NETWORK 90°/INFI 90° Interface to Programmable Controllers and Other Devices

![Diagram of NETWORK 90/INFI 90 Interface]

**FIGURE 1** NETWORK 90/INFI 90 Interface to Programmable Controller

Interfaces between NETWORK 90/INFI 90 and programmable controllers or other devices are available as standard packages. These interfaces are configurable and can be shed in several ways based on the total number of digital states and/or analog values to be transferred and the speed of transfer required. The following represents a general discussion of the methods and techniques used in achieving these interfaces.
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Background Information

The multi function controllers MFC02/03 and the multi function on processors MFP01/02/03 are small and portable. They are designed to be used on block engines with modules in modules and open to open communication systems. These modules are so programmed to provide the ability to run near programs on BAS C and C language programs. They have the capability of reading data streams from and writing data streams to RS232 ports or an RS485 port and reading values from and writing values to function blocks, thereby connecting the program to the Bay ey NETWORK 90 or INFI 9000.

The BAS C and C language programs have been used to write communication programs of various protocols to programmable controllers and other foreign devices. The MFCs and MFPs having communication on a programmable environment can be used as masters or slaves in the interfaces. These own communication on the programmable controllers directly or to other devices that are made to communicate to programmable controllers.

Communication on the ports on the Bay ey modules are under asynchronous program control with asynchronous port buffer sizes on the MFC03 and M P01/02/03 or fixed buffers on MFC02. The MFCs and MFPs can use one port to communicate to the foreign device and the second port to communicate to a second device, print diagnosis messages or to serve as a redundant port.

Most programmable controllers have an RS232 serial port for communication if the programmable controller communicates via some other method such as RS422, RS485, EEE488 etc. Standard adaptors can be placed between the MFC's or MFP's RS232 port and the programmable controller device if synchronous communication on both or closed messages are required a specific designed adapter is used.

The interfaces established between the Bay ey modules and programmable controllers or other small devices have the ability to transfer data and analog data, as well as operator commands to other devices. Where programmable controllers type can be set on the interface and the on/off state of the network 90 and NF 90 have the ability to process commands and analog values with data transfer conditions and current or ast state or value. Thus importing data to the Bay ey system gives the operator personnel the ability to read more information about the system.

The document discusses the methods of selecting a module for a part of a NETWORK 90/INFI 90 to foreign device interface. It so gives a method for establish the execution on the interface and a structure for collecting information and data required to implement the interface. Several examples and tests have been provided for use in designing and implementing an interface.
**Description**

**MODULE SELECTIONS AND SYSTEM SIZING**

Several considerations must be taken into account to produce a successful Network 90/90 interface. The considerations are:

- the amount of data required to be transferred (point count) and whether data is contiguous or broken
- the timing required to update data points
- the type of data analog or digital and operator commands and the OG C used to implement the commands
- the communication character sets
- the arrangements of the data for foreign devices

All of the above criteria are used to determine what type of NETWORK 90/NF 90 module should be used. The following suggest the module type required based on the point count.

<table>
<thead>
<tr>
<th>Module Type</th>
<th>Maximum Point Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multifunction Controller MFC02</td>
<td>400 BAS C ONLY</td>
</tr>
<tr>
<td>Multifunction Controller MFC03</td>
<td>950</td>
</tr>
<tr>
<td>Multifunction Processor MFP01</td>
<td>300</td>
</tr>
<tr>
<td>Multifunction Processor MFP02</td>
<td>1200</td>
</tr>
<tr>
<td>Multifunction Processor MFP03</td>
<td>≥1200</td>
</tr>
</tbody>
</table>

Table 1

(Module function Controller MFC02 has only BAS C language onboard whereas the other modules mentioned above have C language. Where interfaces have been done in the past in BAS C Bayley recommends using the C language interfaces for current and future interfaces. This is because of the extra features employed by the C language and the fact that the Bayley library of interfaces is maintained in C language.)

