Open Cases 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

Calendar Block Shift Code

I am trying to use EtherNet/IP to initialize the Shift Settings.

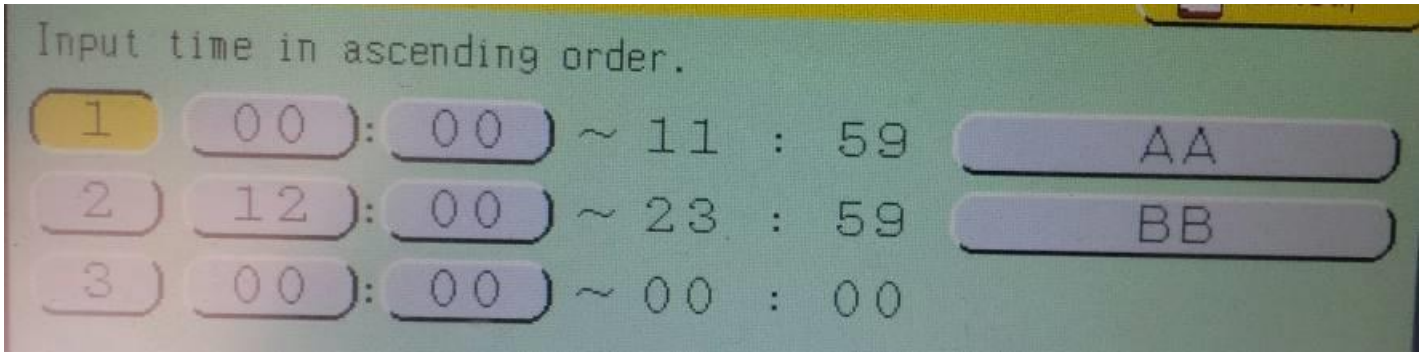
The code looks like

```
#region Item #4

// Add and select item #4
ServiceAttribute(ClassCode.Print_format, (byte)ccPF.Add_Column, 0);
SetAttribute(ClassCode.Index, (byte)ccIDX.Item, 4);

// Point the calendar block  to Item #4
SetAttribute(ClassCode.Index, (byte)ccIDX.Calendar_Block, 4);

SetAttribute(ClassCode.Print_format, (byte)ccPF.Dot_Matrix, "5x8");
SetAttribute(ClassCode.Print_format, (byte)ccPF.InterCharacter_Space, 1);
SetAttribute(ClassCode.Print_format, (byte)ccPF.Print_Character_String, "=>{{EE}}<=");

// Set < Shift Number="1" StartHour="00" StartMinute="00" EndHour="11" EndMinute="59" Text="AA" />
SetAttribute(ClassCode.Index, (byte)ccIDX.Calendar_Block, 1);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_Start_Hour, 0);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_Start_Minute, 0);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_String_Value, "AA");

// Set < Shift Number="2" StartHour="12" StartMinute="00" EndHour="23" EndMinute="59" Text="BB" />
SetAttribute(ClassCode.Index, (byte)ccIDX.Calendar_Block, 2);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_Start_Hour, 12);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_Start_Minute, 0);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Shift_String_Value, "BB");

#endregion
```

The traffic looks like

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column			
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	4	00 04
00 -- O.K. -- 32 7A 01 6F	Set	Index	Calendar_Block	1	4	04
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	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	11	=>{{EE}}<=	3D 3E 7B 7B 45 45 7D 7D 3C 3D 00
00 -- O.K. -- 32 7A 01 6F	Set	Index	Calendar_Block	1	1	01
00 -- O.K. -- 32 69 01 80	Set	Calendar	Shift_Start_Hour	1	0	00
00 -- O.K. -- 32 69 01 81	Set	Calendar	Shift_Start_Minute	1	0	00
00 -- O.K. -- 32 69 01 84	Set	Calendar	Shift_String_Value	3	AA	41 41 00
00 -- O.K. -- 32 7A 01 6F	Set	Index	Calendar_Block	1	2	02
00 -- O.K. -- 32 69 01 80	Set	Calendar	Shift_Start_Hour	1	12	0C
00 -- O.K. -- 32 69 01 81	Set	Calendar	Shift_Start_Minute	1	0	00
00 -- O.K. -- 32 69 01 84	Set	Calendar	Shift_String_Value	3	BB	42 42 00

The view from the printer



No COM errors were generated in the process.

When I tried to read the shift codes back, I got

Status/Path	Count OK	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 6F	True	Index	Calendar_Block				1	1	01
00 -- O.K. -- 33 69 01 80	True	Calendar	Shift_Start_Hour	1	255	FF			
00 -- O.K. -- 33 69 01 81	True	Calendar	Shift_Start_Minute	1	255	FF			
00 -- O.K. -- 33 69 01 82	True	Calendar	Shift_End_Hour	1	12	0C			
00 -- O.K. -- 33 69 01 83	True	Calendar	Shift_End_Minute	1	0	00			
00 -- O.K. -- 33 69 01 84	True	Calendar	Shift_String_Value	1	"	00			
00 -- O.K. -- 32 7A 01 6F	True	Index	Calendar_Block				1	2	02
00 -- O.K. -- 33 69 01 80	True	Calendar	Shift_Start_Hour	1	255	FF			
00 -- O.K. -- 33 69 01 81	True	Calendar	Shift_Start_Minute	1	255	FF			
00 -- O.K. -- 33 69 01 82	True	Calendar	Shift_End_Hour	1	12	0C			
00 -- O.K. -- 33 69 01 83	True	Calendar	Shift_End_Minute	1	0	00			
00 -- O.K. -- 33 69 01 84	True	Calendar	Shift_String_Value	1	"	00			

Not what I expected.

However, I have a question.

I did not send the Shift End Hour or Shift End Minute. Is it safe never to send them?

Any help would be appreciated.

Time Count Function

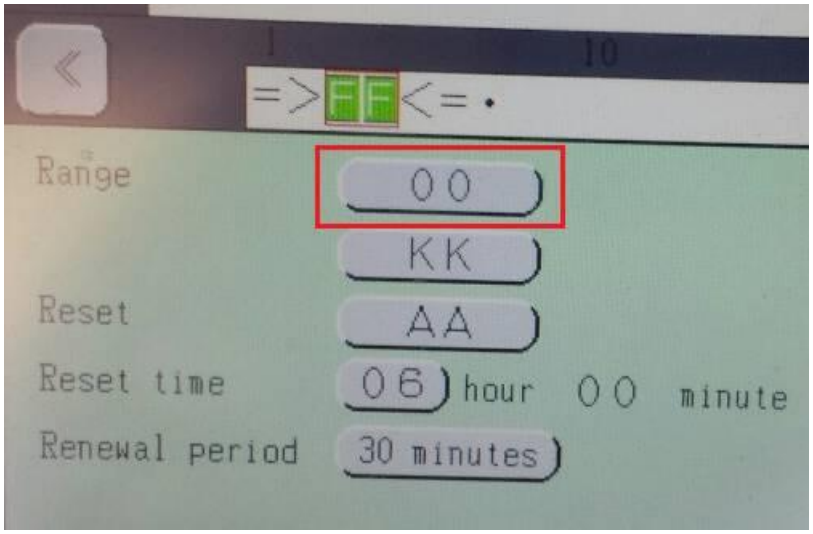
I am trying to set up the Time Count function using EtherNet/IP. The code looks like

```
#region Item #2

// Add and select item #2
ServiceAttribute(ClassCode.Print_format, (byte)ccPF.Add_Column, 0);
SetAttribute(ClassCode.Index, (byte)ccIDX.Item, 2);

// Point to calendar block #2
SetAttribute(ClassCode.Index, (byte)ccIDX.Calendar_Block, 2);

SetAttribute(ClassCode.Print_format, (byte)ccPF.Dot_Matrix, "5x8");
SetAttribute(ClassCode.Print_format, (byte)ccPF.InterCharacter_Space, 1);
SetAttribute(ClassCode.Print_format, (byte)ccPF.Print_Character_String, "=>{{FF}}<=");

// Set <TimeCount Start="AA" End="JJ" Reset="AA" ResetTime="6" RenewalPeriod="30 Minutes" />
SetAttribute(ClassCode.Calendar, (byte)ccCal.Time_Count_Start_Value, "AA");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Time_Count_End_Value, "KK");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Time_Count_Reset_Value, "AA");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Reset_Time_Value, 6);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Update_Interval_Value, "30 Minutes");

#endregion
```

The traffic looks like.

