4. Control and Status Block

This chapter describes the general information that you need for programming your PLC to communicate with the Workstation. You can find detailed information for connecting specific PLCs' to the Work-station.

To set up the Control Block Address, Size and Status Block Address, se-lect [Application]/[Workstation Setup]. Enter the block address and size in the appropriate box shown as in Figure 179.

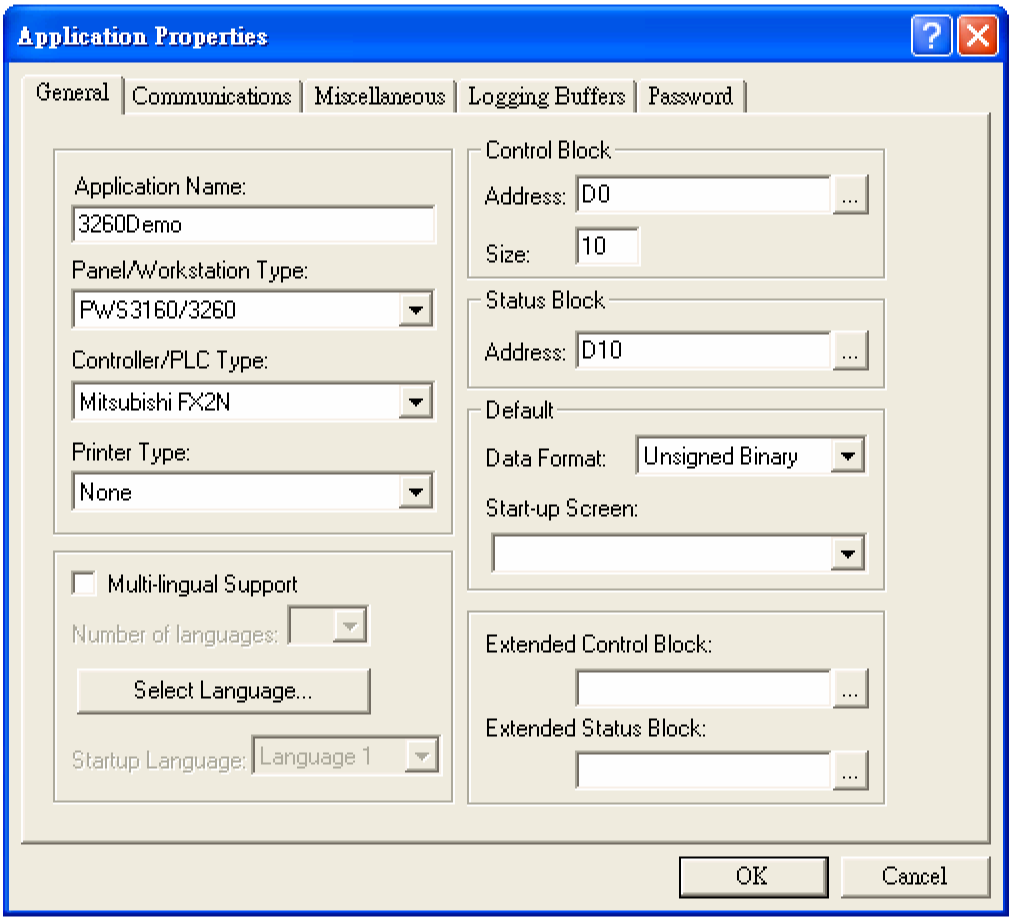


Figure 179. Workstation Parameters Setup

4.1. Control Block

Control Block is a block of contiguous registers in your PLC. The most important function in PWS is control block.

Control block enables the PLC to control actions on the Workstation through the PLC program. The minimum number of words used in the control block is 2. The maximum number of words used is 32 Words. The size of the control block varies according to the functionality required (if recipe functionality is used, then the minimum length is 6 Words). The members of Control Block are shown in the following table:

Word#	Member	Example: S7-200	Example: FX2
Dn	Screen Number Register (SNR)	VW0	D0
Dn+1	Command Flag Register (CFR)	VW2	D1
Dn+2	Logging Buffer Control Register #1	VW4	D2
Dn+3	Logging Buffer Control Register #2	VW6	D3
Dn+4	Logging Buffer Control Register #3	VW8	D4
Dn+5	RCPNo Number Register (RNR)	VW10	D5
Dn+6 and above	General User Area Register (GUAR) User's application registers CBn, n must not exceed 31.	VW12=cb6, VW14=cb7, … VW18=cb9, …	D6=cb6, D7=cb7, … D9=cb9, …

For example, if the starting address is D0 (the starting address can be specified, the member in the above table will shift according to the starting address); Size 10 represents the HMI can read data from D0~D9 (10 words) PLC registers and stored them in CB0~CB9 internal control block.

The functions of word Dn through Dn+m (word n+m) in Control Block will be discussed in the following sections.

4.1.1. Screen Number Register

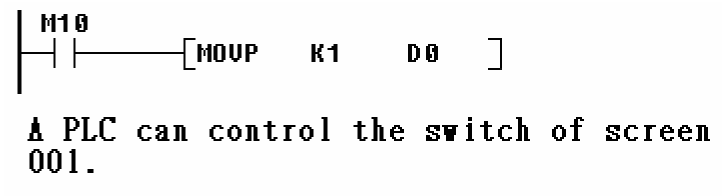
A PLC can request a Workstation to display a specific screen by setting its Screen Number Register (SNR) to the number of that screen.