Generally speaking, a PCU with one or more interfaces can transport:

- 1000 points on P ant Loop
- 2000 points on Super oop

A PCU adding networks should be considered before adding an interface to any PCU.

This is an upperbound estimate on the amount of digital and analog and command points. The actual size of an MFC or MFP is the amount of battery backed RAM for program and function on board storage. The point capacities above are based on an MFC or MFP. However, the modulae for an interface the rest of the module memory can be used for function on board. With more OG C requests and point counts, a lower point count may be used. The cycle time must be examined before ascertaining what MFCs or MFPs can be used and whether one or more PCUs are needed.

**TIMING INFORMATION**

The execution time of a NETWORK 90/NF 90 foreign interface is dependent upon a number of factors such as:

- the type of foreign device
- the number of devices per MFC
- the protocol used
- the request sequence
- the number of requests needed to pass the data
- the number of data points
- the type of data points
- the method used to pass data to the device if there is two way data pass
- the commands for transmission
- the foreign device process time
- the baud rate of communication
- whether NF net (Super cop) or P ant Loop is used
- whether operator acknowledgment of commands is required.
When operating supervisory control is required (e.g., start/stop of a motor) at least two points are required: a wrt the for gn dev ce to send the command and a read from the for gn dev ce to acknowledge the action. Using the t m ng ca cu at ons on the prev ous page a max mum t me for operator acknowledge can be ca cu at ed. C osed oop con tr os or safety nter cocks sho ul d never be attempted through a data. Not unless a compete t me ana y s s s performed.

When a s ng e dev ce s data r a nked to NETWORK 90 with b icked mes sages and a baud rate of 9600 or greater the trans m ss on t me beco mes m na and a rough t m ng est mate can be made by cons der ng on y mod u (MFC or MFP) cyc e t me con so e process ng t me and oop de ay.

The fo ll ow ng tab e conta ns nk t mes recorded on ac tua s te nsta at ons n each of these cases the nks conta n cons ec ut ve reg ster a gnments t e or no con tro og c n the mod u es re ab e response t mes from the fore gn dev ce and data be ng read and wrt en t h word range command. Cyc e t me den otes the t me to send/rece ve data to/from the fore gn dev ce. Conso e Scan T me s not f igured in these est mates.

The tab e demonstrates that there are vary ng factors for each dfferent type of nk. The ca cu at on on g ve above attempts to account for the average c ircumstances.
OPERATOR COMMANDS

Several considerations are taken into account in the MFC programming when commands are issued to foreign devices. Be aware of these questions and descriptions that result in several possible methods of using operator commands.

Is control to be transferred from the foreign device to Bailey? The operator may have the option of requiring control to the foreign device, operator, or maintaining control. It is necessary to decide whether commands can be issued from either system or only from the Bailey system.

Will the Bailey system track or alarm when the foreign device is in a different state than the issued commands? The track can arm a field timer, a network to arm a network, a network to arm a network, and a network to arm a device. The network can be designed with functions on blocks.

Will the Bailey system pulse the foreign device or issue a maintained status? The system can be dictated by the nature of the foreign device. The foreign device can be added if or by the choice in the first command. The operator can control a device at the system's generator used. Note that pulses output to a foreign device can be independent of presentation to the operator. Any operator can view the state command state when a pulse was issued to the foreign device.

The customer has a particular method for operating commands. The customer may need to supply a drawing to Bailey.

TRANSMISSION MEDIA

The usual method of transmission is communica-on with the "E"WORK 90 NF 90 via "d" RS232 connection. If the foreign device uses another method of communication, Bailey will specify a commercial converses on box or modem for the transmission. For longer distance communication, there may be necessary to specify modem phone lines. If the foreign device is not a modem, the transmission is on the specific terms of the transmission equipment.
SINGLE DROP

The following picture (Figure 3) shows a module configuration of a single drop MFC/MFP to foreign device interface. The MFC/MFP terminal on unit port is connected to the foreign device port.