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column			
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	2	00 02
00 -- O.K. -- 32 7A 01 6F	Set	Index	Calendar_Block	1	2	02
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	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	11	=>{{FF}}<=	3D 3E 7B 7B 46 46 7D 7D 3C 3D 00
00 -- O.K. -- 32 69 01 7B	Set	Calendar	Time_Count_Start_Value	3	AA	41 41 00
00 -- O.K. -- 32 69 01 7C	Set	Calendar	Time_Count_End_Value	3	KK	4B 4B 00
00 -- O.K. -- 32 69 01 7D	Set	Calendar	Time_Count_Reset_Value	3	AA	41 41 00
00 -- O.K. -- 32 69 01 7E	Set	Calendar	Reset_Time_Value	1	6	06
00 -- O.K. -- 32 69 01 7F	Set	Calendar	Update_Interval_Value	1	30 Minutes	06

The view from the printer



Everything worked except the initial part of the range. No COM Errors were generated.

Where I read the settings back, I get

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
00 -- O.K. -- 33 69 01 7B	Get	Calendar	Time_Count_Start_Value	3	"000"	30 30 30
00 -- O.K. -- 33 69 01 7C	Get	Calendar	Time_Count_End_Value	3	"9KK"	39 4B 4B
00 -- O.K. -- 33 69 01 7D	Get	Calendar	Time_Count_Reset_Value	3	"0AA"	30 41 41
00 -- O.K. -- 33 69 01 7E	Get	Calendar	Reset_Time_Value	1	6	06
00 -- O.K. -- 33 69 01 7F	Get	Calendar	Update_Interval_Value	4	117440268	06 FF FF 0C

The start value agrees with the printer screen but not what I sent.
Start/End/Reset values all have an extra character as a prefix.
Update Interval value returns four bytes. The first byte (the 6) is correct.

Any help on this would be appreciated.

Counter block

I am trying to build a counter and read it back using the EtherNet/IP Protocol.

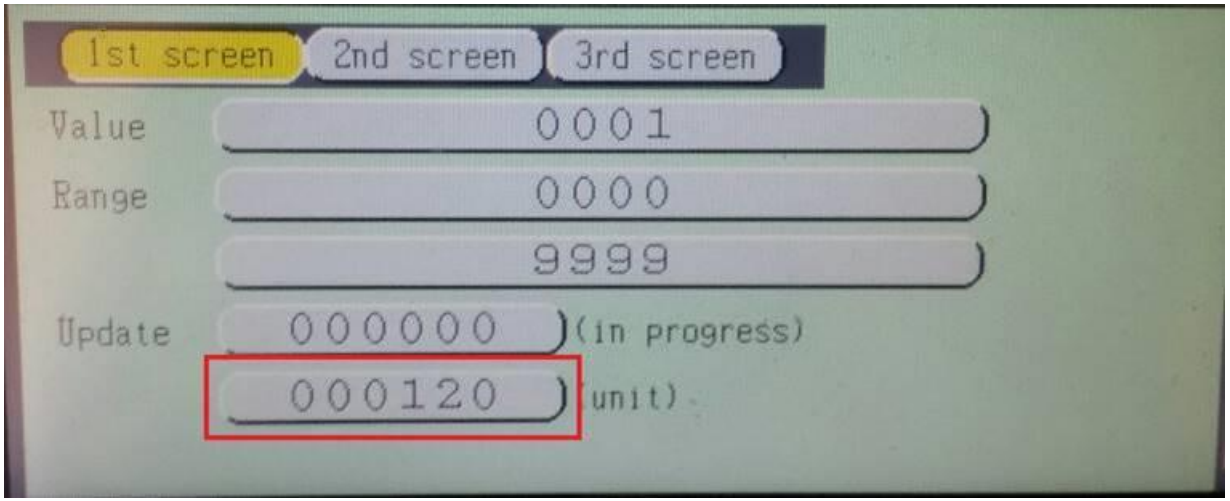
Here is the code. It shows the Class, Attribute, and Data that is being sent. Human readable values like “Enable” or “Disable” are translated to the correct value before they are sent.

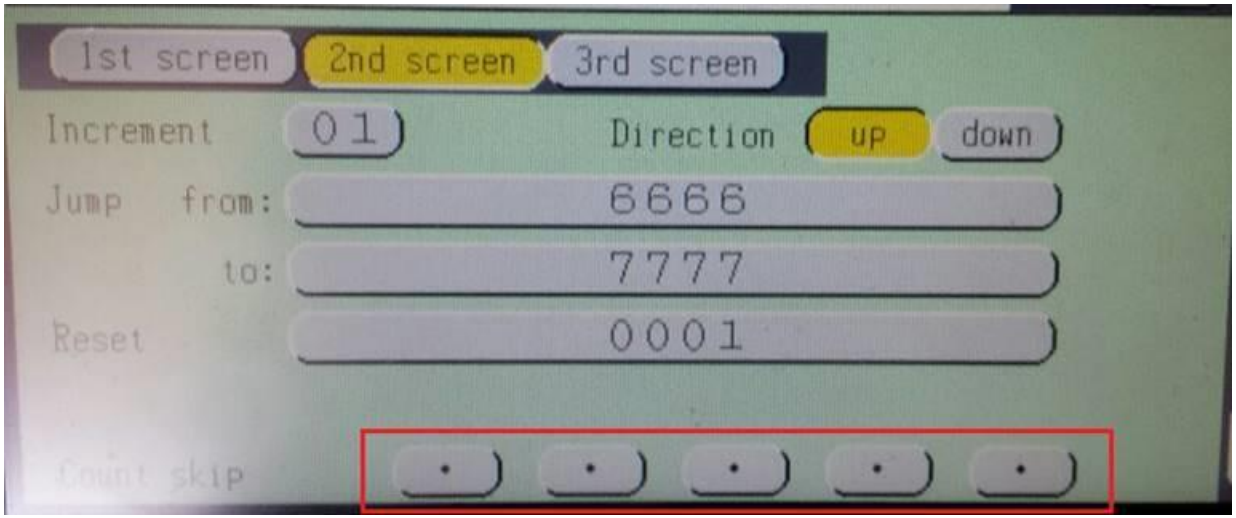
```
// Set to first item
int item = 1;

// Select item #1
SetAttribute(ClassCode.Index, (byte)ccIDX.Item, item);

// Set item number in count block
SetAttribute(ClassCode.Index, (byte)ccIDX.Count_Block, item);

// Set font, ICS, and Text is a 4 digit counter
SetAttribute(ClassCode.Print_format, (byte)ccPF.Dot_Matrix, "5x8");
SetAttribute(ClassCode.Print_format, (byte)ccPF.InterCharacter_Space, 1);
SetAttribute(ClassCode.Print_format, (byte)ccPF.Print_Character_String, "{{CCCC}}");

// Set <Counter InitialValue="0001" Range1="0000" Range2="9999" JumpFrom="6666" JumpTo ="7777"
//      Increment="1" Direction="Up" ZeroSuppression="Enable" UpdateIP="0" UpdateUnit="1"
//      Multiplier ="2" CountSkip="0" Reset="0001" ExternalSignal="Disable" ResetSignal="Signal 1" />
SetAttribute(ClassCode.Count, (byte)ccCount.Initial_Value, "0001");
SetAttribute(ClassCode.Count, (byte)ccCount.Count_Range_1, "0000");
SetAttribute(ClassCode.Count, (byte)ccCount.Count_Range_2, "9999");
SetAttribute(ClassCode.Count, (byte)ccCount.Jump_From, "6666");
SetAttribute(ClassCode.Count, (byte)ccCount.Jump_To, "7777");
SetAttribute(ClassCode.Count, (byte)ccCount.Increment_Value, 1);
SetAttribute(ClassCode.Count, (byte)ccCount.Direction_Value, "Up");
SetAttribute(ClassCode.Count, (byte)ccCount.Zero_Suppression, "Enable");
SetAttribute(ClassCode.Count, (byte)ccCount.Update_Unit_Halfway, 0);
SetAttribute(ClassCode.Count, (byte)ccCount.Update_Unit_Unit, 1);
SetAttribute(ClassCode.Count, (byte)ccCount.Count_Multiplier, "2");
SetAttribute(ClassCode.Count, (byte)ccCount.Reset_Value, "0001");
SetAttribute(ClassCode.Count, (byte)ccCount.Type_Of_Reset_Signal, "Signal 1");
SetAttribute(ClassCode.Count, (byte)ccCount.External_Count, "Disable");
SetAttribute(ClassCode.Count, (byte)ccCount.Count_Skip, "0");
```

