Hitachi UX Printer Model 161

EtherNet/IP Version

Printer software Version 2.6

The test results here are using the Hitachi Browser that I wrote. The entire set of read requests can be accomplished in under 7 seconds. The Molex tool is too slow and cumbersome to use for this large an effort.

The source code for the browser has been released as Open Source and is available on GitHub.

https://github.com/MarvinThompson/HitachiEtherNetIP

Open Cases Previously Submitted to Hitachi

Case	Received	Closed	Subject
70980	Tue 3/12/2019 10:26 AM	Fri 4/12/2019 9:51 AM	Calendar Block Shift Code
70999	Tue 3/12/2019 12:10 PM	Fri 4/12/2019 9:51 AM	Time Count Function
71000	Tue 3/12/2019 12:11 PM	Fri 4/12/2019 9:51 AM	Counter block
71014	Tue 3/12/2019 1:53 PM	Fri 4/12/2019 9:51 AM	Calendar Block
71277	Sun 3/17/2019 12:56 PM	Fri 4/12/2019 9:51 AM	Debugging cijConnect
71389	Tue 3/19/2019 8:45 AM	Fri 4/12/2019 9:51 AM	IJP Operation Function
71400	Tue 3/19/2019 10:36 AM	Fri 4/12/2019 9:53 AM	Managing messages saved on the printer
71435	Tue 3/19/2019 3:21 PM	Fri 4/12/2019 9:51 AM	Print Data Management
71476	Wed 3/20/2019 10:12 AM	Fri 4/12/2019 9:51 AM	User pattern processing
71488	Wed 3/20/2019 11:35 AM	Fri 4/12/2019 9:51 AM	Environment Settings
71501	Wed 3/20/2019 1:31 PM	Fri 4/12/2019 9:51 AM	Unit Information
71535	Thu 3/21/2019 8:54 AM	Fri 4/12/2019 9:51 AM	Print Format Function
71678	Mon 3/25/2019 9:38 AM	Fri 4/12/2019 9:51 AM	Add/Delete/Insert columns
71710	Mon 3/25/2019 1:11 PM	Fri 4/12/2019 9:51 AM	Multi-line setup
72039	Fri 3/29/2019 12:48 PM		Auto Reflection issue
72285	Wed 4/3/2019 12:35 PM		Character Size

0x66 Print data management function

Browser Screen

Test Results:

- Select Message (0x64) == Worked. Loaded message 10
- Store Print Data (0x65) == What is type? Could not test
- Delete Print Data (0x67) == Worked. Deleted message 10
- Print Data Name (0x69) == Worked. Changed message name in printer
- List of Messages (0x6A) == Ignored. Causes I/O error.
- Print Data Number (0x6B) == Worked. Changed message number.
- Change Create Group Name (0x6C) == Worked.
- Group Deletion (0x6D) == Worked.
- List of Groups (0x6F) == Worked. See results below.
- Change Group Number (0x70) == Worked.

Traffic during test.

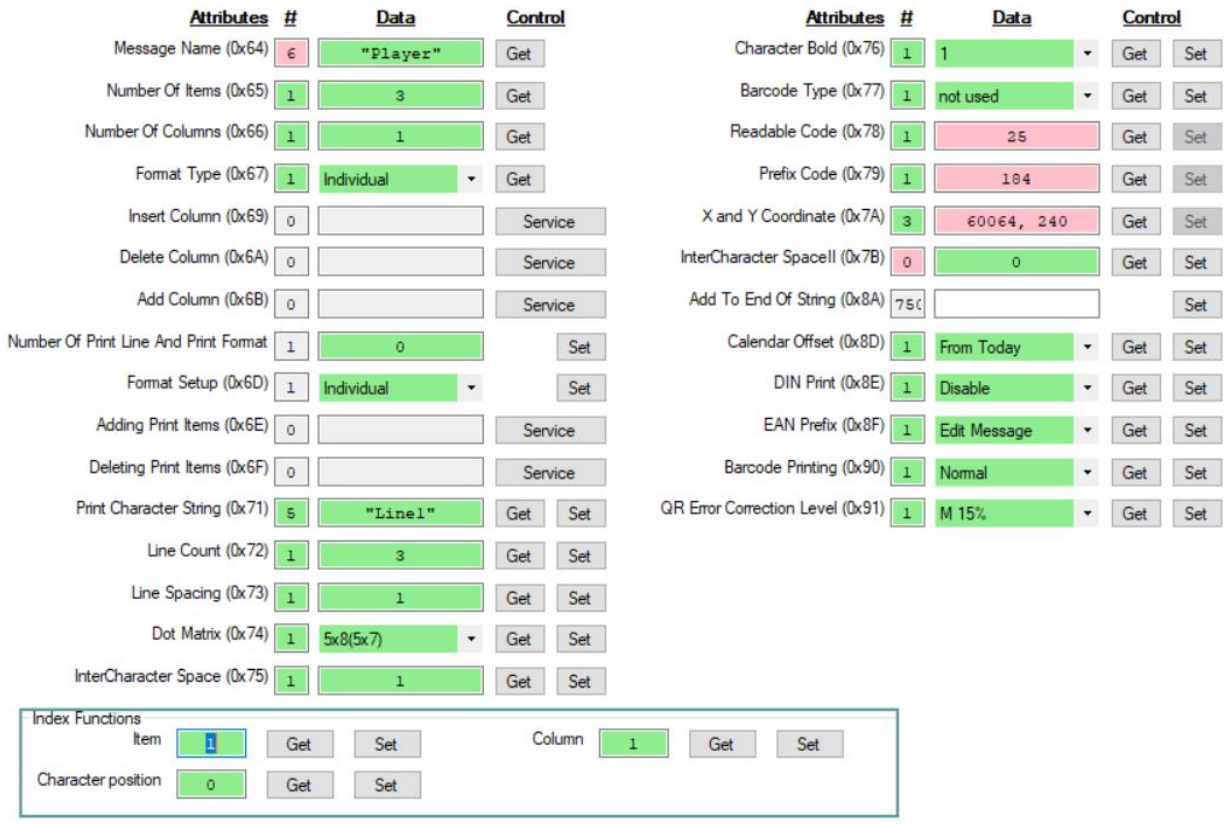
Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
32 75 01 6F	Set	IJP_operation	Online_Offline				1	On Line	01
33 75 01 6F	Get	IJP_operation	Online_Offline	1	On Line	01			
33 7A 01 65	Get	Index	Automatic_reflection	1	0	00			
33 7A 01 64	Get	Index	Start_Stop_Management_Flag	1	0	00			
33 7A 01 6B	Get	Index	Print_Data_Group_Data	1	1	01			
33 7A 01 6A	Get	Index	Print_Data_Message_Number	2	1	00 01			
33 66 01 6F	Get	Print_data_management	List_of_Groups	500	See=>	01 00 ...			
34 66 01 64	Service	Print_data_management	Select_Message				2		00 0A
32 66 01 67	Set	Print_data_management	Delete_Print_Data				2	10	00 0A
32 7A 01 6A	Set	Index	Print_Data_Message_Number				2	20	00 14
33 66 01 6F	Get	Print_data_management	List_of_Groups	500	See=>	01 00 ...			
32 66 01 69	Set	Print_data_management	Print_Data_Name				9	20,Player	00 14 50 6C 61 79 65 72 00
32 66 01 6B	Set	Print_data_management	Print_Data_Number				4	20,30	00 14 00 1E
32 66 01 6C	Set	Print_data_management	Change_Create_Group_Name				10	1,ROSEMART	01 52 4F 53 45 4D 41 52 54 00
32 66 01 70	Set	Print_data_management	Change_Group_Number				2	1,2	01 02
33 66 01 6F	Get	Print_data_management	List_of_Groups	500	See=>	01 00 ...			