FIGURE 3 Single Drop MFC/MFP to Foreign Device Interface
MULTIDROP

An MFC/MFP interface can be used successfully for data acquisition in a multidrop arrangement. In this case, the MFC/MFP will provide each foreign device with services and requires the foreign devices to have an addressing scheme. The following picture (Figure 4) shows an interface module configuration for communication with several foreign devices to one NETWORK 90/NF 90 node. The MUX denotes some type of multiplexer such as multiport modems to read together current loops or a radio broadcast system. (This hardware may be provided by the foreign device vendor or a commercial communications equipment vendor.)

FIGURE 4  Multidrop MFC/MFP to Foreign Device Interface
Software Layout

INTRODUCTION

Generating drivers are a collection of C language programs which drive data over a serial data link to various devices which conform to a common communication protocol A of the interfaces are constructed in a very similar manner A dBASE data points are converted to a data file and a set of Bailey backware. The data file and the backware are loaded into an MFC or MFP along with the C code for the appropriate protocol such as A en Brad ey or MODBUS. There are three parts to every interface:

1. The Bailey logics (CADEWS function codes) for data transfer to and from the Bailey own. There is a first page of Bailey backware which defines some of the parameters for the link as well as an error in storage and the segment control blocks. See the diagram on the following page.

2. The C protocol driver which communicates to the foreground devices sending and receiving messages.

3. The data file (point st) which crosses references the Bailey backware actions to the foreground device actions, such as register addresses. See the PO NT L ST section of the manual for more information on the data to be provided on the data file.

There is an OPTIONAL fourth part of an interface:

4. Other control or segments of control codes configured with Bailey function codes.

Bailey does not recommend doing too many control codes on the same module as a data link. The control codes are dependent upon the operation time of the data link. The memory capacity of the module is available for the control codes dependent upon the data point st sze.

Drivers are written for each unique type of protocol A of these drivers are capable of reading standard format data points and converting the file information into a series of message packets A of the drivers are compatible with the standard file CADEWS sheet. They take advantage of the functions contained in a generic C d g ta

interface brary. The brary consists of common functions and the interfaces run nestes used by most of the drivers. Examples of library functions are the message SCHEDULER the BINBOUTH routine which does back input and back output, the diagnostic C TELL function and many others.

Because of these smart users of one of the drivers are able to earn to use others in the collection quickly.

Interface software is created and loaded to a module with the following Bailey Ut es:

1. CADEWS/TXTEWS for Bailey og cs

2. Lower C Cross Comp er (for comp ing code) and the C Ut ty Package for oad ng C Code and data f es

3. KW KED T for mod fy ng an nt erface database

4. MFUTIL tes for oad ng code and data f es (used f the C Ut ty package s not purchased )

The same code runs on MFC03s, MFP01s, MFP02s and MFP03s. The difference in module sizes (non volatile memory) allows for different amounts of points per module.
STANDARD FIRST BLOCKWAre SHEET

The first standard function block sheet is a basic template used for generating protocol drivers and contains standard MFC/MFP function block program report sequence blocks. Port Mode Parameters are shown as an Error handler and Redundancy entry.

Standard MFC/MFP Function Block

Program Report Sequence Blocks

- Data On/Off Switch
- Delay Between Data On/Off [msec]
- Mod Type
- Test Mode
- Invoke C Program

Port Mode Parameters

- Baud Rate
- S & Q
- RTE & CTS
- Break Detect
- # Stop Bits
- Parity
- DataBits

Error Handler

- Interface Program Status
  - Queue Length (bytes)
  - Omit Length (bytes)
  - Interface Software
  - Rev on Line

Redundancy Entry

FIGURE 5  Standard First Blockware Sheet for Interfaces
EXAMPLES

The next picture (Figure 6) shows a C or BASIC program and hardware interface configuration with the MFC/MFP acting as the MASTER.