SNR (Dn) enables PLC to control the HMI screen or print the screen. For example, A PLC can request a Workstation to display a specific screen by setting its SNR as the number of that screen.

The HMI can not clear the SNR (Dn) to 0 automatically. But HMI clears the SNR (Dn) to zero before change a screen. If the screen specified by the SNR does not exist, then the HMI does nothing but clears the SNR (Dn=0).

The value in SNR can be BCD or binary.

Example:



The value of data register SNR (Dn) and the functions (bit 0-bit 05) are as following:

Dn 16-Bit # (00-15)	Function
BIT 9-..BIT 0	The first 10bits will store the screen number to be changed to.
BIT 10	Reserve
Bit 13=off,12=off,11=off	No language was selected
Bit 13=off,12=off,11=on	Language1
Bit 13=off,12=on,11=off	Language 2
Bit 13=off,12=on,11=on	Language 3
Bit 13=on,12=off,11=off	Language 4
Bit 13=on,12=off,11=on	Language 5
Bit 13=on,12=on,11=off	Reserve
Bit 13=on,12=on,11=on	Reserve
Bit 14	Back light was turned off when set to 1
Bit 15	Back light was turned on when set to 1

The register (bit 0~9) to control the screen change and the other bits (bit 10~15) are not related. In other words, it is not necessary to control the back light or language when change the screen. Simultaneously, it is not necessary to assign to the screen number when set up the back light or select language.

4.1.2. Command Flag Register

The functions of the bits in CFR are summarized in the following table:

Dn+1 16-Bit# (00-15)	**Function**
Bit 0	Alarm History Buffer Clear Flag
1	Alarm Frequency Buffer Clear Flag
2	Print Change Paper Flag/Form Feed Flag
3	Hardcopy Flag
4	Recipe Write Flag - Data send from PWS to PLC
5	RCPNO Change Flag
6	Recipe Read Flag - Data send from PLC to PWS
7	Buzzer action control
8	Clear Flag #1
9	Clear Flag #2
10	Clear Flag #3
11	Clear Flag #4
12	Trigger Flag #1
13	Trigger Flag #2
14	Trigger Flag #3
15	Trigger Flag #4

The bits of CFR (Dn+1) will be introduced in the following.

Bit 0: Alarm History Buffer Clear Flag

The function of this PLC bit is to clear the data of alarm history buffer.

If bit 1 represents to clear the data of alarm history buffer; the HMI will clear its data when bit 0 sets to bit1.

PLC require reseting the bit if HMI is re-assigned to clear the data and it needs enough time for HMI detection; or use the "handshake" function to reset the bit as well. For “handshake” function, please refer to Section 4.2.2. General Status Register.

Bit 1: Alarm Frequency Buffer Clear Flag

The function of this PLC bit is to clear Alarm Frequency Buffer.

If bit 1 represents to clear the data of alarm frequency buffer, the HMI will clear its data when bit 0 sets to bit 1.

PLC requires reseting the bit if HMI is re-assigned to clear the data and it needs enough time for HMI detection; or use the "handshake" function to reset the bit as well. For “handshake” function, please refer to Section 4.2.2. General Status Register.

Bit 2: Print Change Paper Flag

The function of this PLC bit is to control the form feed of the printer connected with HMI.

Set the bit ON, the printer will change paper.

PLC requires reseting the bit if HMI is re-assigned to form feed and it needs enough time for HMI detection.

Bit 3: Hard Copy Flag

The function of this PLC bit is to control the hard copy of the printer connected with HMI.

Set the bit ON, the printer will print the current screen.

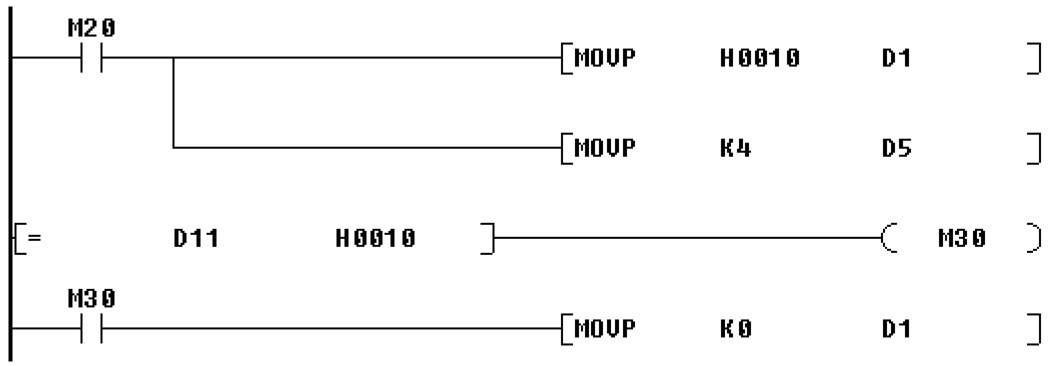
PLC requires reseting the bit if HMI is re-assigned to hard copy and it needs enough time for HMI detection.

