

Appendix I FBs-DAP Simple HMI

In addition to timer, counter, register, and contact data access function, the date setter of FBs-DAP can connect to many others for alarm message display, self-defined special keys, wireless card reading(RFID), and the like simple human machine interface(HMI) functions.

■ FBs-DAP / FB-DAP Simple HMI

| Model Specifications | *FB-DAP-A(R/W) | FBs-DAP-B(R) | FBs-DAP-C(R) |
|-----------------------------|---|----------------------------|---------------|
| Matching PLC series | FB _E | FB _E /FBs | FBs |
| Display | LCD (English), 2-line×16 characters, LED backlight | | |
| Button | 20 keys (4×5) | | |
| Wireless card reading(RFID) | Available only in -AR, -AW | Available only in -BR, -CR | |
| Power input | 5V | 24V | 5V |
| Current consumption | 100mA (120mA) | 41mA (48mA) | 105mA (125mA) |
| Communication interface | HCMOS (5V) | RS485 | RS232 |
| Number of linked station | Single | Maximum 16 stations | Single |
| General functions | Timing/counting、register、contact access(write protected for each) | | |
| Special functions | Alert, message display, self-defined special keys | | |
| Writing function(RFID) | Model -AW is required | Available in -BR, -CR | |

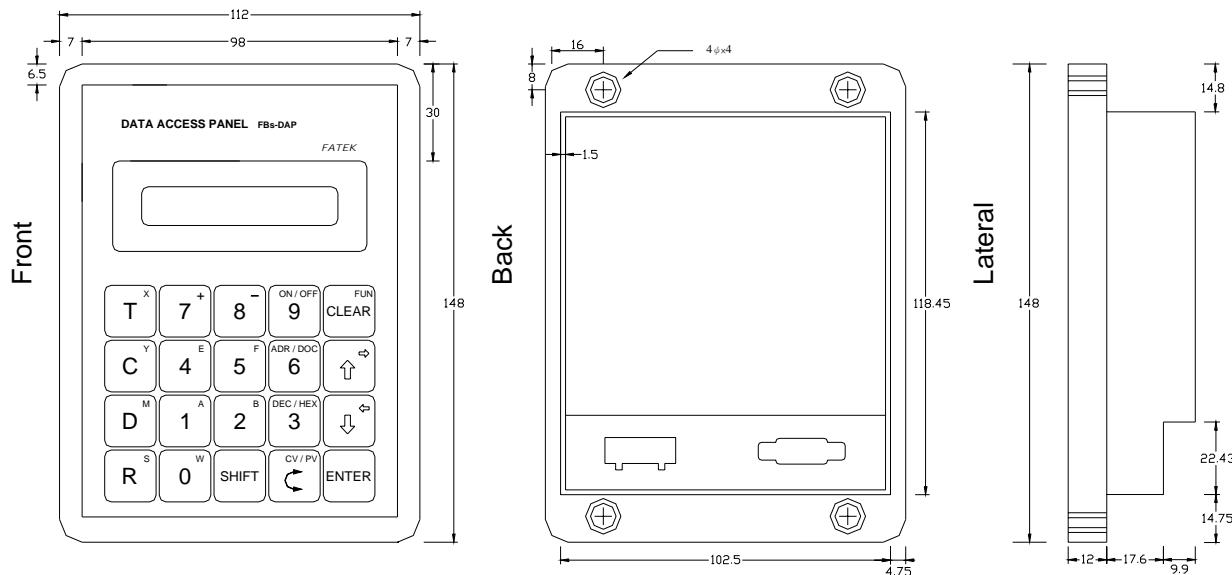
* The card number of CARD-2 can be changed by the special model FB-DAP-AW.

■ RFID card

| Model Specifications | CARD-1 | CARD-2 | *CARD-H |
|----------------------|--|----------------------|---------------|
| Matching DAP models | FB-DAP-R/W | FB-DAP-R/W | FBs-DAP-BR/CR |
| Operating frequency | 134.2KHz | 134.2KHz | 13.56MHz |
| Memory | 64bits with Cyclic Redundancy Check (CRC) on data | | |
| Working temperature | -25°C~50°C (ISO7810) | | |
| Power supply | Battery not required (power supplied from wireless electric waves released by card-reading module -AR/-BR/-CR) | | |
| Sensing distance | 12cm~18cm | | 5cm~9cm |
| Writing times | Unwritable(cannot copy, unique) | At least 10000 times | |
| Dimensions (mm) | 86×54×13 | | |
| Weight (Gram) | 12 | | 5 |

- CARD-H includes one set of read-only UID code (unique card number that cannot be duplicated) and another set of ID code (card number) available for writing/reading. FBs-DAP-BR/-CR can select to read either set of card numbers.