List of Group Names.

```
01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
02 00 R  O  S  E  M  A  R  T  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
05 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
06 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
07 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
09 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

0x67 Print format function

Browser Screen.



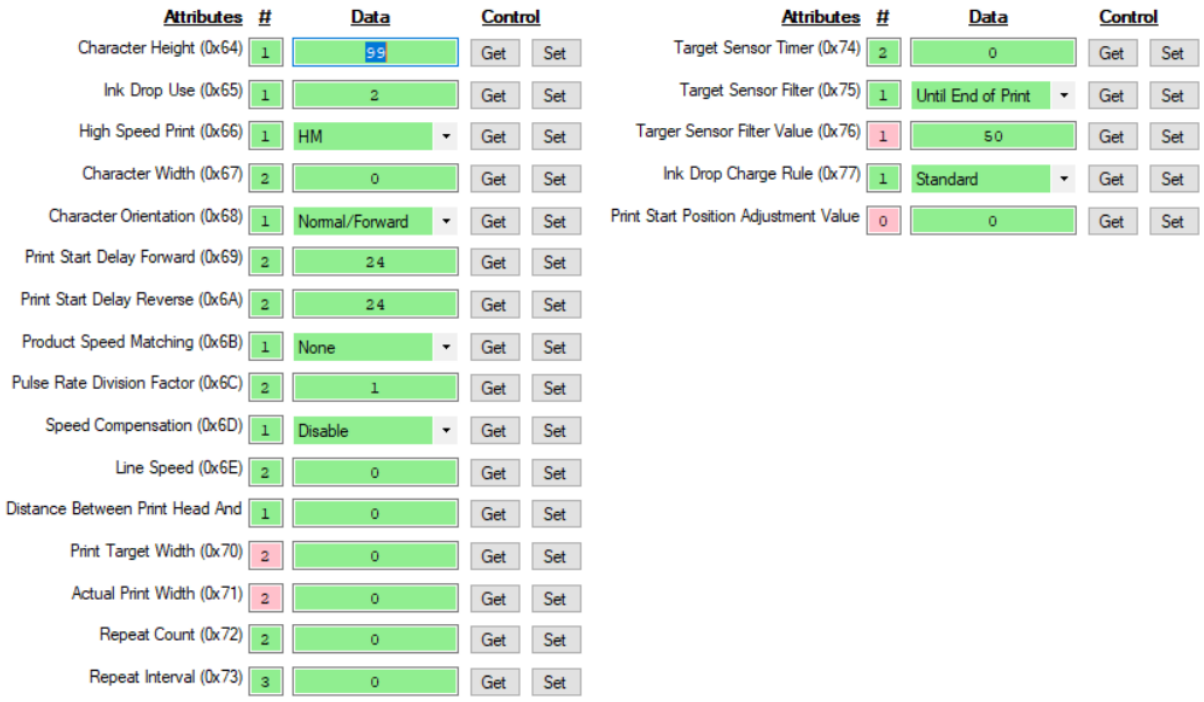
These issues will be sent as a separate request.

Documentation

Address		Function Name	Data Range	Input			Notes
Attribute	Access			Data	Data Length (Byte)	Data Type	
0x64	Get	Get Message Name	MAX 15 Chars	Null	Null	Null	
0x65	Get	Get Print Item	1 to 100	Null	Null	Null	
0x66	Get	Get number of columns	1 to 100	Null	Null	Null	
0x67	Get	Get Format Type	1 to 3	Null	Null	Null	
0x69	Service	Insert column	0 to 99	Null	Null	Null	Set item number in "Column" of index function.
0x6A	Service	Delete column	0 to 99	Null	Null	Null	Set item number in "Column" of index function.
0x6B	Service	Add column	-	Null	Null	Null	
0x6C	Set	Set the number of print line and print format	0 to 1	Setting	1	int	
0x6D	Set	Format setup	0 to 2 1 to 3	Format Nunber *	1	int	0 : Individual setup, 1 1 : Overall setup , 2 2 : Free layout 3
0x6E	Service	Adding print items	-	Null	Null	Null	
0x6F	Service	Deletion of print items	1 to 100	Null	Null	Null	Set item number in "Item Count" of index function.
0x71	Get	Getting of print charcter string	Up to 750 digits (Unicode)	Null	Null	char	Set item number in "Item Count" of index function.
	Set	Setting of print character string		Char. string Unicode+"00"	Max 750	Null	
0x72	Get	Getting of line count	Line Count (1 to 6)	Null	Null	Null	Set item number in "Column" of index function.
	Set	Setting of line count		Line count	1	short	
0x73	Get	Getting of line spacing	0 to 2	Null	Null	Null	Set item number in "Column" of index function.
	Set	Setting of line spacing		Line spacing	1	int	
0x74	Get	Getting of dot matrix	1 to 16	Null	Null	Null	Set item number in "Item Count" of index function. Please refer to "7.1 Dot matrix Code" for dot matrix.
	Set	Setting of dot matrix		Dot matrix	1	int	
0x75	Get	Getting of Inter-character space	0 to 26	Null	Null	Null	Set item number in "Item Count" of index function.
	Set	Setting of Inter-character space		Inter-charcter space	1	char	
0x76	Get	Getting of charcter bold	Bold(1 to 9)	Null	Null	Null	Set item number in "Item Count" of index function.
	Set	Setting of charcter bold	1 to 9	Bold	1	int	
0x77	Get	Getting of barcode type	0 to 27	Null	Null	Null	Set item number in "Item Count" of index function. Please refer to "7.2 Barcode " for barcode.
	Set	Setting of barcode type		Barcode Number	1	int	
0x78	Get	Getting of Readable code	0 to 2	Null	Null	Null	Set item number in "Item Count" of index function.
	Set	Setting of Readable code		Readable code Number *	1	int	*Readable code number 0 : No identification code 1 : Size 5 x 5 2 : Size 5 x 7
0x79	Get	Getting of Prefix Code	0 to 99	Null	Null	Null	Set item number in "Item Count" of index function.
	Set	Setting of Prefix Code		Prefix Code	1	int	

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Print_format						
33 67 01 64	Get	Print_format	Message_Name	6	"Player"	50 6C 61 79 65 72
33 67 01 65	Get	Print_format	Number_Of_Items	1	3	03
33 67 01 66	Get	Print_format	Number_Of_Columns	1	1	01
33 67 01 67	Get	Print_format	Format_Type	1	Individual	01
33 67 01 71	Get	Print_format	Print_Character_String	5	"Line1"	4C 69 6E 65 31
33 67 01 72	Get	Print_format	Line_Count	1	3	03
33 67 01 73	Get	Print_format	Line_Spacing	1	1	01
33 67 01 74	Get	Print_format	Dot_Matrix	1	5x8(5x7)	03
33 67 01 75	Get	Print_format	InterCharacter_Space	1	1	01
33 67 01 76	Get	Print_format	Character_Bold	1	1	01
33 67 01 77	Get	Print_format	Barcode_Type	1	not used	00
33 67 01 78	Get	Print_format	Readable_Code	1	25	19
33 67 01 79	Get	Print_format	Prefix_Code	1	184	B8
33 67 01 7A	Get	Print_format	X_and_Y_Coordinate	3	60064, 240	EA A0 F0
33 67 01 7B	Get	Print_format	InterCharacter_SpaceII	0	0	
33 67 01 8D	Get	Print_format	Calendar_Offset	1	From Today	01
33 67 01 8E	Get	Print_format	DIN_Print	1	Disable	00
33 67 01 8F	Get	Print_format	EAN_Prefix	1	Edit Message	00
33 67 01 90	Get	Print_format	Barcode_Printing	1	Normal	00
33 67 01 91	Get	Print_format	QR_Error_Correction_Level	1	M 15%	00

0x68 Print specification function



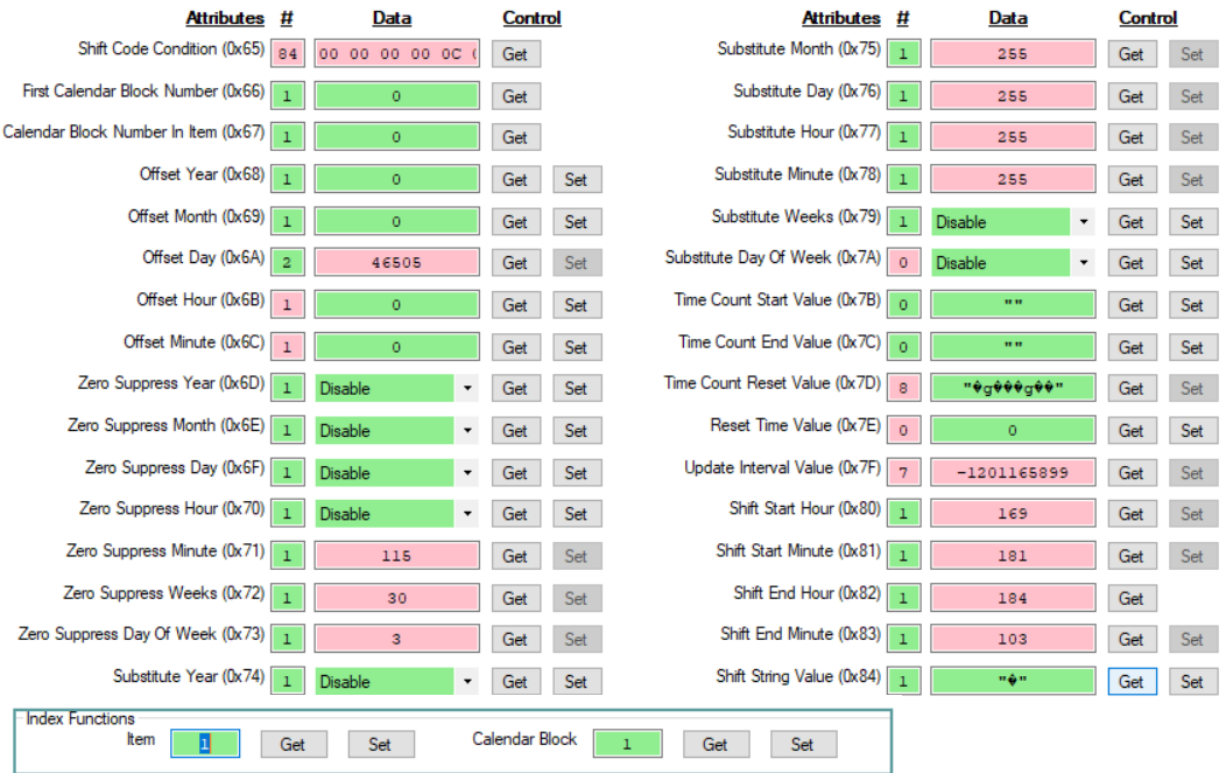
Attributes	#	Data	Control
Character Height (0x64)	1	99	Get Set
Ink Drop Use (0x65)	1	2	Get Set
High Speed Print (0x66)	1	HM	Get Set
Character Width (0x67)	2	0	Get Set
Character Orientation (0x68)	1	Normal/Forward	Get Set
Print Start Delay Forward (0x69)	2	24	Get Set
Print Start Delay Reverse (0x6A)	2	24	Get Set
Product Speed Matching (0x6B)	1	None	Get Set
Pulse Rate Division Factor (0x6C)	2	1	Get Set
Speed Compensation (0x6D)	1	Disable	Get Set
Line Speed (0x6E)	2	0	Get Set
Distance Between Print Head And	1	0	Get Set
Print Target Width (0x70)	2	0	Get Set
Actual Print Width (0x71)	2	0	Get Set
Repeat Count (0x72)	2	0	Get Set