Bit 4: Recipe Write Flag - from PWS to PLC

The function of this bit is to write the recipe from RAM to PLC. It only supports the HMIs with recipe function.

Set the RNR (Dn+5) to write the recipe in, then set the bit ON, the recipe will be written in PLC.

PLC requires reseting the bit if HMI is re-assigned to write another recipe in and it needs enough time for HMI detection.



PLC M20 writes the data from PWS 4th recipe to PLC. D11 bit 4 is Recipe Write status bit.

Bit 5: RCPNo Change Flag

The function of this PLC bit is to change the content value of RCPNo. RCPNo is an internal HMI register used to control the recipe data. It only supports the HMIs with recipe function.

Set the RNR (Dn+5) to write the recipe in, then set the bit ON, RCPNo can be modified.

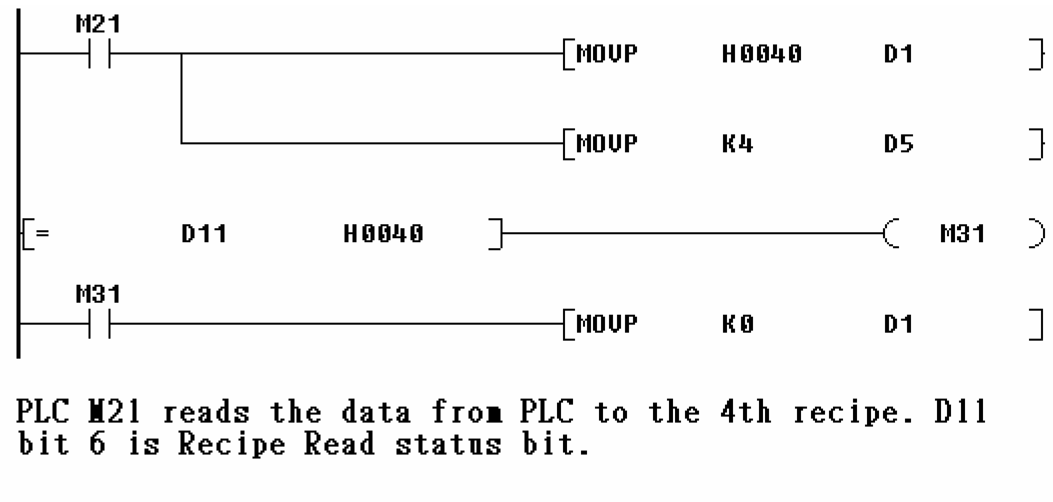
PLC requires reseting the bit if HMI is re-assigned to modify RCPNo. and it needs enough time for HMI detection.

Bit 6: Recipe Read Flag - from PLC to PWS

The function of this PLC bit is to read the recipe data from PLC to HMI and save it in RAM block.

Set the RNR (Dn+5) as the recipe number to be updated. Then set the bit ON, the HMI will update the corresponding recipe.

PLC requires reseting the bit if HMI is re-assigned to update and it needs enough time for HMI detection.



Bit 7: Buzzer Flag

The function of the PLC bit is to control HMI's buzzer.

Set the bit ON (about 1 sec.) to start the buzzer.

PLC requires reseting the bit if HMI is re-assigned to start the buzzer.

Bit 8-11: Clear Flag #1-#4

The function of this PLC bit is to clear curves on HMI. There are four clear flags; a user can set up the corresponding signal to clear curves.

Set the bit ON/OFF once to clear the curves on trend graph or X-Y chart.

PLC requires reseting the bit if HMI is re-assigned to modify RCPNo. and it needs enough time for HMI detection.

Bit 12-15: Trigger Flag #1-#4

The function of this PLC bit is to sample the trend graph data, there are four trigger flags in all.

Once set the PLC bit ON/OFF, HMI will read the continuous data and covert it into a continuous curve which is displayed by trend graph or X-Y chart objects.

PLC requires reseting the bit if HMI is re-assigned to sample the data and it needs enough time for HMI detection.

4.1.3. Logging Buffer Control Registers: LBCRs

The other type of trend graphs in HMI is called the Historical Trend Graph. The HMI reads the data form the corresponding logging buffer according to the specific signal. Logging buffer is used to save the sampling data in battery backup RAM. Remember to specify the logging buffer to read from and its size.

In LBCRs, Trigger Bits are used to request Logging Buffers to sample the data from PLC. Clear Bits are used to clear Logging Buffers and Size Bits are used to determine the size of the data to be read. Therefore, user can use the LBCRs to clear Logging Buffers or to request the Logging Buffers to sample the data from the PLC.

There are twelve logging buffers here; HMI can be specified to sample the data at fixed period automatically; sample or clear the historical trend graph controlled by PLC either.

For the setup of logging buffers; See Figure 180.