**Figure 6** Program and Logic for MFC/MFP as the Master in a Single Drop Arrangement
The following picture (Figure 7) shows a program and software configuration for the MFC acting as a SLAVE.
The next picture (Figure 8) shows a program and software configuration for a multdrop interface. Note that the configuration and program are similar to those of the single drop interface. The program has been set to cycle around the remote stations, and the software has been dup- cated and ordered so that the multipe stations remote network contains an address to owning the start character. The port of the multipe foreign devices is done serially. Each message from the MFC/MFP is broadcast to all of the remote devices. The multipe device with the corresponding address is expected to answer the message.

The program and configuration operate similarly to that of the single drop arrangement. Each message sent to the

**FIGURE 8** Program and Logic for MFC/MFP Multidrop Arrangement
FILES

The following statements summarize the data and program files that are required to configure an interface. Note that the word 'driver' refers to the particular protocol driver name (e.g., modbus ab etc.) The word 'projname' refers to the filename that was initially assigned to the project database file.

**driver.lms**
- This is the compiled and linked driver program file that is loaded into the MFC/MFP.

**driver.csp**
- This is the C specification file for the above driver program.

**driver.map**
- This is the C map file for the above driver program.

**projname.cfg**
- This is the configuration file containing various parameters that are used by the CADEWS compiler from CAD sheets generated by CADEWS.

**projname.nbs**
- This is the EWS save of the C program and data files that owns the code and data to be loaded into the module through the EWS Workstation.

**projname.mhd**
- This is the module header file that is produced before CADEWS's run.

**projname.dta**
- This is the standard format data file that contains information on each point in the data point set.
Redundancy

- Interfaces from NETWORK 90/INF 90 MFCs or MFPS to foreign devices can be configured in redundant arrangements. There are several types of redundancy available in the interfaces.
- Redundant MFCs/MFPs and / or redundant LOOP INTERFACE and BUS INTERFACE MODULES
- Redundant ports using both ports on the MFC/MFP for communications
- Both redundant modules and redundant ports

The customer must choose what type of redundancy is appropriate for the system which is being installed. See the figures below (Figure 9) for examples of the three types of redundancy.

Optional Use for Diagnostic Messages

FIGURE 9 Redundant Interface Hardware Configurations
Error Checking

There are sever a events of error checking provided in the NETWORK 90/ NF 90 interface:

- Program timeouts for port problems or other device not communicating errors

- Diagnostic messages printed to an unused port

- Diagnostic codes printed to bootware for console display

- Checksums in the message based on device defined protocol (for example, CRC, LRC, or straight summat on checksums)

- Forcing bad quality on a or part of the data transferred from the foreign device (The customer must be aware that this may cause many arms on the console and therefore may prefer to keep the last good value of the data point and monitor one block for the status of the nk)

- Prior to receiving a byte the firmware of the module checks for parity and framing bits for each byte

The user may monitor the status of the nk by viewing the designated VFC/MFP nk error block. The user may read the program diagnostic messages by attaching a dumb termna to an unused port and setting matching baud rates on the MFC/MFP switches and termna switches.
Information Checklist

The following is a checklist of information required for a NETWORK 90/ NF 90 to foreign device interface:

A. The manufacturer of the foreign device
B. The model number of the foreign device
C. The protocol to be used or a contact from the foreign device manufacturer from whom to obtain the protocol
D. The electrical connection to the device
   - RS232
   - RS422
   - Other wiring
E. The type of handshaking
   - CTS/RTS
   - XON/XOFF
   - None
F. The method of display error (e.g., each foreign device)
G. The distance between the MFC termination and the foreign device
H. The arrangement of the device
   - Single drop
   - Multidrop
The communication equipment used
   - Modems
   - Radios or microwave
   - Phone lines
   - Other transmissns on media
J. The address of each foreign device
K. The framing of data
   - Number of start bits
   - Number of data bits
   - Number of stop bits
   - Type of parity
L. The baud rate
M. The pinout of the foreign device port
N. The use of redundancy
O. The data storage character set
   - MSB, LSB
   - High, Low byte
   - Modified decimal points
   - Other notation
P. The data point set (See the next section for more details about this)
Q. The digital data information to be included on the NETWORK 90/ NF 90 display
   - the og c state descriptors
   - the arm conditions
R. The analog data information
   - the method of encoding the value
   - BCD
   - Binary
   - Ntary
   - ASCII representation of the digits
   - Other
   - The engineering unit and a conversion from scale unit to engineering unit, if necessary
   - The alarm minute
   - Engineering unit range
S. The control and operating philosophy for operator commands (See Section 2.3 for more explanation)