1.1 Profile



1.2 Important points before operation

- 1、 FBs-DAP possesses a function to return to the operation mode (general data setter and self-defined 8/16 special keys) before power failure and each DAP can be place in a different mode when connecting many sets.
- 2、 When operating FBs-DAP , D2944~D3071 register of PLC will be used as the system configuration area (most data set by FUN functions are stored here) , the user shall avoid this area.
- 3、 Any communication port, once converted to a RS485 interface, can be connected to a maximum of 16 FBs-DAP-B(R) sets.
- 4、 When PLC is connected with FBs-DAP-B(R) , the station number of PLC is limited to a range of 1~32.
- 5、 The communication parameter of connections between PLC and FBs-DAP-B(R) are :
 - port0、1、2 : 9600 / 19200 / 38400 、Even 、7 Data bits 、1 Stop bit
 - (DAP automatic detection baud rate 9600 / 19200 / 38400)
 - ex : R4158=5521H, i.e. port2 being 9600 : R4158=5523H, i.e. port2 being 38400.
- 6、 When many sets of DAP are connected, if any two or more have the same station number, then DAP will request for number change, which can be done by only entering “**New DAP NO** + **ENTER**” keys。
- 7、 The transmission line of the RS-485 interface must use a twisted pair with a shielded cover on the outer layer. Please refer to chapter 11 in the Operation Manual II for other important points.
- 8、 The scanning time of PLC will affect the update time of DAP.
- 9、 When Proladder(or FP-08) and DAP are connected to the same set of PLC, to change the program through Proladder is not allowed; if so, the timer information displayed by DAP won't be correct (In this case, the DAP shall be reset).
- 10、FP-08 is capable of entry of common with up to 16 characters for contacts and registers editing.

1.3 The main functions of FBs-DAP

The main functions of FBs-DAP can be categorized as : general data accessing, FUN functions of parameter setting, wireless card reading (RFID), and message display function. The details of the functions will be introduced in the following sections.

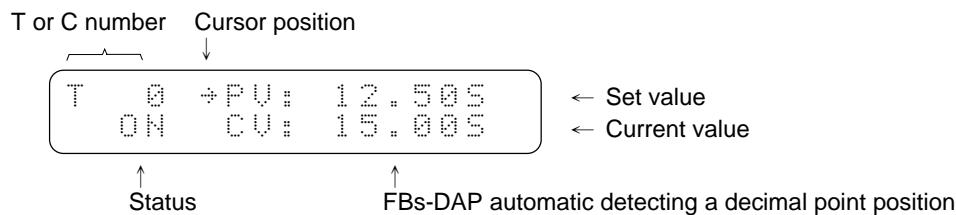
1.4 General data access function

FBs-DAP can be used as a "TC setter" as well as the access to registers (R、D、W) and contacts (X、Y、M、S). In the FUN functions in the following sections, it can also be used as write-protect with T、C、R、D、X、Y、M、S. There are two kinds of display for monitoring information: ADR (general addresses) and DOC monitoring. The latter shall make DOC compilation (max. 16 words in English, symbols, numbers) in advance through Proladder or FP-08 for T, C, register R/D and contacts so the DOC can be displayed.

1、ADR monitoring

A. Timer and Counter monitoring

【Pressing keys】 : $\boxed{T^x}$ or $\boxed{C^y}$ + $\boxed{\text{number}}$ + $\boxed{\text{ENTER}}$

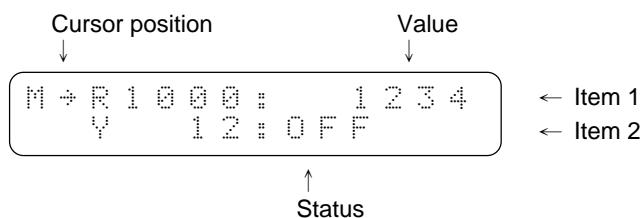


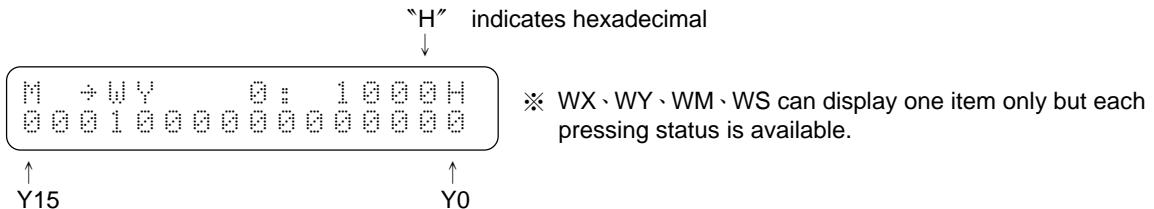
B. Registers (R、D、DR、DD、WX、WY、WM、WS) and contacts (X、Y、M、S) monitoring

【Monitored range】

| Type | T | C | D | R | DD | DR | WX | WY | WM | WS | X | Y | M | S |
|-------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|---------------|---------------|---------------|----------------|---------------|
| Range | 0 255 | 0 255 | 0 4095 | 0 8071 | 0 4094 | 0 8070 | 0 240 | 0 240 | 0 1984 | 0 984 | 0 255 | 0 255 | 0 2001 | 0 999 |

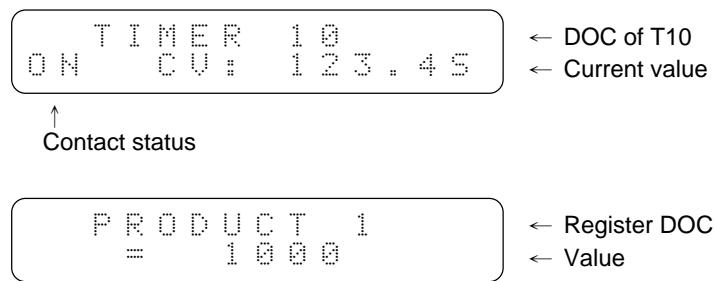
【Pressing keys】 : $\boxed{R^s}$ or $\boxed{D^w}$
 $\boxed{D^w} + (\boxed{R^s} \text{ or } \boxed{D^w})$
 $\boxed{\text{SHIFT}} \boxed{0^w} + \boxed{\text{SHIFT}} (\boxed{T^x} \text{ or } \boxed{C^y} \text{ or } \boxed{D^w} \text{ or } \boxed{R^s})$
 $\boxed{\text{SHIFT}} (\boxed{T^x} \text{ or } \boxed{C^y} \text{ or } \boxed{D^w} \text{ or } \boxed{R^s})$





- Note : 1、Pressing can move the cursor up and down or switch between CV or PV.
- 2、Pressing or can decrease or increase the monitored item number.
- 3、For a monitored item value, input a new value directly and then press . The status of the contacts can be changed by pressing + .
- 4、Pressing + can change the means to display a value (either with decimal or hexadecimal system).