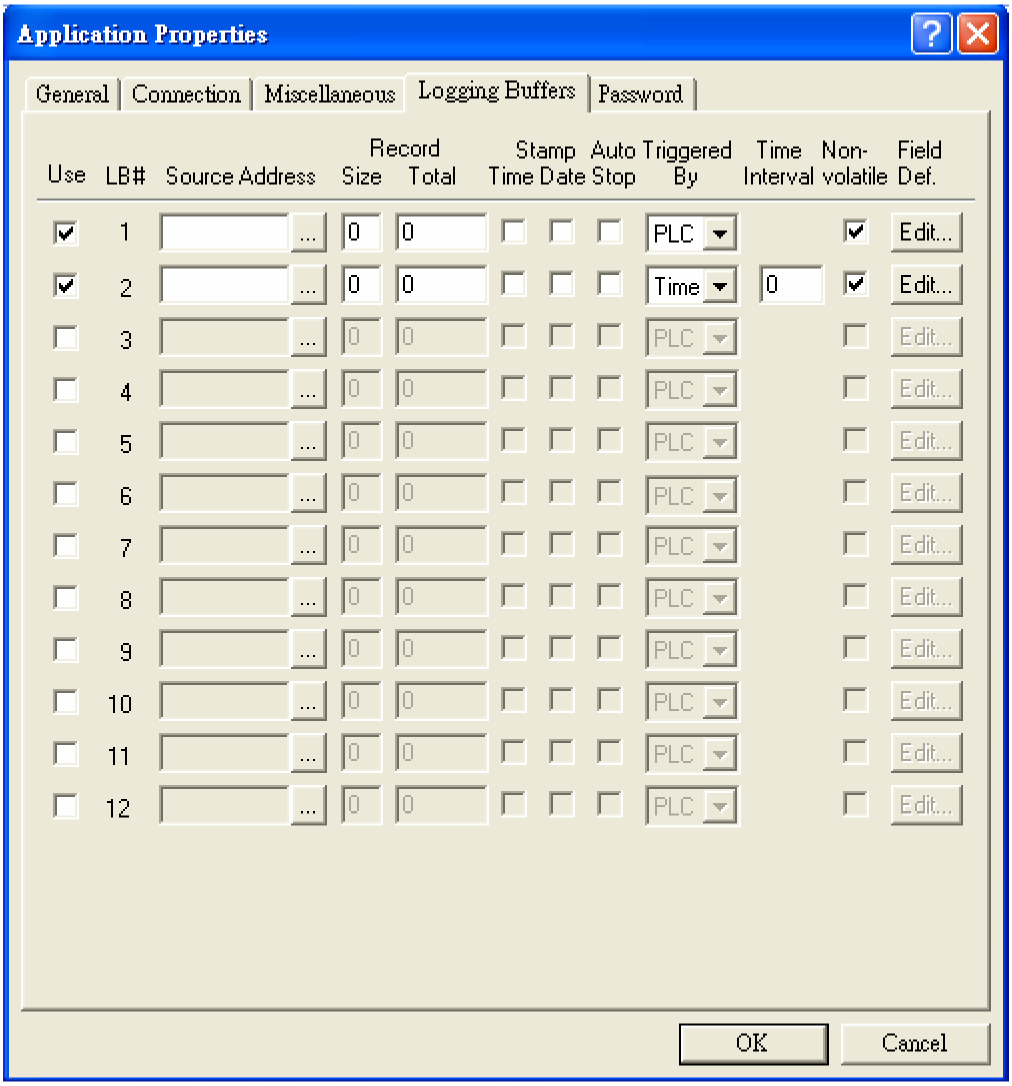


Figure 180. The Logging Buffer Setup

Note that LBCR1 controls Logging Buffer No. 1 through No. 4. LBCR2 controls Logging Buffer No. 5 through No. 8. LBCR3 controls Logging Buffer No. 9 through No. 12.

The positions of the Trigger Bit, Clear Bit, and Size Bit for each Logging Buffer are illustrated in the following table:

Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW4 LBCR1	0	SB4	CB4	TB4	0	SB3	CB3	TB3	0	SB2	CB2	TB2	0	SB1	CB1	TB1
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW6 LBCR2	0	SB8	CB8	TB8	0	SB7	CB7	TB7	0	SB6	CB6	TB6	0	SB5	CB5	TB5
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW8 LBCR3	0	SB12	CB12	TB12	0	SB11	CB11	TB11	0	SB10	CB10	TB10	0	SB9	CB9	TB9

SB: Size Bit;   CB: Clear Bit;   TB: Trigger Bit

LBCR1	Buffer # 4	Buffer # 3	Buffer # 2	Buffer #1
LBCR2	Buffer # 8	Buffer # 7	Buffer # 6	Buffer #5
LBCR3	Buffer #12	Buffer #11	Buffer #10	Buffer #9

Trigger Bit #1--#12：Sampling Control

The HMI not only can sample the historical trend graph in time interval but also sample the historical trend graph controlled by the trigger bit of PLC. Once trigger bit (TB#1—TB#12) sets ON/OFF (about 1 sec.), the HMI will execute sampling. Remember to set OFF before re-trigger.

Clear Bit #1--#12：Clear Control

By triggering the trend graph clear bit (CB#1--CB#12) ON/OFF one time(about 1 sec), the trend graph can be erased. The flag need to set OFF if need to trigger again.