Repeat Interval (0x73)	3	0	Get Set

Attributes	#	Data	Control
Target Sensor Timer (0x74)	2	0	Get Set
Target Sensor Filter (0x75)	1	Until End of Print	Get Set
Targer Sensor Filter Value (0x76)	1	50	Get Set
Ink Drop Charge Rule (0x77)	1	Standard	Get Set
Print Start Position Adjustment Value	0	0	Get Set

Not possible to test without being able to print. The items in red should be looked at as issues.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Print_specification						
33 68 01 64	Get	Print_specification	Character_Height	1	99	63
33 68 01 65	Get	Print_specification	Ink_Drop_Use	1	2	02
33 68 01 66	Get	Print_specification	High_Speed_Print	1	HM	00
33 68 01 67	Get	Print_specification	Character_Width	2	0	00 00
33 68 01 68	Get	Print_specification	Character_Orientation	1	Normal/Forward	00
33 68 01 69	Get	Print_specification	Print_Start_Delay_Forward	2	24	00 18
33 68 01 6A	Get	Print_specification	Print_Start_Delay_Reverse	2	24	00 18
33 68 01 6B	Get	Print_specification	Product_Speed_Matching	1	None	00
33 68 01 6C	Get	Print_specification	Pulse_Rate_Division_Factor	2	1	00 01
33 68 01 6D	Get	Print_specification	Speed_Compensation	1	Disable	00
33 68 01 6E	Get	Print_specification	Line_Speed	2	0	00 00
33 68 01 6F	Get	Print_specification	Distance_Between_Print_Head_And_Object	1	0	00
33 68 01 70	Get	Print_specification	Print_Target_Width	2	0	00 00
33 68 01 71	Get	Print_specification	Actual_Print_Width	2	0	00 00
33 68 01 72	Get	Print_specification	Repeat_Count	2	0	00 00
33 68 01 73	Get	Print_specification	Repeat_Interval	3	0	00 00 00
33 68 01 74	Get	Print_specification	Target_Sensor_Timer	2	0	00 00
33 68 01 75	Get	Print_specification	Target_Sensor_Filter	1	Until End of Print	01
33 68 01 76	Get	Print_specification	Targer_Sensor_Filter_Value	1	50	32
33 68 01 77	Get	Print_specification	Ink_Drop_Charge_Rule	1	Standard	00
33 68 01 78	Get	Print_specification	Print_Start_Position_Adjustment_Value	0	0	

0x69 Calendar function



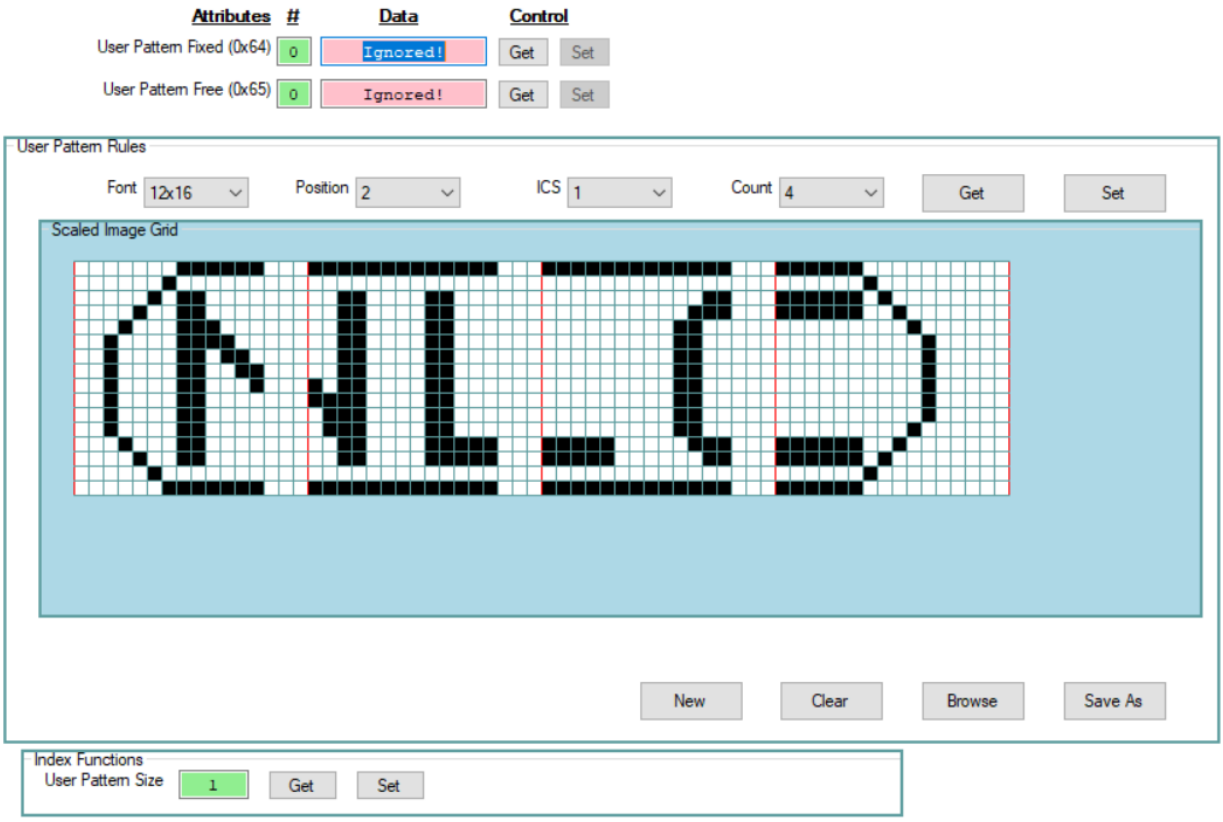
Test results.

- The test results here are long and very complex. It will be addressed as a separate issue.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Calendar						
33 69 01 65	Get	Calendar	Shift_Code_Condition	84	See=>	00 00 00 00 15 00 00 00 FF FF FF FF 70 77 07 00
33 69 01 66	Get	Calendar	First_Calendar_Block_Number	1	0	00
33 69 01 67	Get	Calendar	Calendar_Block_Number_In_Item	1	0	00
33 69 01 68	Get	Calendar	Offset_Year	1	0	00
33 69 01 69	Get	Calendar	Offset_Month	1	0	00
33 69 01 6A	Get	Calendar	Offset_Day	2	46505	B5 A9
33 69 01 6B	Get	Calendar	Offset_Hour	1	0	00
33 69 01 6C	Get	Calendar	Offset_Minute	1	0	00
33 69 01 6D	Get	Calendar	Zero_Suppress_Year	1	Disable	00
33 69 01 6E	Get	Calendar	Zero_Suppress_Month	1	Disable	00
33 69 01 6F	Get	Calendar	Zero_Suppress_Day	1	Disable	00
33 69 01 70	Get	Calendar	Zero_Suppress_Hour	1	Disable	00
33 69 01 71	Get	Calendar	Zero_Suppress_Minute	1	115	73
33 69 01 72	Get	Calendar	Zero_Suppress_Weeks	1	30	1E
33 69 01 73	Get	Calendar	Zero_Suppress_Day_Of_Week	1	3	03
33 69 01 74	Get	Calendar	Substitute_Year	1	Disable	00
33 69 01 75	Get	Calendar	Substitute_Month	1	255	FF
33 69 01 76	Get	Calendar	Substitute_Day	1	255	FF
33 69 01 77	Get	Calendar	Substitute_Hour	1	255	FF
33 69 01 78	Get	Calendar	Substitute_Minute	1	255	FF
33 69 01 79	Get	Calendar	Substitute_Weeks	1	Disable	00
33 69 01 7A	Get	Calendar	Substitute_Day_Of_Week	0	Disable	
33 69 01 7B	Get	Calendar	Time_Count_Start_Value	0	""	
33 69 01 7C	Get	Calendar	Time_Count_End_Value	0	""	
33 69 01 7D	Get	Calendar	Time_Count_Reset_Value	8	"g g"	BC 67 A9 B5 B8 67 A9 B5
33 69 01 7E	Get	Calendar	Reset_Time_Value	0	0	
33 69 01 7F	Get	Calendar	Update_Interval_Value	7	-1201165899	67 A9 B5 B8 67 A9 B5
33 69 01 80	Get	Calendar	Shift_Start_Hour	1	169	A9
33 69 01 81	Get	Calendar	Shift_Start_Minute	1	181	B5
33 69 01 82	Get	Calendar	Shift_End_Hour	1	184	B8
33 69 01 83	Get	Calendar	Shift_End_Minute	1	103	67
33 69 01 84	Get	Calendar	Shift_String_Value	1	""	A9

0x6B User pattern function

Browser screen



Test results:

- User Pattern Fixed (0x64) Set == Works for 4X5, 5X5, and 5X8(5X7). Fails for the rest ofv the pattern sizes.
- User Pattern Fixed (0x64) Get == Fails for all pattern sizes.
- User Pattern Free (0x65) Get and Set == I did not test.

Documentation:

- The document says “1 to 19” but table only has 15.
- Appears to use column “No.” rather than “Character Size Code”.

6.8 User Pattern function (Class Code = 0x6B)

User pattern function sets and acquires user pattern data.

List of user pattern functios

Address		Function Name	Data Range	Input Data			Notes
Attribute	Access			Data	Data Length (Byte)	Data Type	
0x64	Get	Getting of User Pattern(Fixed)	Dot Matrix : 1 to 19 Position No. : 0 to 199	Dot Matrix + Position No.	2	unsigned short + unsigned char	Refer to Technical manual " 5.3.8 User Pattern Character Transmission".
	Set	Setting of User Pattern(Fixed)		Dot Matrix + Position No. + Pattern	Dot Matrix:1 to 19 Position No.:0 to 199 Pattern:Max 998 bytes		