2、DOC monitoring



- Note : 1、Pressing + can switch the monitoring of ADR and DOC.
- 2、The display switch between CV (current value) and PV of the timer (counter) can use .
- 3、 or can be moved up or down to next monitored item with DOC.

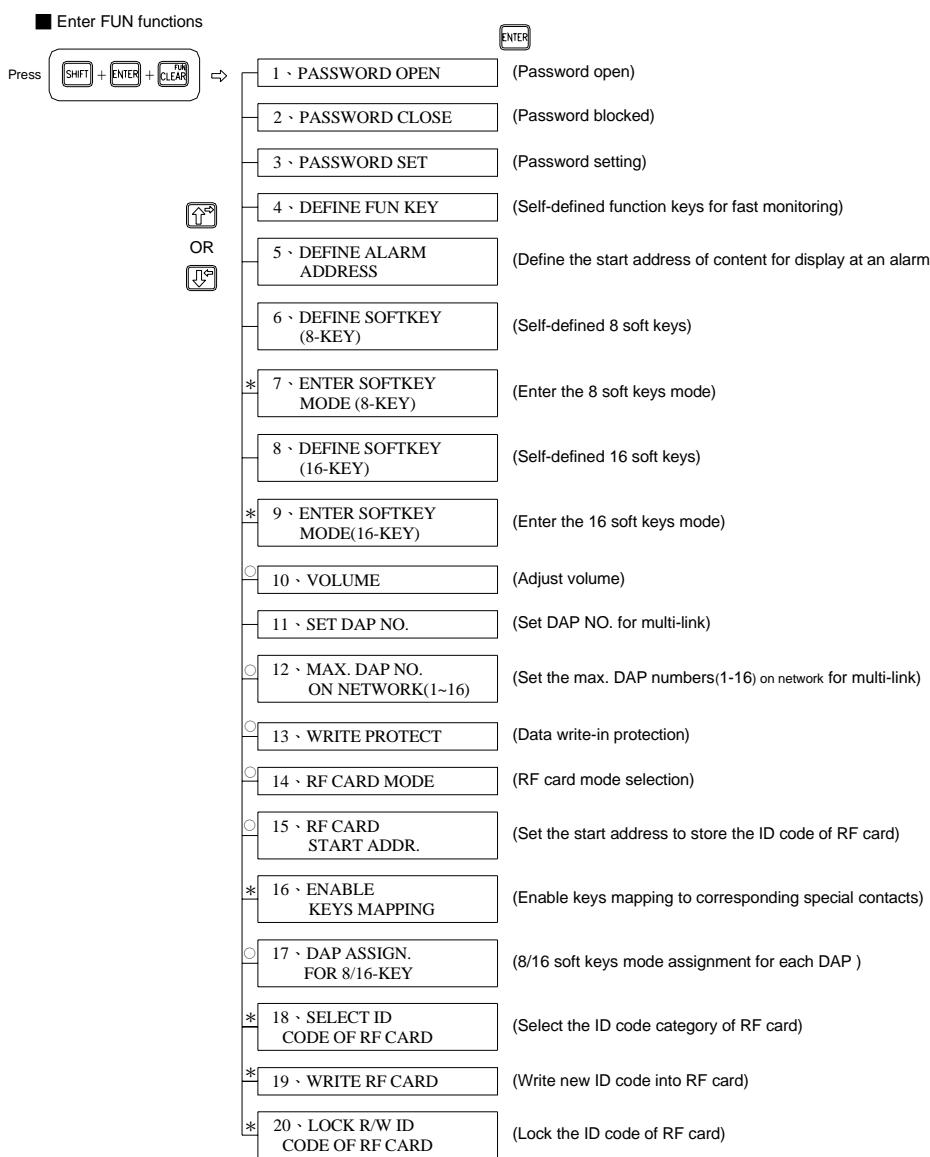
3、Speed monitoring FUN keys(FUN KEY 0~9, totaling 10 keys)

【Pressing keys】 : + (~) ⇒ Direct display of a monitored item set by the client.

- Note : 1、Items to be monitored can be set from the following "FUN functions".
- 2、Items to be monitored can be displayed with ADR or DOC monitoring.

1.5 FUN Functions

1.5.1 In and out of FUN functions



* : Indicates when multiple DAPs are connected, each DAP can be set respectively.

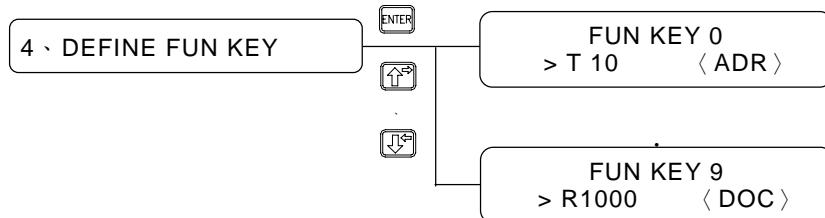
○ : Indicates when multiple DAPs are connected, the information set by one of them is not available for use until PLC is reset.