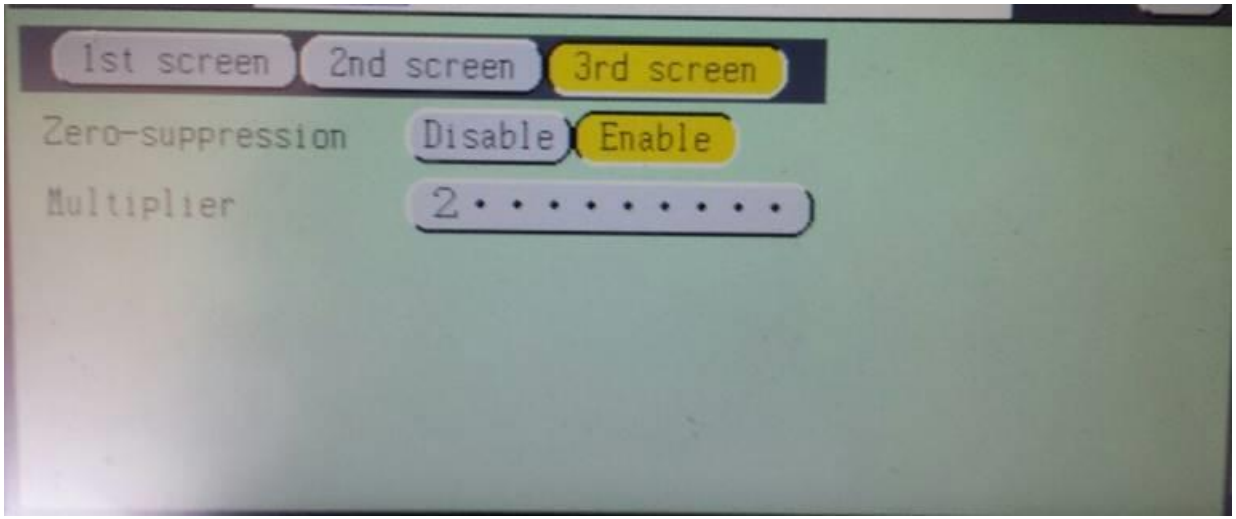
EtherNet/IP

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	1	00 01
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	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	4	1	20 31 20 00
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	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 6A	Set	Count	Update_Unit_Halfway	3	0	00 00 00
00 -- O.K. -- 32 79 01 6B	Set	Count	Update_Unit_Unit	3	1	00 00 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 71	Set	Count	Type_Of_Reset_Signal	1	Signal 1	01
00 -- O.K. -- 32 79 01 72	Set	Count	External_Count	1	Disable	00
00 -- O.K. -- 32 79 01 75	Set	Count	Count_Skip	2	0	30 00

Here is the view from the printer







Update Unit always get set to 120 no matter what value is set.

I do not understand Count Skip so have no idea on what should be displayed.

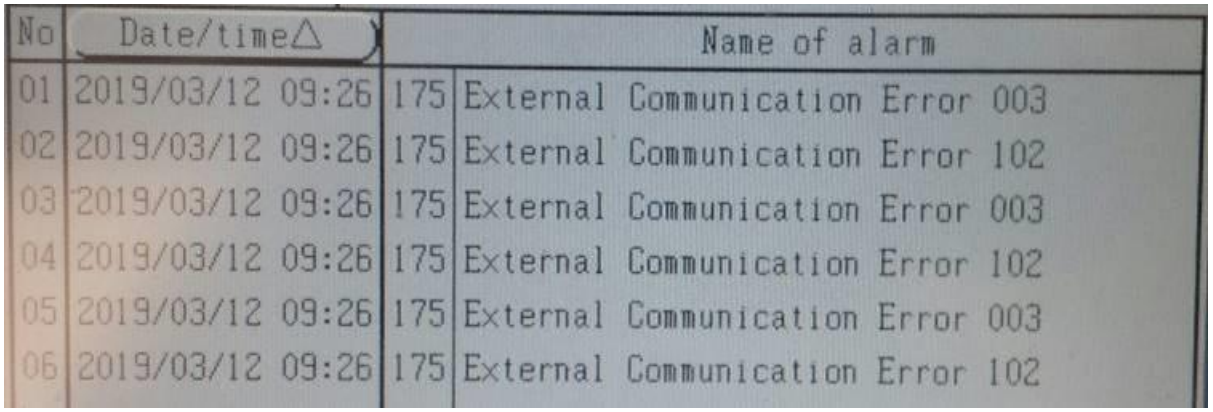
Here is the data when it is read back:

Status/Path	Access	Class	Attribute	#In	Data In	Raw In
00 -- O.K. -- 33 75 01 6F	Get	IJP_operation	Online_Offline	1	1	01
00 -- O.K. -- 33 7A 01 65	Get	Index	Automatic_reflection	1	0	00
00 -- O.K. -- 33 7A 01 64	Get	Index	Start_Stop_Management_Flag	1	1	01
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	"0001"	30 30 30 31
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	120	00 00 78
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	1	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	
00 -- O.K. -- 33 79 01 73	Get	Count	Zero_Suppression	1	1	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

Everything comes back as expected except:

Update Unit Unit is 120
Type of reset signal is “000”
External count returns no data.
Count Skip is a Space “ “ (0x20)

The printer fault log looks like



No	Date/time△		Name of alarm
01	2019/03/12 09:26	175	External Communication Error 003
02	2019/03/12 09:26	175	External Communication Error 102
03	2019/03/12 09:26	175	External Communication Error 003
04	2019/03/12 09:26	175	External Communication Error 102
05	2019/03/12 09:26	175	External Communication Error 003
06	2019/03/12 09:26	175	External Communication Error 102

The COM Errors are caused by

```
SetAttribute(ClassCode.Count, (byte)ccCount.Update_Unit_Halfway, 0);           // Causes COM Error
SetAttribute(ClassCode.Count, (byte)ccCount.Update_Unit_Unit, 1);              // Causes COM Error
SetAttribute(ClassCode.Count, (byte)ccCount.Type_Of_Reset_Signal, "Signal 1"); // Causes COM Error
SetAttribute(ClassCode.Count, (byte)ccCount.External_Count, "Disable");        // Causes COM Error
```

Any assistance would be appreciated.

Calendar Block

I am trying to set up the Calendar Block using EtherNet/IP. There are a lot of parts to it.

Here is the code for step 1. Setting Month and Day-of-Week in substitution Rule #2

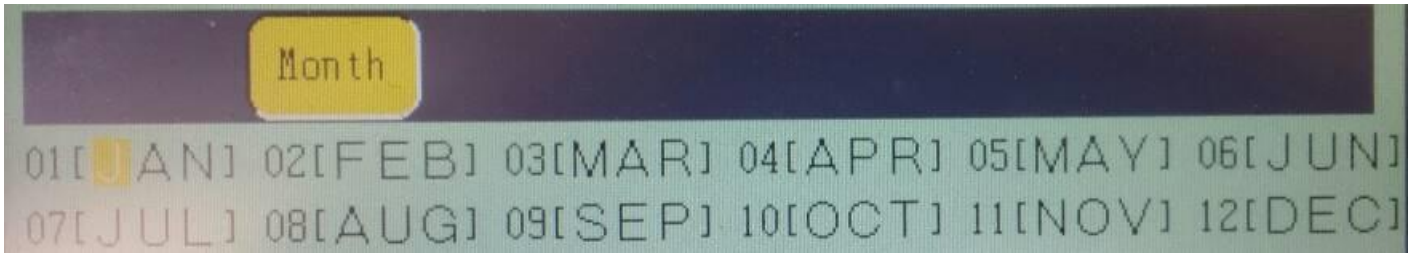
```
// Set <Substitution Rule="01" StartYear="2010" Delimeter="/">
char delimeter = '/';
SetAttribute(ClassCode.Index, (byte)ccIDX.Substitution_Rules_Setting, Rule);
SetAttribute(ClassCode.Substitution_rules, (byte)ccSR.Start_Year, 2010);

// Set <Month Base="1">JAN/FEB/MAR/APR/MAY/JUN/JUL/AUG/SEP/OCT/NOV/DEC</Month>
string[] months = "JAN/FEB/MAR/APR/MAY/JUN/JUL/AUG/SEP/OCT/NOV/DEC".Split(delimeter);
for (int i = 0; i < months.Length; i++) {
   SetAttribute(ClassCode.Substitution_rules, (byte)ccSR.Month, i + 1, months[i]);
}

// Set <DayOfWeek Base="1">MON/TUE/WED/THU/FRI/SAT/SUN</DayOfWeek>
string[] day = "MON/TUE/WED/THU/FRI/SAT/SUN".Split(delimeter);
for (int i = 0; i < day.Length; i++) {
   SetAttribute(ClassCode.Substitution_rules, (byte)ccSR.Day_Of_Week, i + 1, day[i]);
}
```