Size Bit #1--#12：Multiple Sampling Control

By triggering the size bit (SB#--SB#12) ON, the HMI can sample one data, or multiple data. Once trigger bit (TB#1--TB#12) sets ON/OFF (about 1 sec.), the HMI will execute sampling.

Logging Buffer:

If need to setup the logging buffer, the first step is to specify the [Source Address] which is used to specify the PLC address to read the data from.

After the setup of [Source Address], the Size bit is OFF and the trigger bit is from 0 to 1. Then the logging buffer will read a data from the PLC.

To require logging buffer reading multiple data from PLC, a user set the [Size] of [Source Address] to read from. Then set the Size bit ON and the Trigger bit from 0 to 1. Note that the length of size cannot exceed 1,022 Words.

Set the Clear bit from 0 to 1 to clear the logging buffer.

To require logging buffer recording, PLC must reset the Trigger and Clear bit. It needs enough time for HMI detection

Example: FX2 PLC

Assumptions:

1. Control Block starts from D0 with the size of 6
2. Source Address of Logging Buffer #11 is D200
3. The record size of Logging Buffer#11 is 3 words

To request Logging Buffer #11 to read only one record of the data from the PLC, then first put the data to be read in D200-D202. Set the Size Bit 10 of D4 to be OFF and change the Trigger Bit 8 of D4 from 0 to 1. The HMI reads D200-D202 for Logging Buffer #11 after it detects the Trigger Bit 8 of LBCR3 changed from 0 to 1.

To request Logging Buffer #11 to read 50 records of the data from PLC, set D200 to be 150(=50x3). Put the data to be read in D201-D350. Set the Size Bit 10 of D4 to be ON and change the Trigger Bit 8 of D4 from 0 to 1. The HMI reads D200-D202 first to get the real size of the data to be read after it detects the Trigger Bit 8 of LBCR3 changed from 0 to 1. Then the HMI reads D200-D350 and stores in battery backup RAM.

To request Logging Buffer #11 to clear records, then change the clear bit of D4 from 0 to 1.

4.1.4. RCPNo Number Register : RNR

RCPNO is an internal register of the HMI that specifies the current recipe number. To change the RCPNO, the PLC first sets the RNR to the number of the recipe and then turns on the RCPNO Write Flag or Recipe Read Flag.

To change RCPNO by PLC, the PLC has to set RNR to the number of recipe and turn on the RCPNO Change Flag which is CFR 5 bit. If the RNR is zero or greater than the maximum recipe number, then the HMI would ignore the request.

To request HMI to change RCPNO, the PLC must reset the RCPNO Change Flag, or use the RCPNO Change Status which is GSR 5 bit Therefore, be sure to set this flag with enough time so the HMI is able to detect it.

4.1.5. General User Area Register

For high-speed display, the HMI reads the data from internal register only (cannot write in) when edit in ADP. (The maximum size is 32; the size relied on the length of control block) The format is shown in the following table:

Format	Description
CB n	n represents the Words data of the nth register , n is decimal number; n ≥ 0 but smaller than the specified size.
CBn b	n.b represents the bit data correspondent with nth word register, b is hexadecimal nth b = 0-f.

For example, if the address of the Control Block is D0, then user can select [Object], [Numeric Display] to display the Recipe Number Register by configuring it to display CB5 instead of displaying D5.

The internal buffer for the Control Block is read only. This means that, for example, one can configure a Numeric Display object to show the value of CB2, but you cannot configure the object to allow the operator to change the value of CB2.

For example, if user wants to achieve the effect of the RNR numeric display object by using ADP. He can specified D5 to read from (writeable) or CB5 to read from(unwriteable).

4.1.6. Determine the Size of Control Block

As every application needs a Screen Number Register (SNR) and a Control Flag Register (CFR), User can refer to the following rules to determine the size of Control Block:

1. If the HMI reads/writes a recipe from/to a PLC, then the minimum size is six.

2. If Item 1. is not true and the HMI uses LBCR3 to control Logging Buffer #9-12, then the minimum size is five.

3. If either Item 1. or Item 2. is not true and the Workstation uses LBCR2 to control Logging Buffer #5-8, then the minimum size is four.

4. If none of Item 1. through Item 3. is true and the Workstation uses LBCR1 to control Logging Buffer #1-4, then the minimum size is three.

5. If none of the above is true, then the minimum size is two.

6. The size of Control Block is the minimum size plus the size of the user area.

4.2. Status Block

Status Block is a block of contiguous registers in your PLC that display status information from the Workstation. For example, you can get the current screen number from the first word of the Status Block. The constituents of Status Block are shown in the following table:

Word#	Member	Example: S7-200	Example: FX2
Dm	Screen Status Register (SSR)	VW20	D10
Dm+1	General Status Register (GSR)	VW22	D11
Dm+2	Logging Buffer Status Register #1 (LBSR1)	VW24	D12
Dm+3	Logging Buffer Status Register #2 (LBSR2)	VW26	D13
Dm+4	Logging Buffer Status Register #3 (LBSR3)	VW28	D14
Dm+5	RCPNo Image Register (RIR)	VW30	D15
Dm+6	PWS700X Key Image Register	VW32	D16

For example, if the status block is D10 and the size is 6 Words; the HMI will write the status data of current screen in D10~D15. The size of Status Block is six words (seven words for 700X). Some words are not needed in application.