■ Exit of FUN functions to general data access functions. Press 

- Note: 1、When several DAPs are connected, information can be stored to PLC (D2944~D3071) if one of the DAP is set in all the FUN functions (except item 11).
- 2、After entering FUN 4~20, without password protection, all the FUN functions can be executed by only pressing . With password protection, it is required to pass it first before executing FUN functions.
- 3、If it is password-protected, FBs-DAP will be set in a password protection status at each beginning of operation.
- 4、FUN items 1~9 can be entered with numeric keys directly and then go straight to that function.
- 5、After executing a item of FUN functions, if execution of other items is required, press the three keys  again.

1.5.2 FUN function description

- FUN 1~3 (password)
 - 1、 Password contains up to 4 digits (unrelated to LADDER program's password).
 - 2、 After the password is set, it will enter a password-locked status until DAP power on next time.
 - 3、 After the password is locked, all the FUN functions are not available.
- FUN 4 (DEFINE FUN KEY) : Self-defined function keys for fast monitoring.



- 1、 There are ten self-defined function keys for fast monitoring in total.
- 2、 All items available for monitoring can be defined in the ten function keys.
- 3、 Pressing **SHIFT**+**6** can select ADR or DOC.
- FUN 5 (DEFINE ALARM ADDRESS) : Define the address of content for display at an alarm.
 1. There are ten start addresses, that is, ten levels of alarm signals.
 2. All items available for monitoring can be defined in the said ten start addresses.
 3. Pressing **SHIFT**+**6** can select ADR or DOC for display.
 4. Control measures of alarm signals for display are shown as follows :

【Corresponding list for control】

| Alarm level (priority sequence) | Control contact | Indication register | Start address of the content displayed |
|------------------------------------|-----------------|---------------------|--|
| ALARM 0 | M1900 | R3820 | Client-defined |
| ALARM 1 | M1901 | R3821 | Client-defined |
| ⋮ | ⋮ | ⋮ | ⋮ |
| ALARM 9 | M1909 | R3829 | Client-defined |

【Example】 Assume the start address of ALARM 0 displayed content to be R100,

If M1900=1 then the alarm address for display is R100 + (R3820)

If R3820=0 ⇒ Display address or DOC of R100

R3820=1 ⇒ Display address or DOC of R101

R3820=2 ⇒ Display address or DOC of R102

Note 1 : When a multi-level alarm occurs, only the address or DOC with priority can be displayed. The address or DOC of a sub level alarm will not be displayed until this alarm with priority is released.

Note 2 : To display a DOC (message) with 16 digits above, the corresponding indication register (R3820~R3829) content can be changed anytime to reach this purpose.

Note 3 : M1911 can control whether to sound the alarm buzzer. If M1911=0 (preset), it shall be activated.

- FUN 6 (DEFINE SOFTKEY—8 KEYS) : Self-defined 8 soft keys
- FUN 7 (ENTER SOFTKEY MODE—8 KEYS) : Enter the 8 soft key mode

1. Available for defining 8 soft keys : 、、、、、、、
2. Definable range : R0～R3839、D0～D2943、M0～M1899.
3. In defining M0～M1899, this key can be defined as one of the 5 modes.

| Mode | Definition | Description |
|------|-------------|--|
| 0 | Set (S) | Set this contact to 1 |
| 1 | Reset (R) | Set this contact to 0 |
| 2 | Moment (M) | 1 in pressing, 0 in being released |
| 3 | Inverse (I) | Pressing once will have one inverse phase. |
| 4 | Monitor (V) | Monitor this contact |

【Example】 Assume definition as R0, definition as M0 mode 0(Set). Once enter the 8 soft key mode in function 7,

Then pressing ⇒ display address or DOC of R0.
 ⇒ display address or DOC of M0 and force M0 ON

Note 1 : After defining the 8 soft keys, once function 7 is executed, it will enter 8 soft key operation mode.
And then the 8 soft keys will be executed according to function 6 definitions.

Note 2 : In situation of and with no definition, push either of them will cause DAP returning the general data access function. Just push to turn back 8/16 soft keys mode.

Note 3 : 、 both are allowed out of definition, but the other keys will not be effected without definition.

Note 4 : To return to normal operation mode, press " + (D2972 content) + " , among which D2972 content is from 0000～9999 (4 digits required).

Note 5 : When define special key, for optional can push and choose protection or non-protection on the defined content. (the upper right corner of LCD show that " p " content of monitoring which shows this special key can only be read and can't be written)

Note 6 : Push both and at one time can transform 8/16 soft keys mode.

- FUN 8 (DEFINE SOFTKEY—16 KEYS) : Self-defined 16 soft keys
- FUN 9 (ENTER SOFTKEY MODE—16 KEYS) : Enter the 16 soft keys mode

 1. Available for defining 16 soft keys : 、、、、、、～
 2. Definable range : T0～T255、C0～C199、R0～R3839、D0～D2943、M0～M1899。
 3. In defining M0～M1899, this key can be defined as one of the 5 modes and when a message is being displayed, if the key is pressed, the display will not be changed.

| Mode | Definition | Description |
|------|-------------|--|
| 0 | Set (S) | Set this contact to 1 |
| 1 | Reset (R) | Set this contact to 0 |
| 2 | Moment (M) | 1 in pressing, 0 in being released |
| 3 | Inverse (I) | Pressing once will have one inverse phase. |
| 4 | Monitor (V) | Monitor this contact |

4. When defined as T, C, R or D, the value change is by pressing or to make the corresponding M1840~M1871 ON (the client is required to write a plus/minus 1 program in the LADDER program) to achieve this purpose.

| Soft key | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | T | C | D | R | SHIFT | |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | M1840 | M1841 | M1842 | M1843 | M1844 | M1845 | M1846 | M1847 | M1848 | M1849 | M1850 | M1851 | M1852 | M1853 | M1854 | M1855 |
| | M1856 | M1857 | M1858 | M1859 | M1860 | M1861 | M1862 | M1863 | M1864 | M1865 | M1866 | M1867 | M1868 | M1869 | M1870 | M1871 |

【Example】 Assume definition as R0, defined as M0 mode 1 (Reset).