0x65	Get	Getting of User Pattern(Free)	Vertical Size: (1 to 32) Horizontial Size: (1 to 320) Position No. (0 to 49)	Vert.Size + Hori. Size + Position No.		unsigned short + unsigned char	Refer to Technical manual " 5.3.8 User Pattern Character Transmission".
	Set	Setting of User Pattern(Free)		Vert. Size + Hori. Size + Position No. + Pattern	Vertical Size : 1 Horizontial Size : 2 Position No. : 1 Pattern:Max 996 bytes		

Example) Case of acquire user Pattern (fixed) (Dot Matrix 4x5, pattern number 0)
0x33 0x6B 0x64 0x01 0x00
0x33 = Get
0x6B = UserPattern function
0x64 = Get user pattern (fixed) content
0x01 = Dot Matrix 4x5
0x00 = registed pattern number 0

5.3.8-3 Pattern data

(1) Pattern data length

- The pattern data length per character varies with the character size as indicated below.

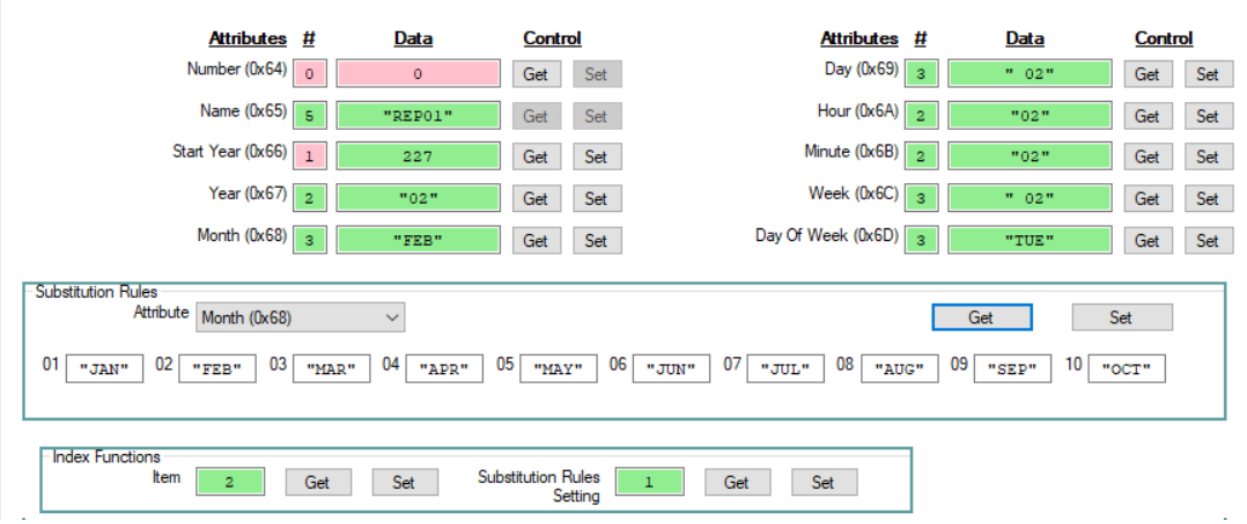
Character size code table

No.	Character size	Character size code	Pattern data length (bytes)	Remarks
1	4×5	30H	8	
2	5×5	31H	8	
3	5×8(5×7)	32H	8	
4	9×8(9×7)	33H	16	
5	7×10	34H	16	
6	10×12	35H	32	
7	12×16	36H	32	
8	18×24	37H	72	
9	24×32	38H	128	
10	11×11	39H	32	
11	5×3(chimney)	3AH	5	
12	5×5(chimney)	3BH	5	
13	7×5(chimney)	3CH	7	
14	30×40	3EH	200	
15	36×48	3FH	288	

Traffic for 17x16 set of 4 characters. Total of 2 + 32 = 34 bytes sent. Reports successful completion but no user pattern data appears in printer.

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
32 7A 01 6D	Set	Index	User_Pattern_Size	1	12x16	07
32 6B 01 64	Set	User_pattern	User_Pattern_Fixed	34	7	07 02 00 00 00 00 F0 07 08 08 04 10 02 20 01 40
32 6B 01 64	Set	User_pattern	User_Pattern_Fixed	34	7	07 03 C1 80 71 80 FD BF FD BF 01 80 01 80 01 80
32 6B 01 64	Set	User_pattern	User_Pattern_Fixed	34	7	07 04 0D 80 0D 80 0D 80 0D 80 0D 80 01 80 01 80
32 6B 01 64	Set	User_pattern	User_Pattern_Fixed	34	7	07 05 0D B0 0D B0 0D B0 0D B0 0D B0 0D B0 02 40

0x6C Substitution rules function



Implementation Success

1. Using Index Functions Index and Substitution Rule works priperly.
2. Setting and retrieving the substitution rule settings works properly
3. Getting the name works (did not work in 2.03). Have not tried to set a different name.

Implementation Issues

1. Attempts to get the rule number returns either 0 bytes or 3 bytes (01 E3 07). The 3 byte results look like.
    a. 01 == could be the rule number
    b. E3 07 == is 2019 when interpreted as Little Endian
2. Attempts to get the start year returns 1 byte (E3). Could be the leading byte of 2019.
3. Attempts to change the start year to 2018 does not change the start year in the printer.
4. Set Auto Reflection to 1, set the values, and set Auto Reflection to 0 clears all the substitutions for all attributes (month, dat, …).

Documentation Issues

5.

List of substitution rules functios

Address		Function Name	Data Range	Input data			Notes
Attribute	Access			Data	Data Length (Byte)	Data Type	
0x64	Get	Getting of substitution rules number	1 to 99	Null	Null	Null	Set item number in "Substitution rules Setting" of index function.
	Set	Setting of substitution rules number		Number	1	unsigned char	
0x65	Get	Getting of substitution rules name	-	Null	Null	Null	Set item number in "Substitution rules Setting" of index function.
	Set	Setting of substitution rules name	up to 13 digits	Charcter+ "00"	1	unsigned char	
0x66	Get	Gettinig of the start year	-	Null	Null	Null	Set item number in "Substitution rules Setting" of index function.
	Set	Settinig of the start year	2000 to 2099	Year Data	2	unsigned char	
0x67	Get	Getting the character string of the substitution rules value(Year)	0 to 23 24	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Year)		Number+ Charcter+ "00"	Max 3	unsigned short unsigned char	
0x68	Get	Getting the character string of the substitution rules value(Month)	1 to 12	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Month)		Number+ Charcter+ "00"	Max 4	unsigned short unsigned char	
0x69	Get	Getting the character string of the substitution rules value(Day)	1 to 31	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Day)		Number+ Charcter+ "00"	Max 3 4	unsigned short unsigned char	
0x6A	Get	Getting the character string of the substitution rules value(Hour)	0 to 23	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Hour)		Number+ Charcter+ "00"	Max 3	unsigned short unsigned char	
0x6B	Get	Getting the character string of the substitution rules value(Minute)	0 to 59	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Minute)		Number+ Charcter+ "00"	Max 4 3	unsigned short unsigned char	
0x6C	Get	Getting the character string of the substitution rules value(Week Number)	1 to 53	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value(Week Number)		Number+ Charcter+ "00"	Max 4	unsigned short unsigned char	
0x6D	Get	Getting the character string of the substitution rules value (The day of the week)	1 to 7	Number	1	Byte	Set item number in "Substitution rules Setting" of index function.
	Set	Setting the character string of the substitution rules value (The day of the week)		Number+ Charcter+ "00"	Max 4	unsigned short unsigned char	

XML for setting Substitution values