Here is the traffic sent to the printer

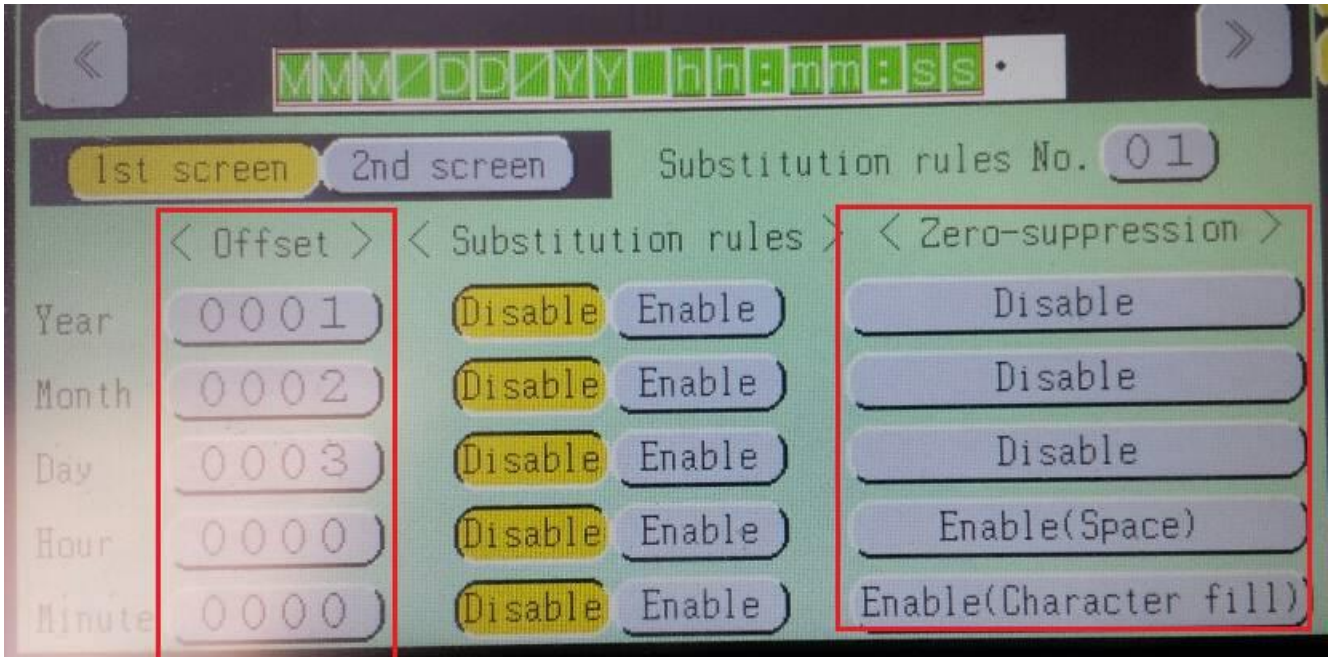
Status/Path	Count OK	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 6C	True	Index	Substitution_Rules_Setting	1	2	02
00 -- O.K. -- 32 6C 01 66	True	Substitution_rules	Start_Year	2	2010	07 DA
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	JAN	01 4A 41 4E 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	FEB	02 46 45 42 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	MAR	03 4D 41 52 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	APR	04 41 50 52 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	MAY	05 4D 41 59 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	JUN	06 4A 55 4E 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	JUL	07 4A 55 4C 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	AUG	08 41 55 47 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	SEP	09 53 45 50 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	OCT	0A 4F 43 54 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	NOV	0B 4E 4F 56 00
00 -- O.K. -- 32 6C 01 68	True	Substitution_rules	Month	5	DEC	0C 44 45 43 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	MON	01 4D 4F 4E 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	TUE	02 54 55 45 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	WED	03 57 45 44 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	THU	04 54 48 55 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	FRI	05 46 52 49 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	SAT	06 53 41 54 00
00 -- O.K. -- 32 6C 01 6D	True	Substitution_rules	Day_Of_Week	5	SUN	07 53 55 4E 00

Worked perfectly if I use substitution rule #1. I can set Substitution rule #2 and they appear in the printer but cannot read them back.

Here is what the screen looked like



After the entire message was sent, Here is what the calendar block looked like.



Offsets Code:

```
// Set <Offset Year="1" Month="2" Day="3" Hour="4" Minute="-5" />
SetAttribute(ClassCode.Calendar, (byte)ccCal.Offset_Year, 1);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Offset_Month, 2);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Offset_Day, 3);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Offset_Hour, 4);
SetAttribute(ClassCode.Calendar, (byte)ccCal.Offset_Minute, -5);
```

Substitution code

```
// Set <EnableSubstitution SubstitutionRule="01" Year="False" Month="True"  Day="False"
//      Hour ="False" Minute="False" Week="False" DayOfWeek="False" />
SetAttribute(ClassCode.Calendar, (byte)ccCal.Substitute_Year, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Substitute_Month, "Enable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Substitute_Day, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Substitute_Hour, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Substitute_Minute, "Disable");
```

Zero Suppression code

```
// Set <ZeroSuppress Year="Disable" Month="Disable" Day="Disable"
//      Hour ="Space Fill" Minute="Character Fill" />
SetAttribute(ClassCode.Calendar, (byte)ccCal.Zero_Suppress_Year, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Zero_Suppress_Month, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Zero_Suppress_Day, "Disable");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Zero_Suppress_Hour, "Space Fill");
SetAttribute(ClassCode.Calendar, (byte)ccCal.Zero_Suppress_Minute, "Character Fill");
```

The traffic

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	1	00 01
00 -- O.K. -- 32 7A 01 6C	Set	Index	Substitution_Rules_Setting	1	2	02
00 -- O.K. -- 32 7A 01 6F	Set	Index	Calendar_Block	1	1	01
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	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	33	{{MMM}/{DD}/{YY} {hh}:{mm}:{ss}}	7B 7B 4D 4D 4D 7D 2F 7B 44 44 7D 2F 7B 59 59 7D
00 -- O.K. -- 32 69 01 74	Set	Calendar	Substitute_Year	1	Disable	00
00 -- O.K. -- 32 69 01 75	Set	Calendar	Substitute_Month	1	Enable	01
00 -- O.K. -- 32 69 01 76	Set	Calendar	Substitute_Day	1	Disable	00
00 -- O.K. -- 32 69 01 77	Set	Calendar	Substitute_Hour	1	Disable	00
00 -- O.K. -- 32 69 01 78	Set	Calendar	Substitute_Minute	1	Disable	00
00 -- O.K. -- 32 69 01 68	Set	Calendar	Offset_Year	1	1	01
00 -- O.K. -- 32 69 01 69	Set	Calendar	Offset_Month	1	2	02
00 -- O.K. -- 32 69 01 6A	Set	Calendar	Offset_Day	2	3	00 03
00 -- O.K. -- 32 69 01 6B	Set	Calendar	Offset_Hour	2	4	00 04
00 -- O.K. -- 32 69 01 6C	Set	Calendar	Offset_Minute	2	-5	FF FB
00 -- O.K. -- 32 69 01 6D	Set	Calendar	Zero_Suppress_Year	1	Disable	00
00 -- O.K. -- 32 69 01 6E	Set	Calendar	Zero_Suppress_Month	1	Disable	00
00 -- O.K. -- 32 69 01 6F	Set	Calendar	Zero_Suppress_Day	1	Disable	00
00 -- O.K. -- 32 69 01 70	Set	Calendar	Zero_Suppress_Hour	1	Space Fill	01
00 -- O.K. -- 32 69 01 71	Set	Calendar	Zero_Suppress_Minute	1	Character Fill	02

Offset out for Hour (+4) and Minute (-5) were not set. Zero suppression was all set properly.