Some of these parameters can be set by switches. Most of the parameters are covered in the manual for the foreign device. The point set information may be obtained by the engineer assigned to the job but an approximate number of points must be known to choose the equipment for the job.
Point List

Each project must define the point set of data and commands to be transferred over the interface DSK. There are several options for submitting a database database sheets such as the one on the following page. A DOS file in the format of the database sheet a dBASE III+ system in the database database is required for each device interface. The suit should consist of a point to be included in the interface. The database sheets are included on SPARE points.

The database accompanies this manual that contains the file DATA DBF which is a dBASE III+ system in the database structure for entering the database format. To enter data into the file DATA DBF use the APPEND function on dBASE.

The database contains the file

DSHEET DOC

which is a DOS file of the datasheet on the following page.

To type the database into DSHEET DOC use an editor such as PE2 or WORDSTAR in NONDOCUMENT MODE.

The entries for the database are as follows:

dBase III+ DATABASE STRUCTURE

To create the standard file the following information is entered into the dBase + structure DATA DBF in order to accurately specify the configuration of an interface program. Certain rules and restrictions are placed on the structure and content of the database. The structure of the database file must include the following file:

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Type</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAGNAME</td>
<td>interface point tag name</td>
<td>char</td>
<td>14</td>
</tr>
<tr>
<td>DESCRIPTOR</td>
<td>/o text descriptor</td>
<td>char</td>
<td>30</td>
</tr>
<tr>
<td>UNITS</td>
<td>eng neutron units</td>
<td>char</td>
<td>8</td>
</tr>
<tr>
<td>ENDX</td>
<td>eng neutron units index</td>
<td>numer c</td>
<td>3</td>
</tr>
<tr>
<td>STORAGE</td>
<td>type of data point</td>
<td>char</td>
<td>8</td>
</tr>
<tr>
<td>DIRECT</td>
<td>data file directory</td>
<td>char</td>
<td>8</td>
</tr>
<tr>
<td>DEVADR</td>
<td>foregn device address</td>
<td>char</td>
<td>5</td>
</tr>
<tr>
<td>LOC</td>
<td>ocat on foreign device</td>
<td>char</td>
<td>10</td>
</tr>
<tr>
<td>SUBLOC</td>
<td>sub ocat</td>
<td>char</td>
<td>10</td>
</tr>
<tr>
<td>LOCBLK</td>
<td>ocat block number</td>
<td>numer c</td>
<td>4</td>
</tr>
<tr>
<td>RNG</td>
<td>x report range number</td>
<td>numer c</td>
<td>3</td>
</tr>
<tr>
<td>PCJ</td>
<td>x report pc number</td>
<td>numer c</td>
<td>3</td>
</tr>
<tr>
<td>MADR</td>
<td>x report module number</td>
<td>numer c</td>
<td>2</td>
</tr>
<tr>
<td>BNMODE</td>
<td>span of data range</td>
<td>numer c</td>
<td>11</td>
</tr>
<tr>
<td>SDCFG</td>
<td>span of data range</td>
<td>numer c</td>
<td>11</td>
</tr>
<tr>
<td>SFCANTCHANGE</td>
<td>span of data range</td>
<td>numer c</td>
<td>11</td>
</tr>
<tr>
<td>HALARM</td>
<td>ana og a arm hgh fmt</td>
<td>numer c</td>
<td>11</td>
</tr>
<tr>
<td>LALARM</td>
<td>ana og a arm ow fmt</td>
<td>numer c</td>
<td>11</td>
</tr>
<tr>
<td>ALMSTND</td>
<td>da tag arm status</td>
<td>numer c</td>
<td>1</td>
</tr>
<tr>
<td>BNMODE</td>
<td>pusemartna mode</td>
<td>char</td>
<td>1</td>
</tr>
<tr>
<td>REVLEVEL</td>
<td>pot rev s on eve</td>
<td>char</td>
<td>4</td>
</tr>
<tr>
<td>TEMPATE</td>
<td>CADEWS ogc tempate #</td>
<td>numer c</td>
<td>2</td>
</tr>
<tr>
<td>SPECAL1</td>
<td>first spec use f ed</td>
<td>char</td>
<td>1</td>
</tr>
<tr>
<td>SPECAL2</td>
<td>second spec use f ed</td>
<td>numer c</td>
<td>3</td>
</tr>
<tr>
<td>DLMEM</td>
<td>message temp interval</td>
<td>numer c</td>
<td>6</td>
</tr>
</tbody>
</table>