After entering 16 soft key mode in function 9,

Press ⇒ Display the address or DOC of R0, and then pressing , its corresponding M1850 will be ON; OFF after it is released.

⇒ Display the address or DOC of M0 and force M0 OFF.

Note 1 : After the 16 soft keys are defined, once function 9 is executed, it will enter 16 soft key operation mode and then the 16 soft keys will be executed according to function 8 definition.

Note 2 : In situation of and with no definition, push either of them will cause DAP returning the general data access function. Just push to turn back 8/16 soft keys mode.

Note 3 : To return to normal operation mode, press " + (+ + +) + " .

Note 4 : Push both and at one time can transform 8/16 soft keys mode.

- FUN 11 (SET DAP NO.) : Set DAP NO. for multi-link.

After any communication of FBs-PLC is converted to RS485 interface (Among which port2 as such is a RS485 interface), the FBs-DAP-B(R) of the 16 sets can be connected. Each DAP shall need a unique number, 1~16 (but one of them must be number 1). This DAP is not related to PLC numbers, meaning the number can have the same PLC number.

- FUN 12 (MAX. DAP NO. ON NETWORK) : Set the max. DAP numbers on network for multi-link. (Max. 16 ,default 7)

In a connection of several DAPs, FBs-PLC can be joined with new DAPs. But the more the DAP number, the longer the time to update information of each DAP. As a result, set the DAP number (the DAP number can not be bigger than this number) on network appropriately will decrease time for information to update.

- FUN 13 (WRITE PROTECT) : Data write-in protection

Aimed for monitored items (T, C, R, D, Y, M, S), set the information in write-in protection separately. Just fill in the corresponding place with 1, and then the item is write-in protected and can be read values only.

- FUN 14 (RF CARD MODE) : RF card mode selection

MODE= "0" ⇒ When reading a RF card, it will display whether this card is OK or Error. When the RF card is out of sensing distance, it will pop up "NEXT", indicating another RF card is available now.

MODE= "1" ⇒ Once a RF card is read, it will beep once and will not display any information so the sensing speed can be faster. But when many DAPs are connected, this mode will increase by about 60mS to each set for monitored item information.

- FUN 15 (RF CARD START ADDR.) : Set the start address to store the ID code of RF card

Store a card number's address can be set through the function, ranging from D0~D2860 (preset to D2860). Please refer to "Wireless card reading functions in sec. 1.6" for detailed description.

- FUN 16 (ENABLE KEYS MAPPING) : Enable keys mapping to corresponding special contact

After this function is set to "Enable" and enter SOFTKEY MODE(8-KEY and 16-KEY), pressing a definable soft key will force ON some contact of a corresponding contact under its number and the other contacts become OFF. When set to "Disable", the corresponding special contact of this DAP will not be effected.

The following is corresponding special contacts to different DAP keys when in 16-KEY mode:

| KEY No. | T | C | D | R | 7 (↑) | 4 (↓) | 1 | 0 | 8 | 5 | 2 | SHIFT | 9 | 6 | 3 | C |
|------------|-------|-------|-------|-------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | M1784 | M1785 | M1786 | M1787 | M1788 | M1789 | M1790 | M1791 | M1792 | M1793 | M1794 | M1795 | M1796 | M1797 | M1798 | M1799 |
| 2 | M1768 | M1769 | M1770 | M1771 | M1772 | M1773 | M1774 | M1775 | M1776 | M1777 | M1778 | M1779 | M1780 | M1781 | M1782 | M1783 |
| 3 | M1752 | M1753 | M1754 | M1755 | M1756 | M1757 | M1758 | M1759 | M1760 | M1761 | M1762 | M1763 | M1764 | M1765 | M1766 | M1767 |
| 4 | M1736 | M1737 | M1738 | M1739 | M1740 | M1741 | M1742 | M1743 | M1744 | M1745 | M1746 | M1747 | M1748 | M1749 | M1750 | M1751 |
| 5 | M1720 | M1721 | M1722 | M1723 | M1724 | M1725 | M1726 | M1727 | M1728 | M1729 | M1730 | M1731 | M1732 | M1733 | M1734 | M1735 |
| 6 | M1704 | M1705 | M1706 | M1707 | M1708 | M1709 | M1710 | M1711 | M1712 | M1713 | M1714 | M1715 | M1716 | M1717 | M1718 | M1719 |
| 7 | M1688 | M1689 | M1690 | M1691 | M1692 | M1693 | M1694 | M1695 | M1696 | M1697 | M1698 | M1699 | M1700 | M1701 | M1702 | M1703 |
| 8 | M1672 | M1673 | M1674 | M1675 | M1676 | M1677 | M1678 | M1679 | M1680 | M1681 | M1682 | M1683 | M1684 | M1685 | M1686 | M1687 |
| 9 | M1656 | M1657 | M1658 | M1659 | M1660 | M1661 | M1662 | M1663 | M1664 | M1665 | M1666 | M1667 | M1668 | M1669 | M1670 | M1671 |
| 10 | M1640 | M1641 | M1642 | M1643 | M1644 | M1645 | M1646 | M1647 | M1648 | M1649 | M1650 | M1651 | M1652 | M1653 | M1654 | M1655 |
| 11 | M1624 | M1625 | M1626 | M1627 | M1628 | M1629 | M1630 | M1631 | M1632 | M1633 | M1634 | M1635 | M1636 | M1637 | M1638 | M1639 |
| 12 | M1608 | M1609 | M1610 | M1611 | M1612 | M1613 | M1614 | M1615 | M1616 | M1617 | M1618 | M1619 | M1620 | M1621 | M1622 | M1623 |
| 13 | M1592 | M1593 | M1594 | M1595 | M1596 | M1597 | M1598 | M1599 | M1600 | M1601 | M1602 | M1603 | M1604 | M1605 | M1606 | M1607 |
| 14 | M1576 | M1577 | M1578 | M1579 | M1580 | M1581 | M1582 | M1583 | M1584 | M1585 | M1586 | M1587 | M1588 | M1589 | M1590 | M1591 |
| 15 | M1560 | M1561 | M1562 | M1563 | M1564 | M1565 | M1566 | M1567 | M1568 | M1569 | M1570 | M1571 | M1572 | M1573 | M1574 | M1575 |
| 16 | M1544 | M1545 | M1546 | M1547 | M1548 | M1549 | M1550 | M1551 | M1552 | M1553 | M1554 | M1555 | M1556 | M1557 | M1558 | M1559 |