4.2.1. Screen Status Register

When a screen is changed on the HMI, the PLC sets its Screen Status Register (SSR) to the number of new screen. Therefore, the PLC can identify the current screen by reading the SSR.

The value of SSR can be in BCD or binary format.

4.2.2. General Status Register

The components of the General Status Register (GSR) are shown in the following (bit 0- bit 15):

D11 16-Bit # (00-15)	Member
Bit 0	Password Level Status (not available for applications configured to monitor alarms)
1	Password Level Status (not available for applications configured to monitor alarms)
Bit 0	Alarm History Buffer Clear Status
1	Alarm Frequency Buffer Clear Status
2	Form Feed Status
3	Hardcopy Status
4	Recipe Write Status
5	RCPNO Change Status
6	Recipe Read Status
7	Battery Status
8	Clear Status Flag #1
9	Clear Status Flag #2
10	Clear Status Flag #3
11	Clear Status Flag #4
12	Trigger Status Flag #1
13	Trigger Status Flag #2
14	Trigger Status Flag #3
15	Trigger Status Flag #4

Bit 0, 1: Password Level Status - (not available for applications configured to monitor alarms)

Once connected with HMI, the password level status bit 0 ~ bit 3 represent the current user level.

Level 0 ==>Bit 0 = off, Bit 1 = off
Level 1 ==>Bit 0 = on, Bit 1 = off
Level 2 ==>Bit 0 = off, Bit1 = on
Level 3 ==>Bit 0 = on, Bit1 = on
Level 4 ~ 9 ==>Bit 0 = on, Bit 1 = on

Bit 0: Alarm History Buffer Clear Status

The HMI will turn ON this status bit when it detects the Alarm History Buffer Clear Flag being turned ON. When the HMI finishes clearing the Alarm History Buffer, it will turn OFF this status bit.

Bit 1: Alarm Frequency Buffer Clear Status

The HMI will turn ON this status bit when it detects the Alarm Frequency Buffer Clear Flag being turned ON. When the Workstation finishes clearing the Alarm Frequency Buffer, it will turn OFF this status bit.

Bit 2: Form Feed Status

The HMI will turn ON this status bit when it detects the Form Feed Flag being turned ON. When the HMI finishes sending the Form Feed character to a printer, it will turn OFF this status bit.

Bit 3: Hardcopy Status

The HMI will turns ON this status bit when it detects the Hardcopy Flag being turned ON. When the Workstation finishes printing the current screen, it will turn OFF this status bit.

Bit 4: Recipe Write Status

The HMI will turns ON this status bit when it finishes sending a recipe from RAM block of HMI to PLC. The HMI will turn OFF this status bit as it detects the Recipe Write Flag being turned OFF. One can use this bit as a handshake signal to switch the Recipe Write Flag.

Note that this function only supports the HMI with recipe function.

Bit 5: RCPNo Change Status

The HMI will turns ON this status bit when it detects the RCPNO Change Flag being turned ON. When the Workstation finishes changing the RCPNO, it will turn OFF this status bit.

Bit 6: Recipe Read Status

The Workstation will turns ON this status bit when it finishes reading a recipe from PLC. The Workstation will turn OFF this status bit as it detects the Recipe Read Flag being turned OFF. One can use this bit as a handshake signal to switch the Recipe Read Flag.

Note that this function only supports the HMI with recipe function.

Bit 7: Battery Status

The HMI will turn ON the Battery Status if it detects battery low before running an application.

Bit 8-11: Clear Status Flag #1-#4

The HMI will turn ON one of the Clear Status Bits when it finishes the clearing task requested by the corresponding Clear Flag controlled by PLC. The HMI will turn OFF the same status bit as it detects the corresponding Clear Flag being turned OFF. One can use Clear Status Bits as handshake signals to switch the Clear Flags.

Bit 12-15: Trigger Status Flag #1-#4

The HMI will turn ON one of the Trigger Status Bits when it finishes the task triggered by the corresponding Trigger Flag. The HMI will turn OFF the same status bit as it detects the corresponding Trigger Flag being turned OFF. One can use Trigger Status Bits as handshake signals to switch the Trigger Flags.

4.2.3. Logging Buffer Status Registers (LBSRs)

LBSR1 saves the status of Logging Buffer No. 1 through No. 4. LBSR2 saves the status of Logging Buffer No. 5 through No. 8. LBSR3 saves the status of Logging Buffer No. 9 through No. 12.

The status bit's position for each of the Logging Buffers is illustrated in the following:

Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW24 LBSR1	AB4	FB4	CB4	TB4	AB3	FB3	CB3	TB3	AB2	FB2	CB2	TB2	AB1	FB1	CB1	TB1
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW26 LBSR2	AB8	FB8	CB8	TB8	AB7	FB7	CB7	TB7	AB6	FB6	CB6	TB6	AB5	FB5	CB5	TB5
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW28 LBSR3	AB12	FB12	CB12	TB12	AB11	FB11	CB11	TB11	AB10	FB10	CB10	TB10	AB9	FB9	CB9	TB9

AB: Almost Full Bit indicates the buffer is 90% or more full.
FB: Full Bit indicates the buffer is full.
CB: Clear Status Bit indicates the clear command was received.
TB: Trigger Status Bit indicates the trigger command was received.