All could be read back getting the values shown on the printer screen.

I am working to understand the Substitution rule settings.

- The substitution rule was not set in the calendar block
- Substitution rule settings that I sent were not used

Any input would be greatly appreciated.

Moving cijConnect from the Hitachi (Serial) protocol to the EtherNet/IP protocol will require a lot of testing. Here are a couple of things that would be helpful:

- Request status

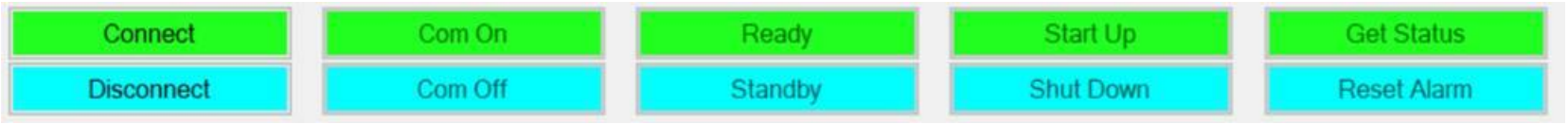
    - The Serial Protocol returned two different status values
        - ACK == The request was accepted
        - NAK == The request was rejected
    - The EtherNet/IP Protocol just returns “Success” and returns data even if the request was rejected. The data returned is not meaningful.
    - A helpful change would be for the EtherNet/IP Protocol to
        - return NAK if the request was rejected and return no data
- COM Errors
    - The Serial Protocol generated COM errors when a NAK was returned. Without the SOP-04 Kit, there was no way to determine the COM Error.
    - The EtherNet/IP Protocol sets the “S/S Management Flag” to “1”
    - A helpful change would be for the EtherNet/IP Protocol to
        - Provides a method of reading the number of COM errors that current exist
        - Provide a method of reading the COM error information
        - Provide a method to clear the COM error list.

These two changes would make the move to EtherNet/IP Protocol faster, easier, and more reliable.

Debugging cijConnect

How do I accomplish this?

cijConnect provides a number of controls for controlling the state of the printer using the Hitachi (Serial) Protocol:

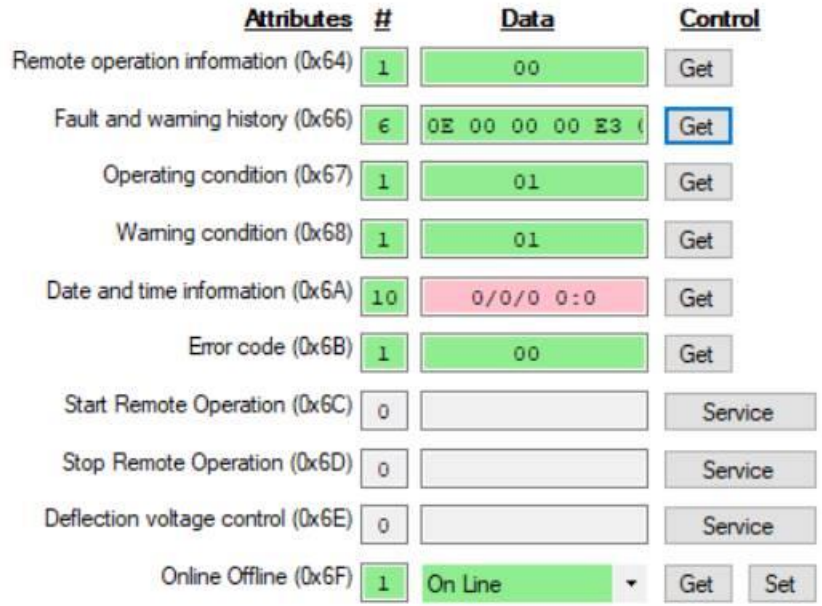


I would like to continue to provide them for the EtherNet/IP Protocol.

- Connect / Disconnect == These will probably not be provided in the new protocol. There is no unsolicited input from the printer, so there is no need to keep the connection open. The EtherNet/IP Protocol provides for a Session/Forward envelope around the requests for burst type transmission
- Com On / Com Off == is provided 0x75 0x6F
- Ready / Standby == There is a Service called “Deflection Voltage Control” but I do not know what it does.
- Start Up / Shut Down == There are two Service Call for “Start Remote Operation” and “Stop Remote Operation” that will work. Curious as to why it is not a Get/Set like Online/Offline State?
- Get Status == There are a number of flags on the IJP Operation Function. Would be nice to retrieve then with a single Get request that had the same components as the Serial Protocol.
- Reset Alarm == In the Serial Interface, there was a Fault Clear. I do not see an equivalent Service request

IJP Operation Function

For the IJP Operation Function in general



Here are the Attribute codes and retrieved values

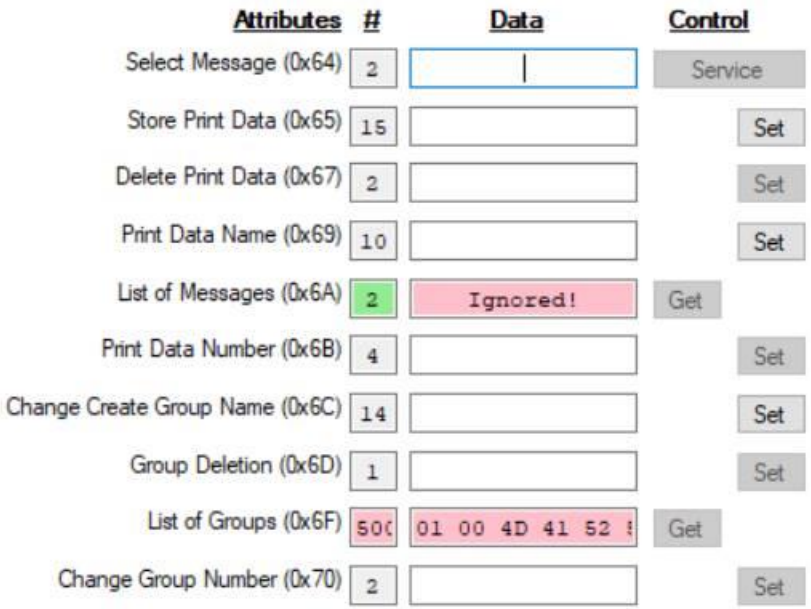
- 0x64 / 00 == Do not know what it means. Reception not possible?
- 0x66 / 0E 00 00 00 E3 07 == Do not know what it means
    - 0E == 14 which is the number of Com errors currently in my printer
    - 00 00 00 == Do not know what they mean
    - E3 07 == 2019 in Little End format
- 0x67 / 01 == In standby?
- 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.

Print Data Management

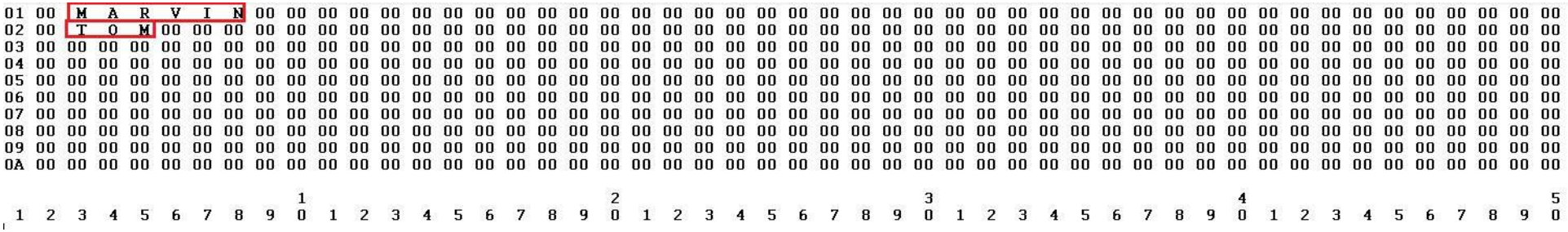
My observations working with Print Data Management Function



Attribute number and comment:

- 0x64 == Works as expected
- 0x67 – Works as expected
- 0x6A == Causes printer to hang. Must turn EtherNet/IP off and back on to clear issue (A reset function would be nice)
- 0x6F == Need to specify 0 to 99, not 1 to 99. See output below.
- The rest have not been tested yet.

For 0x6F, I created two groups (1 – MARVIN, 2 – TOM) and put messages in them. Then I read them using 33 66 01 6F 00.