In 8-KEY mode, only 8 keys 、、、、、、 are effective, i.e. number keys ineffective. And 、 take the positions of and , but it must be when both keys are defined as soft keys so that the corresponding special contacts are effective.

〈 Example 〉 No.2 : Pressing , M1768 is ON and M1769~M1783 OFF.

No. 5 : Pressing , M1722 is ON and other contacts M1720~M1735 OFF.

- FUN 17 (DAP ASSIGN. FOR 8/16-KEY):8/16 soft keys mode assignment for each DAP.

As multiple DAPs are connected, if this DAP select "0) SAME", as long as one of the connected DAPs (also selects "0") sets it self-defined 8/16 soft keys can be shared. If "1) INDEPENDENT" is selected, then this DAP can have independent settings which may have different definitions of its 8/16 soft keys than other DAPs.

- FUN18 (SELECT ID CODE OF RF CARD): Select the ID code category of RF card.

RF CARD-H contains one set of 16-code (0~F) UID code (unique card number, safe from duplication) and one set of 12-code (0~F) writable/readable ID code(card number), which can be used to select the ID code to read from FBs-DAP.

- FUN19 (WRITE RF CARD): Write new ID code into RF card

Please read section 1.6 for details.

- FUN20 (LOCK R/W ID CODE OF RF CARD): Lock the ID code of RF card

RF CARD-H contains one set of 12-code (0~F) writable/readable ID code. Upon execution of this function, the ID code cannot be written as a new set of card numbers.

1.6 Wireless card(RFID) read/write functions

- RF CARD-H that suits FBs-DAP contains one set of 16-code (0~F) UID code (unique card number, safe from duplication) and one set of 12-code (0~F) writable/readable ID code (card number). All card numbers read in by FBs-DAP are coded for protection with high security.

- The sensing distance of CARD-H generally ranges from 5~9cm, away from sources of electromagnetic waves or great power lines.

- There are two ways to write the ID code(card number) into RF CARD-H (but can't lock R/W ID code):

- ① Use FUN19 of FBs-DAP: In FUN 19, input 12 numbers from 0~F or use 、 to change the card number. In the end place CARD-H within 5 cm from FBs-DAP and press to write the card number into CARD-H.
- ② Use the PLC ladder program : Please firstly set M1899 and M1910 to "ON" status and store new card number in D2940~D2942 through PLC ladder program. When put CARD-H inside the sensing distance , FBs-DAP will store the new number in CARD-H within 150mS (when the scan time of PLC is longer than 100mS, this time will increase accordingly) and display "OK" to indicate the completion of card number writing.

- Locations and application of the card number storage

FBs-DAP saves RF card numbers within sensing distance into two places in PLC. The places and application are described as follows:

1、Fixed in R3835~R3839 (totaling 5 registers) : During operation, M1910 shall be controlled.

| Card number format | |
|--------------------|-------|
| R3835 | N1 N2 |
| R3836 | × × × |
| R3837 | × × × |
| R3838 | × × × |
| R3839 | × × × |

N1 : DAP number 1~16 (i.e. 1H~10H)
N2 : 52H (R : read-only card) or 57H (W : readable/writable card)
R3836~R3839 store 16 0~F card numbers

Application :

Only in monitoring (or8/16 soft keys) mode (non-FUN functions) and the RF card in sensing distance, FBs-DAP (-BR or -CR) will send the RF card number together with DAP number to PLC R3835~R3839. In mode 0 of function 14 (RF CARD MODE), all the client needs to do is compare the card number. If it is OK, only set M1910 to 1 and then DAP will indicate "OK", or "ERROR". When the RF card is out of sensing distance, DAP will pop up "NEXT" and clear the content of PLC R3838~R3839 to 0, which means available for another RF card. In mode 1 of function 14, as soon as DAP reads a card number, it will save it to R3835~R3839 with a beep. After the RF card exits, the 5 registers remain unchanged.

Applicable occasions :

Where one set or multiple sets are connected but RF cards are not used frequently, the program to be applied will be a lot easier. But in the event of a card number read from different DAPs at the same time, it will be difficult for PLC to identify the information correctly.