```
<Label ClockSystem="24-Hour" Registration="101" GroupNumber="00" GroupName=""
    Name="EthernetIP" BeRestrictive="False" UseHalfSpace="False" Format="Individual" Version="3">
   <Printer Model="UX" Make="Hitachi">

      <Substitution Rule="01" StartYear="2019" Delimeter="/">
        <Year Base="00">00/01/02/03/04/05/06/07/08/09</Year>
        <Year Base="10">10/11/12/13/14/15/16/17/18/19</Year>
        <Year Base="20">20/21/22/23</Year>

        <Month Base="1">JAN/FEB/MAR/APR/MAY/JUN/JUL/AUG/SEP/OCT/NOV/DEC</Month>

        <Day Base="01">01/02/03/04/05/06/07/08/09/10</Day>
        <Day Base="11">11/02/13/14/15/16/17/18/19/20</Day>
        <Day Base="21">21/22/23/24/25/26/27/28/29/30/31</Day>

        <Hour Base="00">00/01/02/03/04/05/06/07/08/09</Hour>
        <Hour Base="10">10/11/12/13/14/15/16/17/18/19</Hour>
        <Hour Base="20">20/21/22/23</Hour>

        <Minute Base="00">00/01/02/03/04/05/06/07/08/09</Minute>
        <Minute Base="10">10/11/12/13/14/15/16/17/18/19</Minute>
        <Minute Base="20">20/21/22/23/24/25/26/27/28/29</Minute>
        <Minute Base="30">30/31/32/33/34/35/36/37/38/39</Minute>
        <Minute Base="40">40/41/42/43/44/45/46/47/48/49</Minute>
        <Minute Base="50">50/51/52/53/54/55/56/57/58/59</Minute>

        <Week Base="01">01/02/03/04/05/06/07/08/09/10</Week>
        <Week Base="11">11/12/13/14/15/16/17/18/19/20</Week>
        <Week Base="21">21/22/23/24/25/26/27/28/29/30</Week>
        <Week Base="31">31/32/33/34/35/36/37/38/39/40</Week>
        <Week Base="41">41/42/43/44/45/46/47/48/49/50/51/52/53</Week>