LBSR1	Buffer # 4	Buffer # 3	Buffer # 2	Buffer #1
LBSR2	Buffer # 8	Buffer # 7	Buffer # 6	Buffer #5
LBSR3	Buffer #12	Buffer #11	Buffer #10	Buffer #9

The HMI will turn ON one of the Trigger Status Bits when it finishes collecting one record of the data for the Logging Buffer. The Workstation will turn OFF the same status bit as it detects the corresponding Trigger Flag being turned OFF. User can use the Trigger Status Bits as handshake signals to switch the Trigger Flag.

4.2.4. RCPNo Image Register

The HMI sets the RCPNO Image Register (RIR) to the new value of RCPNO as this internal register is changed by user or PLC. Therefore, the PLC is able to identify the current value of RCPNO. The HMI reports the value of RCPNO to the PLC by writing the value to the RCPNO Image Register. RCPNO Image Register is Word #5 of the Status Block and one can keep track of the current recipe by this register.

Recipe Register
Recipe block is located in PLC register. If user wants the HMI to read/write the recipe data from/to the PLC, one needs to define a Recipe Block of the application. Please refer to Chapter 3. Recipe for the complete details.

The maximum recipe memory block is 524,288 16-bit (word) for the HMI with recipe function. For the applied HMI models, please refer to Appendix A for the complete details.

4.2.5. Recipe Register Number- for enhanced HMI

In the application of HMI, the ADP provides internal recipe register number for use; the format is shown in the following:

Format	**Description**
RCPNo	Recipe Register Number (1~N) RCPNO is an internal register of the Workstation that specifies the current recipe number; No≥1.
RCPWnnnnn	Recipe Register #nnnnn is current recipe where nnnnn is a decimal number and n≥0.
RCPWnnnnn.b	Recipe Register Bit nnnnn is decimal number, n≥0; b is hexadecimal number, b=0-F

RCPNO is an internal register of HMI used to display the specified recipe on the screen. Therefore, the HMI changes the RCPNO number to display its corresponding recipe data.

There are two methods to change RCPNO number:

One way is a user can change RCPNO number through the numeric entry object directly.

The other way is the PLC changes RCPNO constant. To change RCPNO constant, a user must write the specified number N to RCPNO Number Register Dn+5; then set the RCPNO Change Flag Dn+1 bit 5 as ON(about 1 sec.). The HMI will change RCPNO constant to N and display the recipe data RCPW0~RCPWm correspondent with the Nth recipe.

4.2.6. Addressing Recipe Data – For enhanced HMI

Suppose that the number of recipe N=20, a recipe size m=100 Words.

To edit an addresss, one need to setup the **current recipe** N =RCPNO, the HMI will display the corresponding recipe data

1. Enter the recipe number N to RCPNO or change RCPNO by PLC. The HMI will display the corresponding recipe data.

For example, if RCONO N=5, RCPW0~RCPW99 displays the data correspondent with 5th recipe; if RCPNO N=7, RCPW0~RCPW99 displays the data correspondent with 7th recipe.

2. Another way to edit the corresponding data of recipe register is **absolute address**.

Suppose that an address is greater than RCPW100, the corresponding recipe address will display the Nth recipe data.

RCPW100~RCPW199 represents 1st recipe data.
RCPW200~RCPW299 represents 2nd recipe data.
`
`
RCPW2000~RCPW2099 represents 20th recipe data.

When the address greater than RCPW2099 is invalid.

So the RCP234 represents 2nd recipe data, 35th words and RPCW 34 in RCPNO =2.

4.3. Time Block

4.3.1. Time Block – The HMI writes to PLC

If user wants the HMI to write the current time and date to the PLC, then one needs to define the Time Block for the application. Time Block is a block of three words in the PLC and its format is BCD. The HMI updates the Time Block every minute with the time data. The format of time block is shown in the following:

Low byte of word 0 (07-00)	Minute BCD 00-59
High byte of word 0 (15-08)	Hour BCD 00-23
Low byte of word 1 (07-00)	Day BCD 00-31
High byte of word 1 (15-08)	Month BCD 01-12
Low byte of word 2 (07-00)	00-99
High byte of word 2 (15-08)	Day-of-week 1 = Sunday 2 = Monday 3 = Tuesday 4 = Wednesday 5 = Thursday 6 = Friday 7 = Saturday

The steps to set up the time block are shown in the following. Select [Application]/[Workstation Setup] in ADP, then a user can set up time block on the [Miscellaneous] tab. See Figure 181. The starting address is D240 and the size is 3 Words, so the data will save in D240, D241 and D242 16-bit registers. The HMI updates the Time Block every minute with the time data.