See the following pages for a detailed expansion of each field.
TAGNAME - An alpha numeric name used to reference the data point

DESCRIPTOR - A brief description of the data point's use generally in terms of the context process. This file is used to format text descriptions on CADEWS drawings.

UNITS - The engineering units of the value carried by the data point. For example, gas is bs fpm kW etc.

EUIINDEX - The Entity Consol. Engineering Unit descriptor index number (see MCS/O S instruct on manual). The value is used n spec 2 of AO/L funct on codes. Va d entries range from 0 through 255.

DL STORAGE - The storage type of the data point in terms of the foreign device. Enter A for analog storage type. Enter D for digital storage type.

DL DIRECT - The direct on that the point flows over the data net. Enter >DCS for data moving from the foreign device to the external system. Enter DCS > for data moving from the external system to the foreign device.

DL DEV ADR - The node number of a message destination on the foreign device's network. Va d entries range from 0 through 65535.

DL LOC - The location of the data point in the foreign device for example: 40001 D007 etc.

DL SUB LOC - A subcategory of the above location. This file describes further decomposition of the data point's location in the foreign device. Such as an address value (numeric) followed by a bit position value (numeric). The bit position must be separated from the address by a colon (:) from a bit position descriptor (e.g. 40001 0001). Va d entries for the address range from 0 through 65535. Va d entries for the bit position range from 0 through 255.

The following files refer to the External locations of the points. For points input from the foreign device or for points output to the device from other external configured. Ca ey can f in the locations.

DL LOC BLK - The oca block number direct referenced by the interface program For example, if the data flow direct on s >DCS the oca block would determine where the point's output is the data flow direct on s >DCS > the oca block would determine from where the point's input Va d entries n the DCS > direct on range from 0 through 9998. Va d entries n the >DCS direct on range from 30 through 9998.

RING - The ring (or oop) number where the data point's except on reported. For example, if the data flow direct on s DCS > and the point's except on reported from another module use the ring number of the other module if the data flows to the opposite direction on reference the ring number from which the point's except on reported onto the oop f not except on reported. eave this fed b ank Va d PCU ad dres ses range from 0 through 250.

PCU - The process control unit (puc) number where the data point's except on reported. For example, if the data flow direct on s DCS > and the point's except on reported from another module use the puc number of the other module if the data flows to the opposite direction on reference the puc number from which the point's except on reported onto the oop f not except on reported. eave this fed b ank Va d PCU ad dres ses range from 0 through 250.

MADR - The module address (madr) number where the data point's except on reported. For example, if the data flow direct on s DCS > and the point's except on reported from another module use that module's address number if the data flows to the opposite direction on reference the module number from which the point's except on reported onto the oop f not except on reported. eave this fed b ank Va d module addresses range from 0 through 31.