        <DayOfWeek Base="1">MON/TUE/WED/THU/FRI/SAT/SUN</DayOfWeek>

      </Substitution>
   </Printer>

</Label>
```

Traffic for loading page

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Substitution_rules									
33 6C 01 64	Get	Substitution_rules	Number	0	0				
33 6C 01 65	Get	Substitution_rules	Name	5	"REP01"	52 45 50 30 31	1	1	01
33 6C 01 66	Get	Substitution_rules	Start_Year	1	227	E3			
33 6C 01 67	Get	Substitution_rules	Year	2	"01"	30 31	1	1	01
33 6C 01 68	Get	Substitution_rules	Month	3	"JAN"	4A 41 4E	1	1	01
33 6C 01 69	Get	Substitution_rules	Day	3	" 01"	20 30 31	1	1	01
33 6C 01 6A	Get	Substitution_rules	Hour	2	"01"	30 31	1	1	01
33 6C 01 6B	Get	Substitution_rules	Minute	2	"01"	30 31	1	1	01
33 6C 01 6C	Get	Substitution_rules	Week	3	" 01"	20 30 31	1	1	01
33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"MON"	4D 4F 4E	1	1	01

Traffic for set.

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	1,"MON"	01 4D 4F 4E 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	2,"TUE"	02 54 55 45 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	3,"WED"	03 57 45 44 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	4,"THU"	04 54 48 55 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	5,"FRI"	05 46 52 49 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	6,"SAT"	06 53 41 54 00
32 6C 01 6D	Set	Substitution_rules	Day_Of_Week	5	7,"SUN"	07 53 55 4E 00

Traffic for Get.

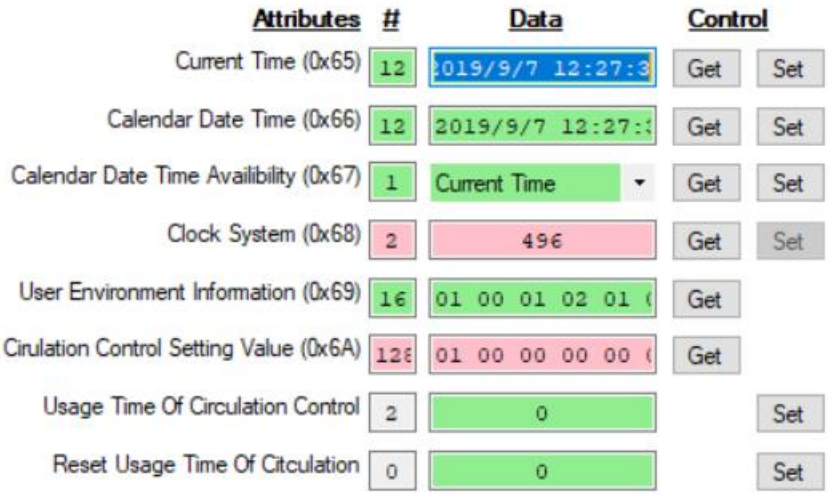
Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Traffic to retrieve substitution data									
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"MON"	4D 4F 4E	1	1	01
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"TUE"	54 55 45	1	2	02
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"WED"	57 45 44	1	3	03
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"THU"	54 48 55	1	4	04
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"FRI"	46 52 49	1	5	05
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"SAT"	53 41 54	1	6	06
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"SUN"	53 55 4E	1	7	07

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Set Item and substitution rule									
00 -- O.K. -- 33 7A 01 66	Get	Index	Item	2	1	00 01			
00 -- O.K. -- 33 7A 01 6C	Get	Index	Substitution_Rules_Setting	1	1	01			
Read one instance of each attribute									
00 -- O.K. -- 33 6C 01 64	Get	Substitution_rules	Number	3	123655	01 E3 07			
00 -- O.K. -- 33 6C 01 65	Get	Substitution_rules	Name	5	"REP01"	52 45 50 30 31	1	1	01
00 -- O.K. -- 33 6C 01 66	Get	Substitution_rules	Start_Year	1	226	E2			
00 -- O.K. -- 33 6C 01 67	Get	Substitution_rules	Year	2	"01"	30 31	1	1	01
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"JAN"	4A 41 4E	1	1	01
00 -- O.K. -- 33 6C 01 69	Get	Substitution_rules	Day	3	" 01"	20 30 31	1	1	01
00 -- O.K. -- 33 6C 01 6A	Get	Substitution_rules	Hour	2	"01"	30 31	1	1	01
00 -- O.K. -- 33 6C 01 6B	Get	Substitution_rules	Minute	2	"01"	30 31	1	1	01
00 -- O.K. -- 33 6C 01 6C	Get	Substitution_rules	Week	3	" 01"	20 30 31	1	1	01
00 -- O.K. -- 33 6C 01 6D	Get	Substitution_rules	Day_Of_Week	3	"MON"	4D 4F 4E	1	1	01

Write the Month Substitutions									
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JAN	01 4A 41 4E 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	FEB	02 46 45 42 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	MAR	03 4D 41 52 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	APR	04 41 50 52 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	MAY	05 4D 41 59 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JUN	06 4A 55 4E 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JUL	07 4A 55 4C 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	AUG	08 41 55 47 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	SEP	09 53 45 50 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	OCT	0A 4F 43 54 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	NOV	0B 4E 4F 56 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	DEC	0C 44 45 43 00
Read the month Substitutions									
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"JAN"	4A 41 4E	1	1	01
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"FEB"	46 45 42	1	2	02
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"MAR"	4D 41 52	1	3	03
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"APR"	41 50 52	1	4	04
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"MAY"	4D 41 59	1	5	05
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"JUN"	4A 55 4E	1	6	06
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"JUL"	4A 55 4C	1	7	07
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"AUG"	41 55 47	1	8	08
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"SEP"	53 45 50	1	9	09
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"OCT"	4F 43 54	1	10	0A
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"NOV"	4E 4F 56	1	11	0B
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month	3	"DEC"	44 45 43	1	12	0C
Set auto reflection									
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection				1	1	01
00 -- O.K. -- 33 7A 01 65	Get	Index	Automatic_reflection	1	1	01			

Write the Month Substitutions								
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JAN	01 4A 41 4E 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	FEB	02 46 45 42 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	MAR	03 4D 41 52 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	APR	04 41 50 52 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	MAY	05 4D 41 59 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JUN	06 4A 55 4E 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	JUL	07 4A 55 4C 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	AUG	08 41 55 47 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	SEP	09 53 45 50 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	OCT	0A 4F 43 54 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	NOV	0B 4E 4F 56 00
00 -- O.K. -- 32 6C 01 68	Set	Substitution_rules	Month				5	DEC	0C 44 45 43 00
Clear Auto Reflection								
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection				1	0	00
00 -- O.K. -- 33 7A 01 65	Get	Index	Automatic_reflection	1	0	00			
Read the month Substitutions								
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	1	01
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	2	02
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	3	03
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	4	04
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	5	05
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	6	06