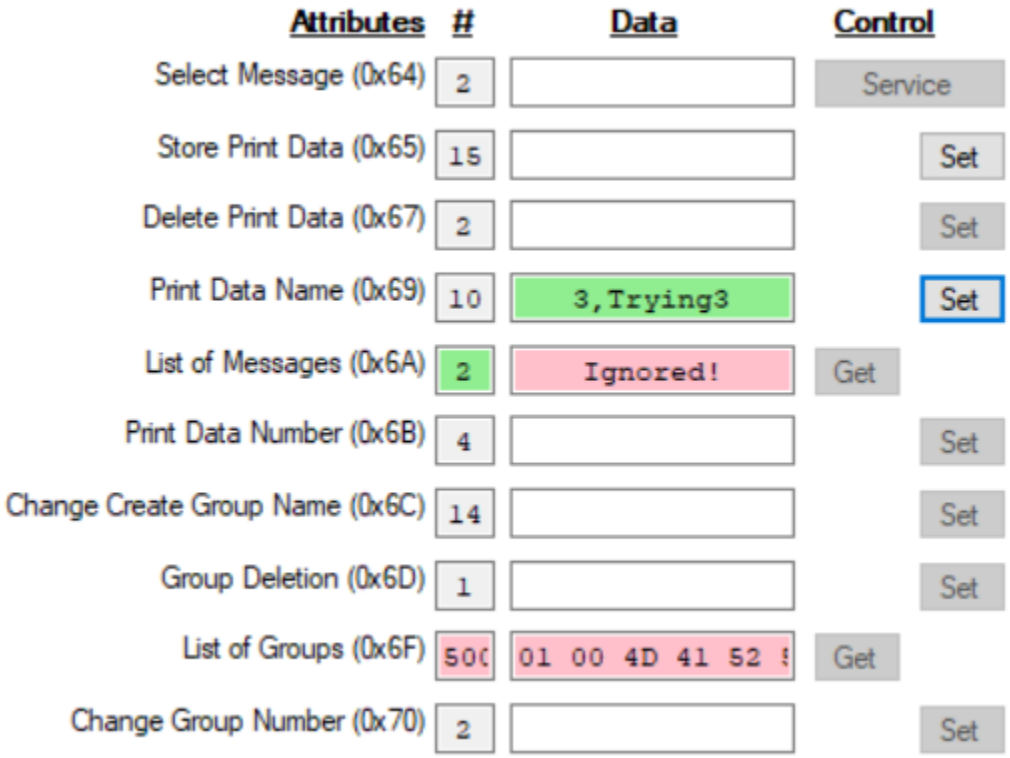
I got:

- 10 groups of 50 bytes (500 bytes in all)
- Each group contained:
    - Two byte group number in Little Endian format
    - The name in UTF8 format
    - Padding with nulls up to 48 bytes.

Marvin

Print Format Function

Except for previously noted in Hitachi case 00071400, everything works as advertised except:



Attribute

- 0X65 == References =>Type + Group Number + Nickname + “00”<=. What is type, how is it formatted for output, and what does this command accomplish? I cannot figure it out.
- 0x69 == seems to act as follows:
  - Can change an existing name
  - If name is blank, the command is ignored but COM Error 006
  - If name duplicates another name in the list, the request is ignored but COM Error 006.

Would be nice to get a NAK if the request is not honored.

Does the 0x65 save the message or is there a command somewhere to cause the message to be saved?

Print Format Function

Some success. I am trying to send and receive the following user trade mark pattern to the printer.

Specification

- Font = 12x16
- Position = 0
- Count = 1

From the RX Technical manual:

Character size code table

No.	Character size	Character size code	Pattern data length (bytes)	Remarks
1	4x5	30H	8	
2	5x5	31H	8	
3	5x8(5x7)	32H	8	
4	9x8(9x7)	33H	16	
5	7x10	34H	16	
6	10x12	35H	32	
7	12x16	36H	32	
8	18x24	37H	72	
9	24x32	38H	128	
10	11x11	39H	32	
11	5x3(chimney)	3AH	5	
12	5x5(chimney)	3BH	5	
13	7x5(chimney)	3CH	7	

From the Hitachi Browser:

Attempt to send:

- Command = 32 6B 01 64
- Data = 07 00 FC 3F 02 40 01 90 01 90 C1 9F 01 90 01 90 01 80 F9 83 01 81 C1 80 01 81 F9 83 01 80 02 40 FC 3F
    - 07 = Font Size
    - 00 = Position
    - FC … 3F = 32 byte pattern

Result:

- The pattern reached the printer

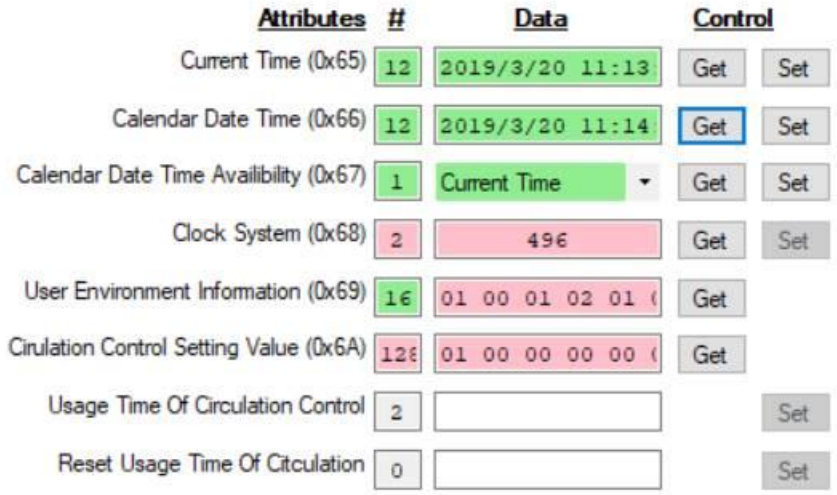
- Response = “Unable to read data from the transport connection: A connection attempt failed because the connected party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.".

Attempt to read:

- Command = 33 6B 01 64
- Data = 07 00
    - 07 = Font Size 12x16
    - 00 = Position
- Response = “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."

Environment Settings

Trying the Environment settings:



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.

Unit Information

The Unit information function has a few issues

Attributes	#	Data	Control
Unit Information (0x64)	64	"UX-D161W	Get
Model Name (0x6B)	8	"UX-D161W"	Get
Serial Number (0x6C)	8	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	8	Get
Maximum Substitution Rule (0x74)	1	99	Get
Shift Code And Time Count (0x75)	1	1	Get
Chimney And DIN Print (0x76)	1	1	Get
Maximum Line Count (0x77)	1	6	Get
Basic Software Version (0x78)	5	"01.07"	Get
Controller Software Version (0x79)	5	"01.07"	Get

Attributes	#	Data	Control
Engine M Software Version (0x7A)	5	"01.04"	Get
Engine S Software Version (0x7B)	5	"01.01"	Get
First Language Version (0x7C)	5	"01.03"	Get
Second Language Version (0x7D)	0	""	Get
Software Option Version (0x7E)	0	Ignored!	Get