- 2、Preset D2860～D2939 (16 differently-located DAP take on 5 registers individually, i.e. 80 registers in all, but the locations can be changed through function 15) control one point of M1880～M1895 separately when in use.

| Card number format | Card number format | Card number format | Card number format |
|--------------------|--------------------|--------------------|--------------------|
| D2860 | N1 N2 | D2865 | N1 N2 |
| D2861 | x x x x | D2866 | x x x x |
| D2862 | x x x x | D2867 | x x x x |
| D2863 | x x x x | D2868 | x x x x |
| D2864 | x x x x | D2869 | x x x x |
| No. 1 | No. 2 | No. 3 | No. 16 |
| ↓ | ↓ | ↓ | ↓ |
| M1880 | M1881 | M1882 | M1895 |

Application measures :

The application measures are all described as the above-mentioned but that the storage places of card numbers and corresponding contacts for control are different. For example, in mode 0 of function 14, from No. 2 DAP sensing to the RF card, now no. 2 will send same card numbers to two different places in R3835～R3839 and D2865～D2869 (the content of the other registers remains unchanged), and all the client needs to do is control M1881 for the DAP to display "OK" or "ERROR". After the RF card exits, the content of the 10 registers R3835～R3839 and D2865～D2869 will be cleared to 0 (but remains unchanged in mode 1).

Applicable occasions :

When several DAPs are connected, the RF card can be read in from different DAPs and each DAP has its independent card numbers storage places and control points so that no PLC misjudgment case occurs, but the programming will be more troublesome.

- ※ If you do not want R3835～R3839 to display a card number value, you can use the Ladder program to fill in these registers with other fixed values.

1.7 Special message display function

In general monitoring mode and soft key mode (16 KEYS or 8 KEYS), the user can configure the DAP to display every kind of message under some circumstances, and the two-line display on the LCD can be controlled separately to simultaneously display different messages. Every message is 1~511 words and numbers (ASCII code) long, in which a maximum of 16 variables (if variables with 32-digit are not used, then it can use up to 25) can be included. When a message has more than 16 words, the message will be displaced left for display, in which the moving speed or pause time can be configured flexibly.

1.7.1 Message display application

The FBs-DAP-B(R) can be connected up to 16 sets (Number 1~16). Each DAP not only can display different messages individually but make all the DAPs connected display the same message simultaneously. If you go to a special contact (R3780~M3813) set by Enable, the DAP will display the message ASCII Code) indicated by the corresponding indication register (R3780~M3813). The content of the indication register is the start register of messages, i.e. start of ASCII Code. The indication register content can be changed anytime in order to change and display different messages.

The following is a list of corresponding special contacts and indication registers when each DAP is displaying a message for control.

| Number of a message displayed | LCD line 1 | | LCD line 2 | |
|-------------------------------|-----------------|---------------------|-----------------|---------------------|
| | Special contact | Indication register | Special contact | Indication register |
| 1~16 | M1800 | R3780 | M1801 | R3781 |
| 1 | M1802 | R3782 | M1803 | R3783 |
| 2 | M1804 | R3784 | M1805 | R3785 |
| 3 | M1806 | R3786 | M1807 | R3787 |
| 4 | M1808 | R3788 | M1809 | R3789 |
| 5 | M1810 | R3790 | M1811 | R3791 |
| 6 | M1812 | R3792 | M1813 | R3793 |
| 7 | M1814 | R3794 | M1815 | R3795 |
| 8 | M1816 | R3796 | M1817 | R3797 |
| 9 | M1818 | R3798 | M1819 | R3799 |
| 10 | M1820 | R3800 | M1821 | R3801 |
| 11 | M1822 | R3802 | M1823 | R3803 |
| 12 | M1824 | R3804 | M1825 | R3805 |
| 13 | M1826 | R3806 | M1827 | R3807 |
| 14 | M1828 | R3808 | M1829 | R3809 |
| 15 | M1830 | R3810 | M1831 | R3811 |
| 16 | M1832 | R3812 | M1833 | R3813 |

⟨ Example ⟩ Assume M1803 from 0→1, R3783=100

Result : Line 2 of No. 1 of the LCD will display messages in ASCII Code with R100 start.

⟨ Example ⟩ Assume M1828 from 0→1, R3808=10000

Result : Line 1 of No. 14 of the LCD will display messages in ASCII Code with D0 start.

⟨ Example ⟩ Assume M1801 from 0→1, R3781=0

Result : Line 2 of all the DAPs will display messages in ASCII Code with R0 start.

- ※ The start register of a message indicated by an indication register means :
0~8070 : indicating R0~R8070
10000~13070 : indicating D0~D3070
- ※ Special contacts M1800 and M1801 have a priority display function.
- ※ M1911 can control an alarm buzzer whether to sound or not. If M1911=0 (preset), it shall be activated.

1.7.2 The Information formats of messages (ASCII)

The information formats of messages are very similar to chapter 14 "Application of ASCII File Output Function" in the Advanced Manual that are all categorized as fixed background information and dynamic variable information. The first can be words in English, numbers, or signs, and the second binary, decimal or hexadecimal system.

Length of a message is 1~511 digits (including blank spaces), but because there are only 16 digits a line in a DAP LCD, if a message has more than 16 digits, it will be displayed automatically toward the left (preset moving one time a second); if less than 16 digits, the tail will be filled in with blank digits and no moving occurs.