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	7	07
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	8	08
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	9	09
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	10	0A
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	11	0B
00 -- O.K. -- 33 6C 01 68	Get	Substitution_rules	Month				1	12	0C

0x71 Enviroment setting function

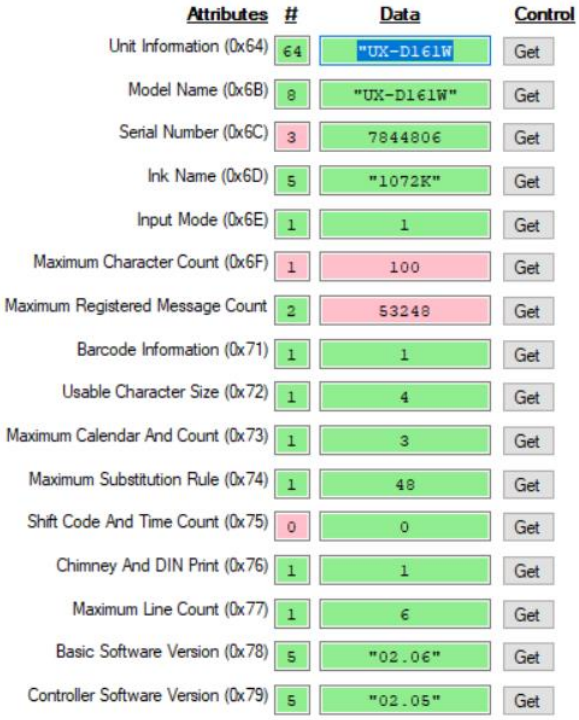


Attributes and comments

- 0x65 & 0x66 == Get
  - Command = 33 71 01 65
  - Response = `E3 07 03 00 14 00 0B 00 10 00 31 00`
    `YYYYY MMMMM DDDDD hhhhh mmmmm sssss`
  - Two bytes each in Little Endian format
- 0x65 == Set (attempt to change month)
  - Command = 32 71 01 65
  - Data = `E3 07 04 00 14 00 0B 00 10 00 31 00`
    `YYYYY MMMMM DDDDD hhhhh mmmmm sssss`
  - Response = Success The time was not changed in the printer
- 0x67 == Worked
- 0x68 == has an issue
  - Get == 33 71 01 68
  - Response = 01 F0 (an extra byte is returned. The first byte is correct)
  - Set = 32 71 01 68
  - Data = 02
  - Response = Success (the clock system was changed)
- 0x69 & 0x6A == Need documentation
- 0x6B & 0x6C == Do not know how to test or when I would use them.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Enviroment_setting						
33 71 01 65	Get	Enviroment_setting	Current_Time	12	2019/9/7 13:6:22	E3 07 09 00 07 00 0D 00 06 00 16 00
33 71 01 66	Get	Enviroment_setting	Calendar_Date_Time	12	2019/9/7 13:6:22	E3 07 09 00 07 00 0D 00 06 00 16 00
33 71 01 67	Get	Enviroment_setting	Calendar_Date_Time_Availibility	1	Current Time	01
33 71 01 68	Get	Enviroment_setting	Clock_System	2	496	01 F0
33 71 01 69	Get	Enviroment_setting	User_Environment_Information	16	See=>	01 00 01 02 01 02 02 01 00 01 00 00 01 00 01 00
33 71 01 6A	Get	Enviroment_setting	Cirulation_Control_Setting_Value	128	See=>	01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0x73 Unit Information function



Attributes	#	Data	Control
Unit Information (0x64)	64	"UX-D161W	Get
Model Name (0x6B)	8	"UX-D161W"	Get
Serial Number (0x6C)	3	7844806	Get
Ink Name (0x6D)	5	"1072K"	Get
Input Mode (0x6E)	1	1	Get
Maximum Character Count (0x6F)	1	100	Get
Maximum Registered Message Count	2	53248	Get
Barcode Information (0x71)	1	1	Get
Usable Character Size (0x72)	1	4	Get
Maximum Calendar And Count (0x73)	1	3	Get
Maximum Substitution Rule (0x74)	1	48	Get
Shift Code And Time Count (0x75)	0	0	Get
Chimney And DIN Print (0x76)	1	1	Get
Maximum Line Count (0x77)	1	6	Get
Basic Software Version (0x78)	5	"02.06"	Get
Controller Software Version (0x79)	5	"02.05"	Get

Attributes	#	Data	Control
Engine M Software Version (0x7A)	5	"02.00"	Get
Engine S Software Version (0x7B)	5	"01.01"	Get
First Language Version (0x7C)	5	"01.08"	Get
Second Language Version (0x7D)	0	""	Get
Software Option Version (0x7E)	12:	"	Get

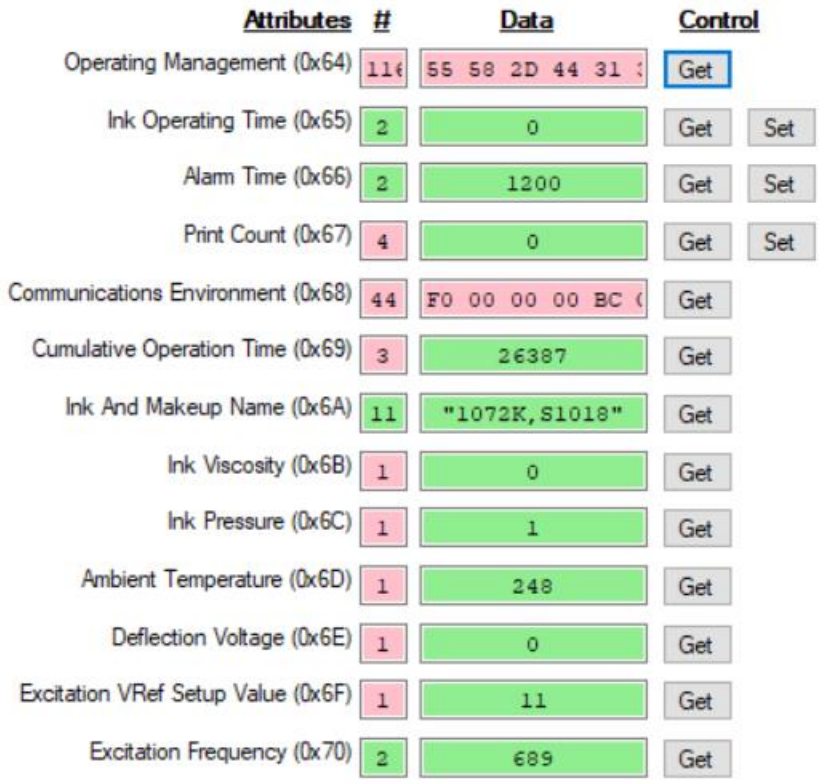
Attribute and comments

- 0x64 == Returns 64 bytes
    - Get = 33 73 01 64
    - Response = 55 58 2D 44 31 36 31 57 00 00 00 00 C6 B3 77 00 31 30 37 32 4B 2B DD BE 69 B2 0D 2C 53 31 30 31 38 2B DD BE 69 B2 0D 00 00 00 00 00 02 00 E8 03 D0 07 01 00 04 00 08 00 63 00 01 00 01 00 06 00
        - 55 58 2D 44 31 36 31 57 ("UX-D161W")
        - 00 00 00 00 C6 B3 77 00 == 0x6D Response(7844806 machine serial number in some unknown format)
        - 31 30 37 32 4B = 0x6D Response (“1072K”)
        - 2C 53 31 30 31 38 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 == Just hanging here. Do not know where it goes. Might be part of the ink type (“,S1018”)
        - 02 00 == 0x6E Response (This is what is actually in the machine but 0x6E reports “01”)
        - E8 03 == 0x6F Response (This is 1000 and should be the response for 0x6F. But 0x6f reports a “64”)
        - D0 07 == 0x70 Response (This is 2000 and should be the response for 0x70. But 0x70 reports “D0 00”)
        - 01 00 == 0x71 Response valid

        - 04 00 == 0x72 Response valid
        - 08 00 == 0x73 Response valid
        - 63 00 == 0x74 Response valid
        - 01 00 == 0x75 Response valid
        - 01 00 == 0x76 Response valid
        - 06 00 == 0x77 Response valid
- 0x6B thru 0x77 are described above
- 0x78 thru 0x7d == Work fine
- 0x7E == Causes a printer hang. {“Unable to read data from the transport connection: A connection attempt failed because the connected party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.")

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Unit_Information						
33 73 01 64	Get	Unit_Information	Unit_Information	64	"UX-D161W	55 58 2D 44 31 36 31 57 00 00 00 00 C6 B3 77 00
33 73 01 6B	Get	Unit_Information	Model_Name	8	"UX-D161W"	55 58 2D 44 31 36 31 57
33 73 01 6C	Get	Unit_Information	Serial_Number	3	7844806	C6 B3 77
33 73 01 6D	Get	Unit_Information	Ink_Name	5	"1072K"	31 30 37 32 4B
33 73 01 6E	Get	Unit_Information	Input_Mode	1	1	01
33 73 01 6F	Get	Unit_Information	Maximum_Character_Count	1	100	64
33 73 01 70	Get	Unit_Information	Maximum_Registered_Message_Count	2	53296	D0 30
33 73 01 71	Get	Unit_Information	Barcode_Information	1	1	01
33 73 01 72	Get	Unit_Information	Usable_Character_Size	1	4	04
33 73 01 73	Get	Unit_Information	Maximum_Calendar_And_Count	1	3	03
33 73 01 74	Get	Unit_Information	Maximum_Substitution_Rule	1	48	30
33 73 01 75	Get	Unit_Information	Shift_Code_And_Time_Count	0	0	
33 73 01 76	Get	Unit_Information	Chimney_And_DIN_Print	1	1	01
33 73 01 77	Get	Unit_Information	Maximum_Line_Count	1	6	06
33 73 01 78	Get	Unit_Information	Basic_Software_Version	5	"02.06"	30 32 2E 30 36
33 73 01 79	Get	Unit_Information	Controller_Software_Version	5	"02.05"	30 32 2E 30 35
33 73 01 7A	Get	Unit_Information	Engine_M_Software_Version	5	"02.00"	30 32 2E 30 30
33 73 01 7B	Get	Unit_Information	Engine_S_Software_Version	5	"01.01"	30 31 2E 30 31
33 73 01 7C	Get	Unit_Information	First_Language_Version	5	"01.08"	30 31 2E 30 38
33 73 01 7D	Get	Unit_Information	Second_Language_Version	0	""	
33 73 01 7E	Get	Unit_Information	Software_Option_Version	122	"	00 00 2E 00 00 00 00 00 00 00 00 00 00 00 00 00

0x74 Operation management function

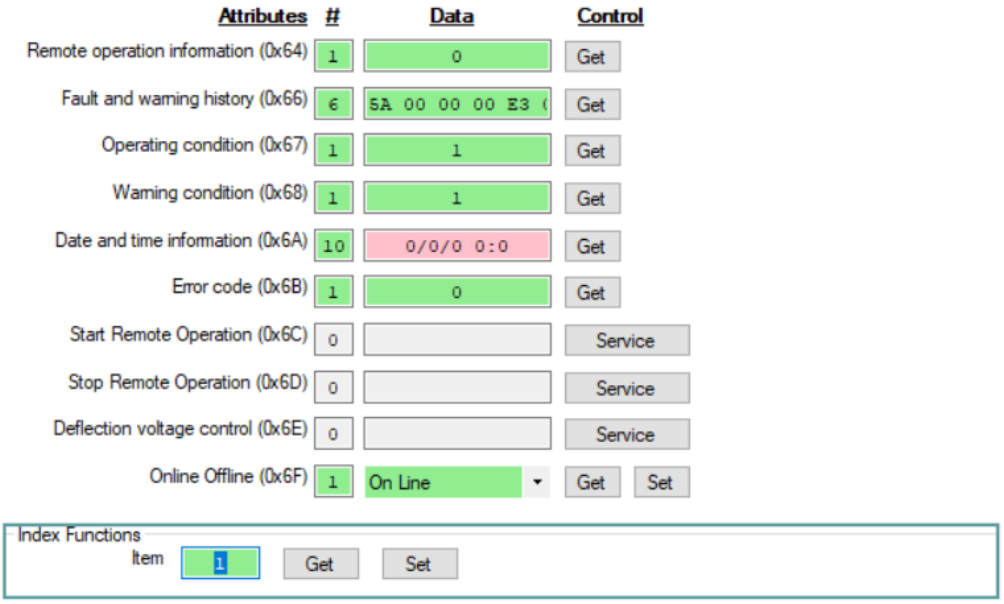


Test results:

- These may have issues since my printer does not have ink.
- All items in red do not match the documentation in terms of amount of data sent.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
Operation_management						
33 74 01 64	Get	Operation_management	Operating_Management	116	See=>	55 58 2D 44 31 36 31 57 00 00 00 00 C6 B3 77 00
33 74 01 65	Get	Operation_management	Ink_Operating_Time	2	0	00 00
33 74 01 66	Get	Operation_management	Alarm_Time	2	1200	04 B0