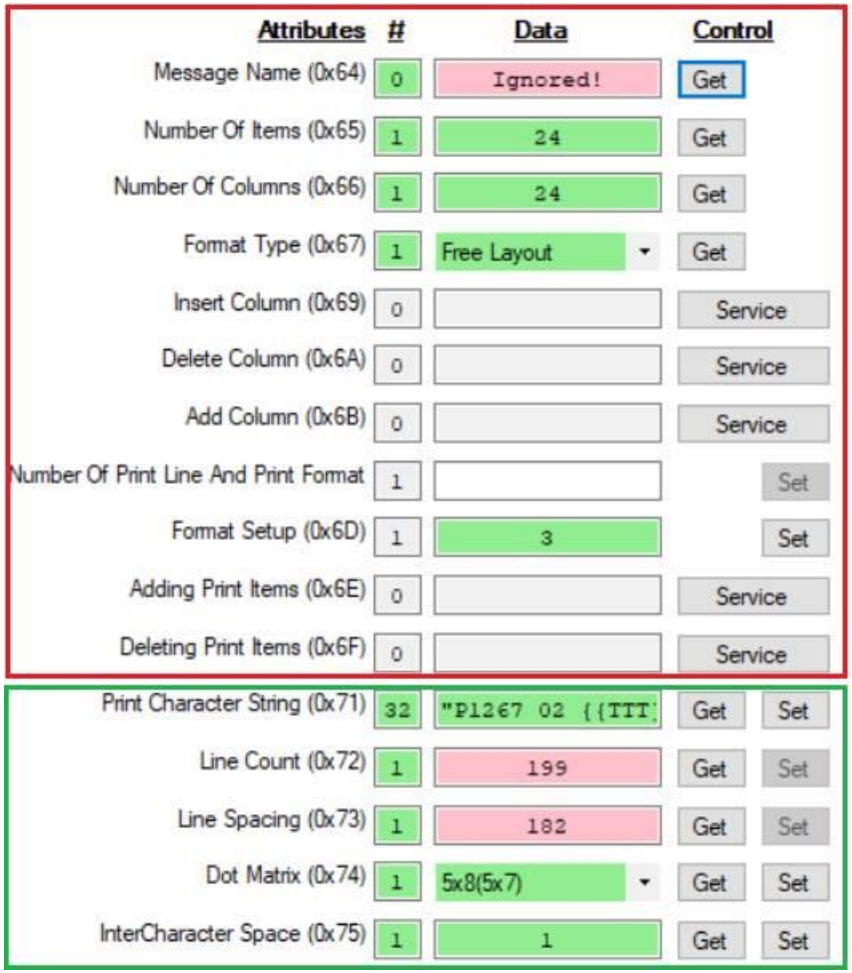
Attribute and comments

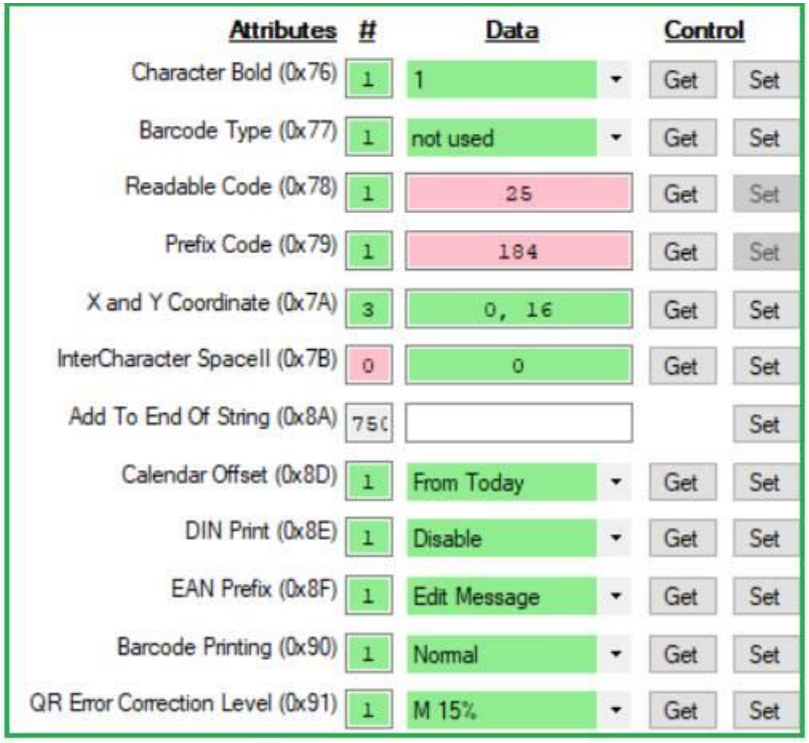
- 0x64 == Returns 64 bytes
  - Get = 33 73 01 64
  - Response = 55 58 2D 44 31 36 31 57 00 00 00 00 C6 B3 77 00 31 30 37 32 4B 2B DD BE 69 B2 0D 2C 53 31 30 31 38 2B DD BE 69 B2 0D 00 00 00 00 00 02 00 E8 03 D0 07 01 00 04 00 08 00 63 00 01 00 01 00 06 00
    - 55 58 2D 44 31 36 31 57 ("UX-D161W")
    - 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.")

Print Format Function

There are two sections to print format

- Message Description (In red) (Should this be moved to print specification?)
- Item Description (In green)





Attributes and comments in red section:

- 0x64 == Attempting to read the message name hangs up the printer {“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.")
- 0x65 == Working properly
- 0x66 == Reports number of items when in free layout
- 0x67 & 0x6D == These two move in lock step with each other. Both take on values 1 to 3. (Not 0 to 2). Why are two needed?
- 0x69 thru 0x6F == Service requests. Still trying all of them. The serial interface had a “Delete all but one” command. Would be nice here. Otherwise, I have to keep deleting columns, etc. to clear the display
- 0x6C == Not sure what it does. Need help here.

Attributes and comments in green section:

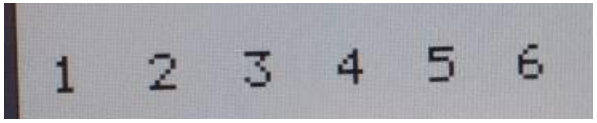
- Several of these do not always apply. It would be nice to get a NAK back if they do not apply for the layout involved.
- 0x7A == X/Y coordinates. Would be nice to be able to read then when Individual and Overall layout is being used. Could then:
    - send a message to the printer
    - read the X/Y coordinates for each item
    - Adjust cijConnect’s display to reflect where the printer actually placed them
- 0X7b == Could not get a response even when I set the message to variable ICS manually in the printer.

Add/Delete/Insert columns

Comments on column creation and deletion

1 == Add Column (34 67 01 6B) == Adds a new column at the end of the current list of columns

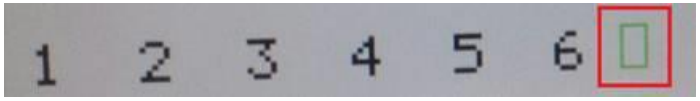
Before



Commands

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column	0		

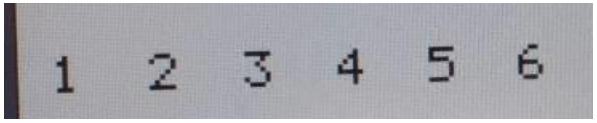
After



Works as expected.

2 == Insert Column (34 67 01 69) == Uses Index Function (Column) to insert a column

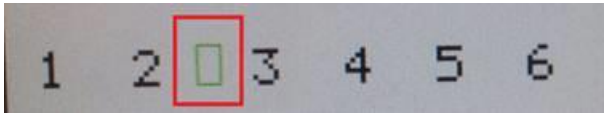
Before



Commands

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 67	Set	Index	Column	2	3	00 03
00 -- O.K. -- 34 67 01 69	Service	Print_format	Insert_Column	0		

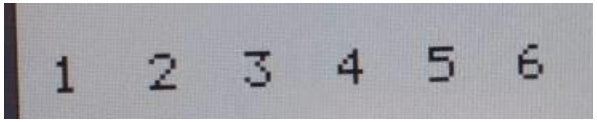
After



New item added at the third position. Column index uses 1-origin positioning.

3 == Delete Column (34 67 01 6A) == Uses Index Function (Column) to delete a column

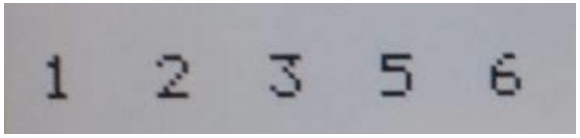
Before



Commands

Status/Path	Access	Class	Attribute	#Out	Data Out	Raw Out
00 -- O.K. -- 32 7A 01 67	Set	Index	Column	2	3	00 03
00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column	0		

After



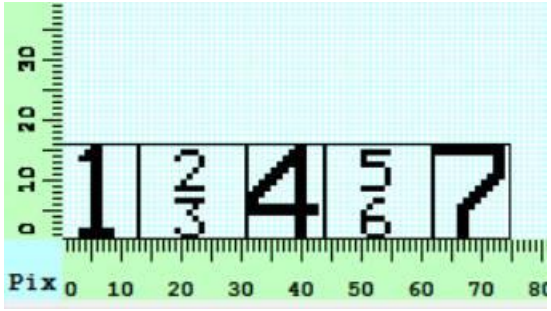
Column was deleted at the fourth position. Column index uses 0-origin positioning.

Multi-line setup

For cijConnect, messages with multiple lines were set up as follows

- The message was cleared using “Delete all items but one”.
- The message was built as a single row(line)
- Text Setup Rules / Line Count was used to stack the items as needed.

