 **<u>AppDefault</u>**, 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" at http://www.maine.gov/revenue/vendors/. 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 Name	Country Code	Country Name	Country Code
AFGHANISTAN	AFG	DOMINICAN REPUBLIC	DR
ALBANIA	ALB	ECUADOR	EC
ALGERIA	ALG	EGYPT	EGY
ANDORRA	AND	EL SALVADOR	ELS
ANGOLA	ANG	EQUATORIAL GUINEA	EGU
ANTIGUA AND BARBUDA	ANT	ETHIOPIA	ETH
ARGENTINA	ARG	ESTONIA	EST
ARMENIA	ARM	GERMANY	FRG
AUSTRALIA	ASR	FIJI	FIJ
AUSTRIA	AUS	FINLAND	FIN
AZERBAIJAN	AZE	FRANCE	FRA
BAHAMAS	BAH	GABON	GAB
BAHRAIN	BAR	GAMBIA	GAM
BANGLADESH	BAN	GEORGIA	GEO
BARBADOS	BAD	GHANA	GHA
BELGIUM	BEL	UNITED KINGDOM	UNI
BELIZE	BZE	UNITED KINGDOM	UK
BENIN	BNI	UNITED KINGDOM	ENG
BERMUDA	BER	GREECE	GRE
BHUTAN	BHU	GRENADA	GRA
BOLIVIA	BOL	GUATEMALA	GUA
BOSNIA-HERZEGOVINA	BOS	GUINEA	GUI
BOTWSANA	BOT	GUINEA-BISSAU	GB
BRAZIL	BRA	GUYANA	GUY
BRUNEI DARUSSALAM	BUN	HAITI	HAI
BRITISH WEST INDIES	BWI	HONDURAS	HON
BULGARIA	BUL	HONG KONG	HK
BURKINA FASO	BF	HUNGARY	HUN
MYANMAR	BUR	ICELAND	ICE
BURUNDI	BD	INDIA	INA
BELARUS	BYE	INDONESIA	IND
CAMEROON	CAM	IRAN	IRN
CANADA	CAN	IRAQ	IRQ
CAPE VERDE	CV	IRELAND	IRE
CENTRAL AFRICAN REPUBLIC	CAR	ISRAEL	ISR
CHAD	CHD	ITALY	IT
CHILE	CHI	IVORY COAST	IC
CHINA	CHN	JAMAICA	JAM
COLOMBIA	COL	JAPAN	JAP
COMOROS	COM	JORDAN	JOR
CONGO	CON	KAZAKHSTAN	KAZ
COSTA RICA	CR	KENYA	KEN
CROATIA	CRO	KIRIBATI	KIR
CUBA	CUB	KUWAIT	KUW
CYPRUS	CYP	NORTH KOREA	NKO
CZECH REPUBLIC	CZ	SOUTH KOREA	KOR
CAMBODIA	KAM	KYRGYZSTAN	KYR
DENMARK	DEN	ST VINCENT AND THE GRENADINES	SVG

DJIBOUTI	DJI	WESTERN SAMOA	SAM
DOMINICA	DOM	SAN MARINO	SMR
LESOTHO	LES	SAO TOME AND PRINCIPE	STM
LIBERIA	LIB	SAUDI ARABIA	SAR
LIBYA	LYB	ST LUCIA	STL
LIECHTENSTEIN	LIE	SENEGAL	SEN
LAOS	LAO	SEYCHELLES	SEY
LATVIA	LAT	SIERRA LEONE	SL
LEBANON	LEB	SINGAPORE	SIN
LITHUANIA	LIT	SLOVENIA	SLV
LUXEMBOURG	LUX	SOLOMON ISLANDS	SI
MACEDONIA	MAC	SLOVAK REPUBLIC	SLO
MADAGASCAR	MAD	SOMALIA	SOM
MALAWI	MWI	SOUTH AFRICA	SAF
MALAYSIA	MAL	SPAIN	SPA
MALDIVES	MLD	SRI LANKA	SRI
MALI	MLI	SUDAN	SUD
MALTA	MTA	SURINAME	SUR
MARSHALL ISLANDS	MAR	SWAZILAND	SWA
MAURITANIA	MAU	SWEDEN	SWE
MAURITIUS	MRU	SWITZERLAND	SWI
MEXICO	MEX	SYRIA	SA
MICRONESIA	MIC	TAIWAN	TWN
MONGOLIA	MGA	TAJIKISTAN	TAJ
MOLDOVA	MOL	THAILAND	TAI
MONACO	MON	TOGO	TOG
MOROCCO	MOR	TONGA	TON
MOZAMBIQUE	MOZ	TRINIDAD AND TOBAGO	TRI
NAMIBIA	NAM	TUNISIA	TUN
NEPAL	NEP	TURKMENISTAN	TRK
NAURU	NAU	TURKEY	TUR
NETHERLANDS	NTH	TUVALU	TUV
NETHERLANDS ANTILLES	NA	UKRAINE	UKR
NEW ZEALAND	NZ	UGANDA	UGA
NICARAGUA	NIC	RUSSIA	USR
NIGER	NGR	UNITED ARAB EMIRATES	UAE
NIGERIA	NIG	TANZANIA	TAN
NORWAY	NOR	UNITED STATES	USA
OMAN	OMA	URUGUAY	URU
PAKISTAN	PAK	UZBEKISTAN	UZB
PANAMA	PAN	VANUATU	VAN
PAPUA NEW GUINEA	PAP	VATICAN CITY	VAT
PARAGUAY	PAR	VENEZUELA	VEN
PERU	PER	VIETNAM	VN
PHILIPPINES	PHL	YEMEN	YEM
POLAND	POL	ZAMBIA	ZAM
PORTUGAL	POR	ZIMBABWE	ZIM
QATAR	QAT	SERBIA	SER
ROMANIA	ROM		
RWANDA	RWA		
ST KITTS AND NEVIS	SKI		