33 74 01 67	Get	Operation_management	Print_Count	4	0	00 00 00 00
33 74 01 68	Get	Operation_management	Communications_Environment	44	See=>	F0 00 00 00 BC CF F0 B6 80 79 07 00 01 00 00 00
33 74 01 69	Get	Operation_management	Cumulative_Operation_Time	3	26368	00 67 00
33 74 01 6A	Get	Operation_management	Ink_And_Makeup_Name	11	"1072K,S1018"	31 30 37 32 4B 2C 53 31 30 31 38
33 74 01 6B	Get	Operation_management	Ink_Viscosity	1	0	00
33 74 01 6C	Get	Operation_management	Ink_Pressure	0	0	
33 74 01 6D	Get	Operation_management	Ambient_Temperature	1	248	F8
33 74 01 6E	Get	Operation_management	Deflection_Voltage	1	0	00
33 74 01 6F	Get	Operation_management	Excitation_VRef_Setup_Value	1	11	0B
33 74 01 70	Get	Operation_management	Excitation_Frequency	2	689	02 B1

0x75 IJP operation function



Here are the Attribute codes and retrieved values

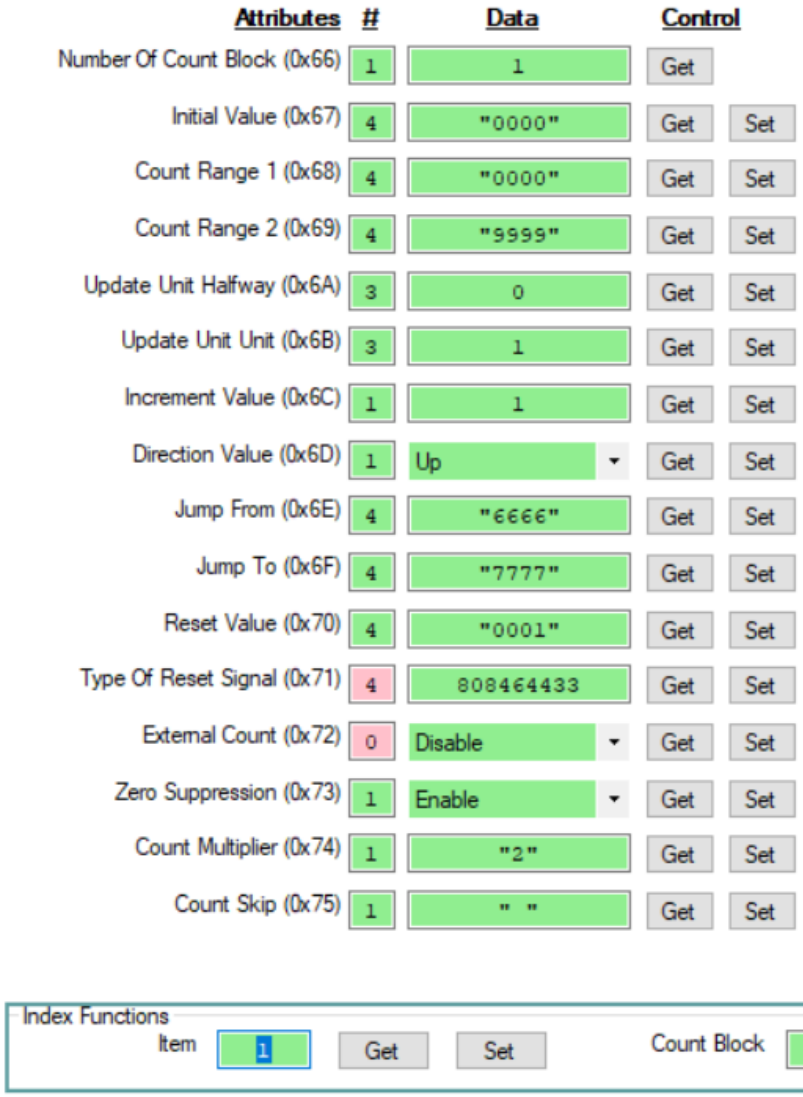
- 0x64 / 00 == Do not know what it means. Reception not possible?
- 0x66 / 0E 00 00 00 E3 07 == Do not know what it means
    - 0E == 14 which is the number of Com errors currently in my printer
    - 00 00 00 == Do not know what they mean
    - E3 07 == 2019 in Little End format
- 0x67 / 01 == In standby?
- 0x68 / 01 == Ink Low warning? (I have no ink in my printer)
- 0x6A / 00 00 00 00 00 00 00 00 00 00 == Sometimes it shows a data and time
- 0x6B == Always shows 00.
- 0x6C & 0x6D == I understand
- 0x6E == What does this do?
- 0x6F == Works fine

Changing the Item Number in the Index Function seems to change some values but have not figured a pattern.

Would like to see a service call to clear all entries from the Alarm History.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
IJP_operation									
33 75 01 64	Get	IJP_operation	Remote_operation_information	1	0	00			
33 75 01 66	Get	IJP_operation	Fault_and_warning_history	6	See=>	5A 00 00 00 E3 07			
33 75 01 67	Get	IJP_operation	Operating_condition	1	1	01			
33 75 01 68	Get	IJP_operation	Warning_condition	1	1	01			
33 75 01 6A	Get	IJP_operation	Date_and_time_information	10	2019/9/6 13:42	E3 07 09 00 06 00 0D 00 2A 00			
33 75 01 6B	Get	IJP_operation	Error_code	1	0	00			
33 75 01 6F	Get	IJP_operation	Online_Offline	1	On Line	01			

0x79 Count function

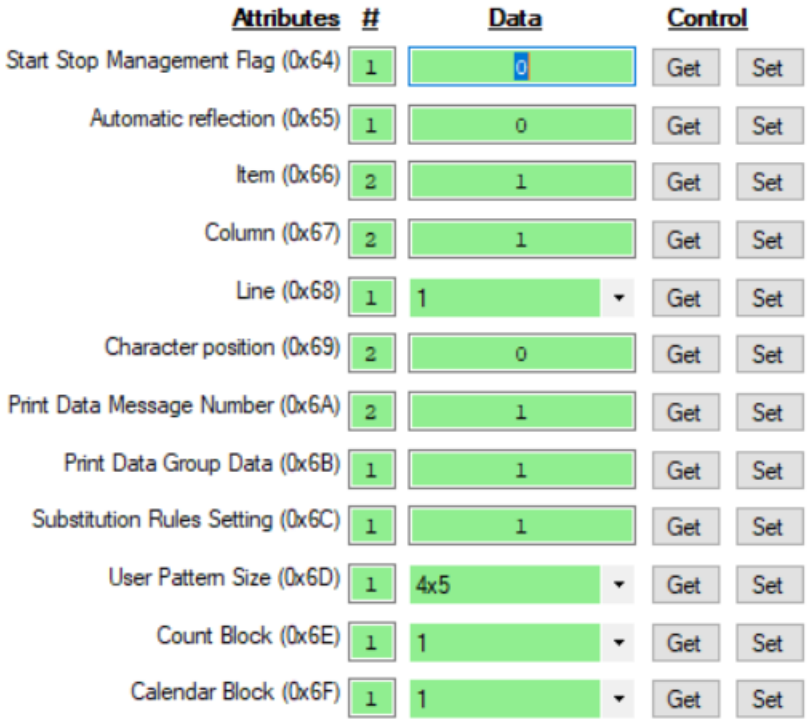


Test Results:

- Almost everything worked.
- Differences indicated in yellow below.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Setup the Counter									
00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	1	00 01
00 -- O.K. -- 32 7A 01 6E	Set	Index	Count_Block				1	1	01
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8(5x7)	03
00 -- O.K. -- 32 67 01 75	Set	Print_format	InterCharacter_Space				1	1	01
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				9	"{{CCCC}}"	7B 7B 43 43 43 43 7D 7D 00
00 -- O.K. -- 32 79 01 67	Set	Count	Initial_Value				5	"0001"	30 30 30 31 00
00 -- O.K. -- 32 79 01 68	Set	Count	Count_Range_1				5	"0000"	30 30 30 30 00
00 -- O.K. -- 32 79 01 69	Set	Count	Count_Range_2				5	"9999"	39 39 39 39 00
00 -- O.K. -- 32 79 01 6E	Set	Count	Jump_From				5	"6666"	36 36 36 36 00
00 -- O.K. -- 32 79 01 6F	Set	Count	Jump_To				5	"7777"	37 37 37 37 00
00 -- O.K. -- 32 79 01 6C	Set	Count	Increment_Value				1	1	01
00 -- O.K. -- 32 79 01 6D	Set	Count	Direction_Value				1	Up	01
00 -- O.K. -- 32 79 01 73	Set	Count	Zero_Suppression				1	Enable	01
00 -- O.K. -- 32 79 01 74	Set	Count	Count_Multiplier				2	"2"	32 00
00 -- O.K. -- 32 79 01 70	Set	Count	Reset_Value				5	"0001"	30 30 30 31 00
00 -- O.K. -- 32 79 01 75	Set	Count	Count_Skip				2	"0"	30 00
Read Back the Counter									
00 -- O.K. -- 33 79 01 66	Get	Count	Number_Of_Count_Block	1	1	01			
00 -- O.K. -- 33 79 01 67	Get	Count	Initial_Value	4	"0000"	30 30 30 30			
00 -- O.K. -- 33 79 01 68	Get	Count	Count_Range_1	4	"0000"	30 30 30 30			
00 -- O.K. -- 33 79 01 69	Get	Count	Count_Range_2	4	"9999"	39 39 39 39			
00 -- O.K. -- 33 79 01 6A	Get	Count	Update_Unit_Halfway	3	0	00 00 00			
00 -- O.K. -- 33 79 01 6B	Get	Count	Update_Unit_Unit	3	1	00 00 01			
00 -- O.K. -- 33 79 01 6C	Get	Count	Increment_Value	1	1	01			
00 -- O.K. -- 33 79 01 6D	Get	Count	Direction_Value	1	Up	01			
00 -- O.K. -- 33 79 01 6E	Get	Count	Jump_From	4	"6666"	36 36 36 36			
00 -- O.K. -- 33 79 01 6F	Get	Count	Jump_To	4	"7777"	37 37 37 37			
00 -- O.K. -- 33 79 01 70	Get	Count	Reset_Value	4	"0001"	30 30 30 31			
00 -- O.K. -- 33 79 01 71	Get	Count	Type_Of_Reset_Signal	4	808464433	30 30 30 31			
00 -- O.K. -- 33 79 01 72	Get	Count	External_Count	0	Disable				
00 -- O.K. -- 33 79 01 73	Get	Count	Zero_Suppression	1	Enable	01			
00 -- O.K. -- 33 79 01 74	Get	Count	Count_Multiplier	1	"2"	32			
00 -- O.K. -- 33 79 01 75	Get	Count	Count_Skip	1	" "	20			

0x7A Index function



Test results:

- All functions seem to operate properly.

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Index									
33 7A 01 64	Get	Index	Start_Stop_Management_Flag	1	0	00			
33 7A 01 65	Get	Index	Automatic_reflection	1	0	00			
33 7A 01 66	Get	Index	Item	2	1	00 01			
33 7A 01 67	Get	Index	Column	2	1	00 01			
33 7A 01 68	Get	Index	Line	1	1	01			
33 7A 01 69	Get	Index	Character_position	2	0	00 00			
33 7A 01 6A	Get	Index	Print_Data_Message_Number	2	1	00 01			
33 7A 01 6B	Get	Index	Print_Data_Group_Data	1	1	01			
33 7A 01 6C	Get	Index	Substitution_Rules_Setting	1	1	01			
33 7A 01 6D	Get	Index	User_Pattern_Size	1	4x5	01			
33 7A 01 6E	Get	Index	Count_Block	1	1	01			
33 7A 01 6F	Get	Index	Calendar_Block	1	1	01			

Character Size

There are two different mappings for character size:

User Pattern Function (0x6B) Attributes 0x64 and 0x65 refer to Table 5.3.8-3 of the UX Technical Spec

No.	Character size	Character size code	Pattern data length (bytes)
1	4×5	30H	8
2	5×5	31H	8
3	5×8(5×7)	32H	8
4	9×8(9×7)	33H	16
5	7×10	34H	16
6	10×12	35H	32
7	12×16	36H	32
8	18×24	37H	72
9	24×32	38H	128
10	11×11	39H	32
11	5×3(chimney)	3AH	5
12	5×5(chimney)	3BH	5
13	7×5(chimney)	3CH	7
14	30×40	3EH	200
15	36×48	3FH	288

Print Format Function (0x67) Attribute 0x74 refers to table 7.4 of the EtherNet/IP document

Dot Matrix Code	Dot Matrix
1	Size4x5
2	Size5x5
3	Size5x7
4	Size9x7
5	Size7x10
6	Size10x12
7	Size12x16
8	Size18x24
9	Size24x32
10	Size11x11 *1
11	Size48x48(QR33)
12	Size30x40
13	Size36x48
14	Size5x3_Chimney
15	Size5x5_Chimney
16	Size7x5_Chimney

Issues with implementation:

- The UX Spec is 0-Origin == 0 thru 15 (missing 13 (3DH))
- The EIP Spec is 1-origin == 1 thru 16
- The location of the chimney fonts differs.

This causes issues with the implementation. It would be nice for both tables to use the EIP Mapping.