Consider the message (an actual message layout but I changed the text):



To build the message with EtherNet/IP

Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
Normal startup. Be sure com is on, get other settings of interest									
00 -- O.K. -- 32 75 01 6F	Set	IJP_operation	Online_Offline				1	1	01
00 -- O.K. -- 33 75 01 6F	Get	IJP_operation	Online_Offline	1	1	01			
00 -- O.K. -- 33 7A 01 65	Get	Index	Automatic_reflection	1	0	00			
00 -- O.K. -- 33 7A 01 64	Get	Index	Start_Stop_Management_Flag	1	0	00			
00 -- O.K. -- 33 7A 01 64	Get	Index	Start_Stop_Management_Flag	1	0	00			
00 -- O.K. -- 33 7A 01 65	Get	Index	Automatic_reflection	1	0	00			
Read the number of columns and then delete all but one									
00 -- O.K. -- 33 67 01 66	Get	Print_format	Number_Of_Columns	1	5	05			
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection				1	1	01
00 -- O.K. -- 32 7A 01 67	Set	Index	Column				2	4	00 04
00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column				0		
00 -- O.K. -- 32 7A 01 67	Set	Index	Column				2	3	00 03
00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column				0		
00 -- O.K. -- 32 7A 01 67	Set	Index	Column				2	2	00 02

00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column	0		
00 -- O.K. -- 32 7A 01 67	Set	Index	Column	2	1	00 01
00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column	0		
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	1	00 01
00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count	1	1	01
Now process all the commands						
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection	1	0	00
00 -- O.K. -- 32 7A 01 64	Set	Index	Start_Stop_Management_Flag	1	2	02
Process only after all the information has been sent						
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection	1	1	01
Add four more columns						
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column	0		
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column	0		
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column	0		
00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column	0		
Stack up columns 2 and 4						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	2	00 02
00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count	1	2	02
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	4	00 04
00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count	1	2	02
Add print string and font for item #1						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	1	00 01
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"1"	31 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
Add print string and font for item #2						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	2	00 02
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 2 "	20 32 20 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
Add print string and font for item #3						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	3	00 03
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 3 "	20 33 20 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
Add print string and font for item #4						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	4	00 04
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"4"	34 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
Add print string and font for item #5						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	5	00 05
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 5 "	20 35 20 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
Add print string and font for item #6						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	6	00 06

00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 6 "	20 36 20 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
Add print string and font for item #7						
00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	7	00 07
00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"7"	37 00
00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
Now process all the commands						
00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection	1	0	00
00 -- O.K. -- 32 7A 01 64	Set	Index	Start_Stop_Management_Flag	1	2	02

The steps needed to accomplish the task

- Be sure COM is on
- Delete any existing message
    - Delete all the columns in the current message except 1
    - Set the number of lines in the first column to 1. To do this, the column number (in this case 1) has to be set as the Index/Item value (not the Index/Column) before setting the lines to 1
- Add four columns to the message
- Set number of lines to 2 for columns 2 and 4. Again, Index/Item is set to the column number.
- The last thing is to step thru the items setting font and text.

It can be done. The main issue is:

- To set the line number, the column number is set in Index/Item Count.
- To read the line number, the column number must be set in Index/Column

What would be nice to see

- A single “Delete all but one” to clean up the old message
- Have setting the number of lines stack existing items like the old Serial Protocol.
- Have Set and Get of number of lines use Index/Columns

One last issue. For the Index function class (7A 66), the description says “Item Count”. It is used for indexing through many lists. It is used for Items but has nothing to do with count. Should be renamed ad “Index”

.

Auto Reflection issue

Using Auto Reflection is 4 times faster that without Auto Reflection. However, there is a problem with Get access when reflection is on.

Saving away a Get to execute later is meaningless since there is no way for the result of a Get to be pass back using the EtherNet/IP protocol. For that reason, the Get request should ignore Auto Reflection flag and pass back the Get data immediately. The returned data should reflect the state of the machine at the time Auto Reflection was set to 1.

A case where it would be useful:

- A complete message is being sent to the printer
- I request the number of columns in the old message
- That number is then used to delete the old message (down to a single item)

In order to do this, I now must:

- turn off Auto Reflection
- Do a Get
- Turn on auto reflection and continue.

This causes the printer to partially build the message rather than build it all at once.

Below is the traffic logs with Auto Reflection On (0.9804 sec) and then Off (4.6054 sec).

A Note: In the traffic file, the Elapsed time for a Get/Set/Service is relative to the last request. The Elapsed time for a Forward Close is relative to the Forward Open. Same for Session and Connection.

Elapsed	Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
4.8003	Connection Open!									
4.8143	Session Open!									
4.8273	Forward Open!									
0.0290	00 -- O.K. -- 33 67 01 66	Get	Print_format	Number_Of_Columns	1	5	05			
0.0200	00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection				1	1	01
0.0240	00 -- O.K. -- 32 7A 01 67	Set	Index	Column				2	1	00 01
0.0210	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.0300	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.0170	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.0250	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.0260	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	1	00 01
0.0160	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	1	01
0.0320	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.0210	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.0340	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.0210	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.0290	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	2	00 02
0.0190	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	2	02
0.0240	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	4	00 04
0.0280	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	2	02
0.0120	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	1	00 01
0.0240	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				2	"1"	31 00
0.0360	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	12x16	07
0.0150	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	2	00 02
0.0190	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 2 "	20 32 20 00
0.0250	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8	03
0.0250	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	3	00 03
0.0180	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 3 "	20 33 20 00
0.0280	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8	03
0.0230	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	4	00 04
0.0190	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				2	"4"	34 00
0.0190	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	12x16	07
0.0270	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	5	00 05
0.0200	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 5 "	20 35 20 00
0.0260	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8	03
0.0320	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	6	00 06
0.0160	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 6 "	20 36 20 00

0.0290	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
0.0190	00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	7	00 07
0.0140	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"7"	37 00
0.0160	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
0.0120	00 -- O.K. -- 32 7A 01 65	Set	Index	Automatic_reflection	1	0	00
0.0550	00 -- O.K. -- 32 7A 01 64	Set	Index	Start_Stop_Management_Flag	1	2	02
0.9804	Forward Close!						
0.9994	Session Close!						
1.0154	Connection Close!						

Elapsed	Status/Path	Access	Class	Attribute	#In	Data In	Raw In	#Out	Data Out	Raw Out
8.4068	Connection Open!									
8.4228	Session Open!									
8.4328	Forward Open!									
0.0190	00 -- O.K. -- 33 67 01 66	Get	Print_format	Number_Of_Columns	1	5	05			
0.0140	00 -- O.K. -- 32 7A 01 67	Set	Index	Column				2	1	00 01
0.0780	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.1650	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.1560	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.1600	00 -- O.K. -- 34 67 01 6A	Service	Print_format	Delete_Column						
0.0410	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	1	00 01
0.1130	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	1	01
0.1010	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.1830	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.2380	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.1590	00 -- O.K. -- 34 67 01 6B	Service	Print_format	Add_Column						
0.0410	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	2	00 02
0.1200	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	2	02
0.0520	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	4	00 04
0.1040	00 -- O.K. -- 32 67 01 72	Set	Print_format	Line_Count				1	2	02
0.0460	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	1	00 01
0.1200	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				2	"1"	31 00
0.1190	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	12x16	07
0.1180	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	2	00 02
0.1210	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 2 "	20 32 20 00
0.2900	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8	03
0.0440	00 -- O.K. -- 32 7A 01 66	Set	Index	Item				2	3	00 03
0.1040	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String				4	" 3 "	20 33 20 00
0.1880	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix				1	5x8	03

0.0430	00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	4	00 04
0.0920	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"4"	34 00
0.3250	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
0.0340	00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	5	00 05
0.1810	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 5 "	20 35 20 00
0.2190	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
0.0370	00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	6	00 06
0.1430	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	4	" 6 "	20 36 20 00
0.2110	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	5x8	03
0.1040	00 -- O.K. -- 32 7A 01 66	Set	Index	Item	2	7	00 07
0.1140	00 -- O.K. -- 32 67 01 71	Set	Print_format	Print_Character_String	2	"7"	37 00
0.1830	00 -- O.K. -- 32 67 01 74	Set	Print_format	Dot_Matrix	1	12x16	07
4.6054	Forward Close!						
4.6203	Session Close!						
4.6393	Connection Close!						

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.