BLKN - The block number (blkn) where the data point's except on reported. For example, if the data flow direct on s DCS > and the point's except on reported from another module use that module's except on report b lock.
number. The data flows to the opposite direction of the reference block number. When specified, the data is converted to the common engineering units (EU). The following equation is used:

EU = Raw value * scale factor + offset value

Note. Enter a value of one (1) if no scaling is required. This value is used in F(X) function on codes.

DL OFFSET

An offset value (intercept) which is applied to raw data values to convert them to common engineering units. See the above equation.

Note. Enter a value of zero (0) if no offset is required. This value is used in F(X) function on codes.

VAL0

The value (zero) of the data range for an analog value. Required for analog except on reported points n. DCS data is used. This value is used in spec 3 of AO/L function on codes.

SPAN

The span (range) of the data range for an analog value. Referenced from VAL0 above. Required for analog except on reported points n. DCS data is used. This value is used in spec 4 of AO/L function on codes.

SIGCHG

The amount of change (n % of span) in the value of an analog data point that is required to indicate a immediate exception on reporting of the value. Required for analog except on reported points n. DCS data is used. This value is used in spec 7 of the AO/L function on codes.

HALARM

An analog data point which is a arm. m t spec fed n engineering units. Required for analog except on reported points n. DCS data is used. This value is used in spec 5 of AO/L function on codes.

LALARM

An analog data point which is m t spec fed n engineering units. Required for analog except on reported points n. DCS data is used. This value is used in spec 6 of AO/L function on codes.

ALMOST IND

A binary data point is a arm status as specified by the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>a arm on zero</td>
</tr>
<tr>
<td>1</td>
<td>a arm on one</td>
</tr>
<tr>
<td>2</td>
<td>a arm</td>
</tr>
</tbody>
</table>

Required for device except on reported points n. DCS data is used. This value is used in spec 2 of DO/L function on codes.

BIN MODE

A binary data point is output status. This value is specified as either P or S for used outputs to the PLC or M for manta re. Output. The pulse duration varies from interface to interface.

REV LEVEL

The revision of each point in the database. For example, a value of 1.01 indicates a change in the database. New points are added to the database. Changes are made to existing points. The revision number is incremented by 2 or 3 and so on.

TEMPLATE

Fed n by Ba ey

SPECIAL 1

A special purpose feed which may be used differently by each protocol. This special feed supports the upper case alphabet character on y.

SPECIAL 2

Another special purpose feed which may be used differently by each protocol. This special feed supports numeric entries only. Values range from 0 through 255.

DL TIME

The time interval between transmissions of the same message. This numeric value represents the number of 1/100s of a second between transmissions. Values range from 0 through 65535. This feed may be fed n by Ba ey.

Note. The DL LOC BLK RING PCU, MADR, BLKN may be assigned by Ba ey.
Interface Documentation

The following is an example of a standard output found in the specific protocol driver manual.

1.0 Introduction
   1.1 System Overview
   1.2 System Diagram

2.0 Hardware
   2.1 Hardware Description
   2.2 Connection Requirements
   2.3 Terminal Layout
   2.4 D phosphor Cuttings
   2.5 D switch Settings
   2.6 Communication Parameters
   2.8 Hardware Check-St

3.0 Software
   3.1 C Program Description
   3.2 Blockware Description
   3.3 File List
   3.4 Operating
      3.4.1 Startup Procedure
   3.4.2 Monitoring Execution
   3.4.3 Error Codes
   3.5 Software Check-St