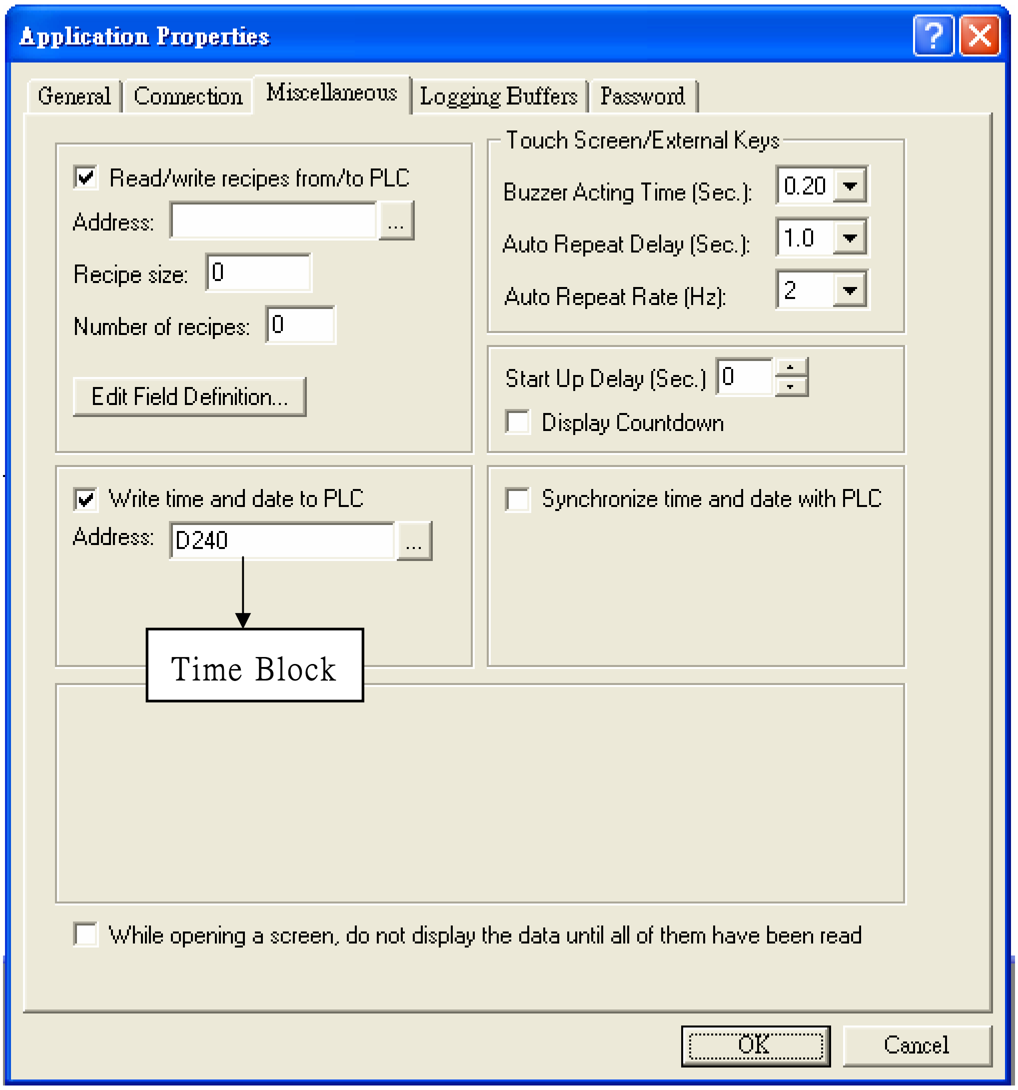


Figure 181. Setup Time Block

4.3.2. Time Block – PLC writes to HMI

The HMI can read time and date from the internal Real Time Clock of PLC. Then the HMI can modify the corresponding data for the time/date/week read from the RTC and display the content on HMI.

The HMI updates the Time Block every minute with the time data. See Figure 182

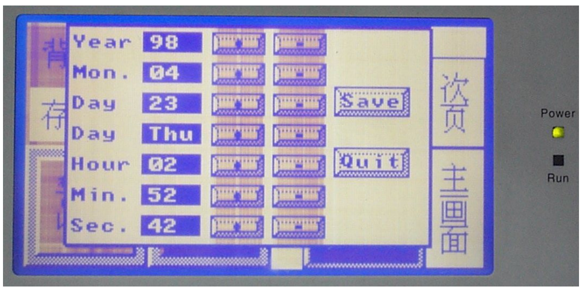


Figure 182. Setup Time/Date/Week on the HMI

4.4. Read Cycle

The HMI does the following steps to accomplish one read cycle and it will repeat these steps continuously. User needs to know this read cycle to configure a HMI so as to communicate with the PLC efficiently.

Steps of the cycle:

1. Reads control block of PLC.

2. Reads specified register blocks for the current screen.

3. Reads specified On/Off blocks for the current screen.

4. Reads specified the Alarm Register regularly (3-10 sec.).

5. Reads a number of PLC locations which: (1) are shown on the current screen; (2) do not appear in the current screen's register blocks or On/Off Blocks and have not been read recently.

   The number of PLC locations to be read in this step is specified by the "number of individual reads per read cycle" of the current screen.

This read cycle is repeated continuously from Step 1. to Step 5.