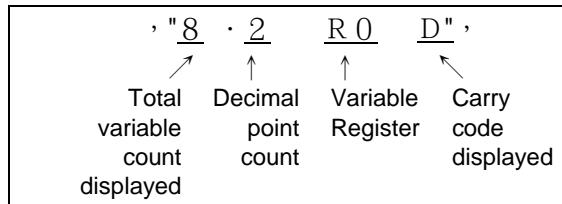
The editing of message can work through 「ASCII Table」 function under WinProladder by choose "DAP output" from 「Output preview」 then start the editing. The editing command formats are as follows:

① Background information format

Any ASCII Code digits quoted with ' ' can be background information. To display a single quotation mark as such, two continuous quotation marks are a must. Example:

' I ' 'M A BOY' will be displayed I'M A BOY

② Variable information format



Description information in a pair of dual quotation marks " " is used to indicate the register address (number) storing the variable information and in what format and carry code to display.

- Total variable count displayed : In this case, the value (including minus) of the variable R0 is displayed in a field with 8 digits. If the variable value is bigger than the total variable count displayed, the digits further from the point will be cut. If not enough, blank spaces will fill in.
- Decimal point count : the decimal point count in the total digits. In this case, with a total count of 8 digits, the decimal point count is 2. The decimal point sign ". " as such possesses one digit and there are 5 digits left in the integral part.
- Variable register : can be used as 16 digit register's R、D、WX、WY、....., or 32 digit register's DR、DD、DWX、DWY、.....etc. The content value in the register will be retrieved and displayed with the format and carry code described in the " ".
- Contacts : generally displayed as ON or OFF (total digit count displayed is set to a fixed 3), but if added with binary system B in the tail, 0/1 will be displayed (total digit count fixed 1)
- Carry code : can be hexadecimal H, decimal D (the carry code will use decimal if without indication, so D can be omitted.), or binary B, etc., but a 32 digit variable can not be displayed with binary system.

In this case, R0's content value is -32768. In 8.2 format the result is displayed as:

| | | | | | | | |
|---|---|---|---|---|---|---|--|
| - | 3 | 2 | 7 | . | 6 | 8 | |
|---|---|---|---|---|---|---|--|

If the format is changed from 8.2 to 5.1, then the result becomes:

| | | | | |
|---|---|---|---|---|
| 2 | 7 | 6 | . | 8 |
|---|---|---|---|---|

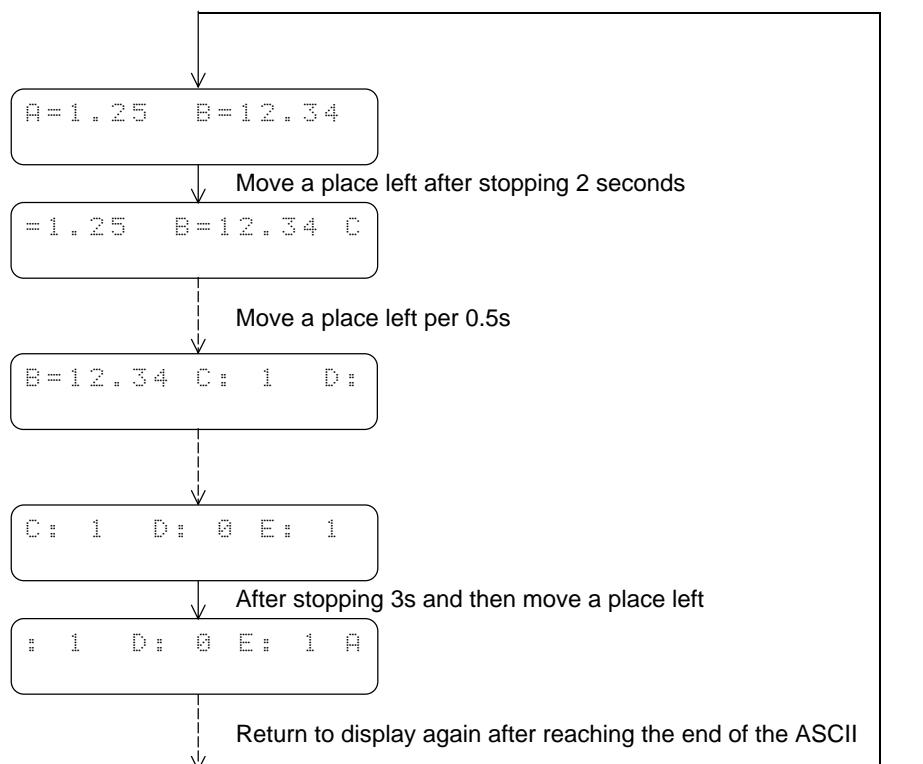
③ Basic command signs

- **nS** Left move speed (repeatable)
Message displayed at a left LCD move per n ($1 \sim 255$) $\times 0.1\text{s}$.
- **nP** Stop move (repeatable)
Message stop in ($1 \sim 255$) $\times 0.1\text{s}$, and then move left at a configured speed.
- **,** Comma
Used as a statement to divide the file information. Information between two neighboring commas is a complete and executable statement (unnecessary for the start and end of a file).
- **END** End of a file
※ nS and nP commands will not be activated until after the information following them moves to the left first place on the LCD display. They can have a repeatable arrangement of any place in ASCII, but the same command cannot be connected together.

〈Example〉 Information edited with WinProladder ASCII file editor. R0 is a start register of an ASCII file and the file information is shown as follows :

```
5S,20P,'A=','6.2R3840','B=','6.2R3841',30P,'C : ','1M0B',
      D : ','1M1B','E : ','1M2B',',',END
```

If M1800 from 0→1 and R3780=0 (i.e. R0) , Line 1 of the LCD of DAPs of all numbers is shown as follows :



- ※ Variable information is renewable anytime.
- ※ To display another message, just change R3780 value and not for M1800.