4.0 Database Point Listing
   4.1 Analog Points
   4.2 Data Points

5.0 C Program Listing

6.0 Blockware Listing

7.0 Protocol

8.0 Multi-Function Controller Module Product Instruction

9.0 C Language Implementation Guide

10.0 Program Configuration Instructions

Purchasing Interfaces

See your Bay Sa'es Representative
Appendix — Interface Applications

ABB PROCONTROL
ACCUVAY D U
ALARM PR NTER
ALLEN BRADLEY PLC2
ALLEN BRADLEY PLC3
ALLEN BRADLEY PLC5
ALLEN BRADLEY/STROMBERG DR VE SYSTEM
ANNUCATOR INTERFACE
APPL ED AUTOMAT ON GAS CHROMATOGRAPHY
AVTRON
BAMBECK
BEND X GAS CHROMATOGRAPH
BENTLY NEVADA 3300 TEMP/V BRAT ON MON TOR
CE CHROMATOGRAPH
COMPRESSOR CONTROLS A R AND GAS COMPRESSOR
CON TEL SYNC INTERFACE
CORE LABS OCTANE ANALYZER
DAN EL UM4000 METER NG SYSTEM
D AMOND POWER SOOTBLOWER
E CM TR SEN SYSTEM
ENV RONMENTAL ELEMENTS ELECTROSTATIC C
PRECP TATOR
FR CK COMPRESSOR
GE MARK TURB NE
GE MARK + STEAM TURB NE
GE MARK V GAS TURB NE
GE SER ES 1 2 5 6 W TH RTU OR CCM
GU DED WAVE ANALYZER
HANDAR R VER MON TOR NG SYSTEM
HONEYWELL 3000 DHP (SLAVE)
HONEYWELL 9000 PLC
HONEYWELL UDC
HYDR LL RTU DATA L NK
H TURB NE
N IDUSRAL CONTROL SERV CES SAFETY SYSTEM
MVME BASED CONTROLLER
NGERSOL RAND COMPRESSOR SYSTEM
(WEST NGHOUSE NCOM NETWORK)
NTRAC 2000 COMPUTER
JOY PREC P TATOR
KAYE D G 4 DATALOGGER
K TRON K105 FEEDER CONTROLLER
LEAR S EGLER EM SS ONS SYSTEM
L & J TANK GAUG NG SYSTEM
L & N RECORDER 25000 24000
L PPKE SCANNER
MEASUREX DFP
M CROL TE L GHT NG AND CONTROL NETWORK
M TZUB SH DR VE SYSTEM
M RAN ANALYZER
MOD CON 484 584 984
MOD CON 485 585 985 W TH BR DGE MODULE
MOTOROLA REMOTE PAG NG SYSTEM
OPT CHP OVER
OPT CON
PANALARM
PERK N ELMER DATA NK
PR ME MOVER PROPULS ON TELEGRAPH
PMS FAC L TY MON TOR NG SYSTEM FMS300
REL ANCE MODBUS
REL ANCE AUTOMATE 30 40
REL ANCE DR VE SYSTEM
ROCHESTER SOE
ROSEMOYNT TEMPERATURE RECORDER 400
SAAB TANK GAUG NG SYSTEM
SENTROL PAPER SCANNER
SERCK REMOTE MON TOR NG SYSTEM
S EMENS AS 220 EHF TELEPERM ME
S EMENS S MAT C CONTROL SYSTEM
SOLAR TURB NE
SOUTHERN SOOTBLOWER
SQUARE D PLC W TH MODBUS
STEWART & STEVENSON GAS TURB NE
STREETER R CHARDSON SCALE
SYNERGET CS REMOTE MON TOR NG SYSTEM
TAMSEC
TAYLOR MOD 30/720N MODEL A COMMUN CAT ON L NK
TEXAS NSTRU MENTS PLC W TH MODN M
TEXAS NSTRU MENTS T WAY (UN L NK HOST)
TR CONEX
TR GEN
WEST NGHOUSE DDACS (WDPF)
WEST NGHOUSE NCOM Q1000 QDATA+
WEST NGHOUSE NCOM MP3
WEST NGHOUSE NUMA LOG C 700 1200 PLC
WEST NGHOUSE WDPF
WESTRON CS RECODER
WOODWARD GOVERNOR 501 505E
YOKAGOWA RECORDERS MODEL 4081 1 3