Advant 800xA | Advant OCS | Bailey Infi 90
Bailey Net 90 | Contronic | Master | Procontic
Procontrol | Taylor MOD 30 and Mod 300

Distributed Control Systems
for Industrial Automation

ABB

Product PDF
Presented by – DCScenter.com

00 10 46 04 11 07

Bailey® control systems®

Application Guide

AG-0000-100-01

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

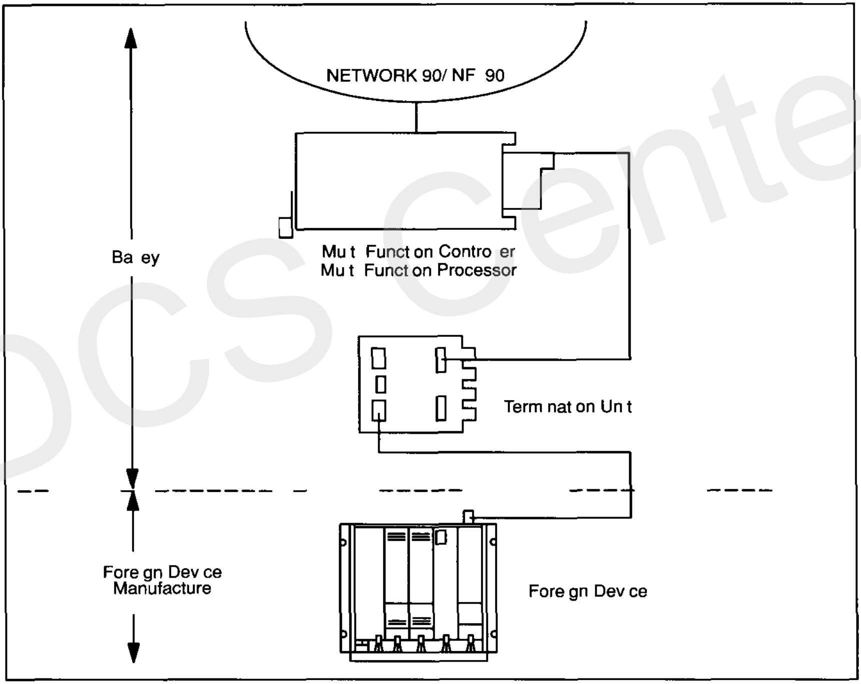

FIGURE 1 NETWORK 90/INFI 90 Interface to Programmable Controller

Interfaces between NETWORK 90/INFI 90 and programmable controllers or other devices are available as standard packages. These interfaces are accomplished in several ways based on the total number of logic 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.

Bailey Seamless, Real-Time Process Management Solutions

00 10 46 04 11 07

Table Of Contents

Background Information

The multifunction controllers (MFC02/03) and the multifunction processors (MFP01/02/03) are similar to other NETWORK 90 and INFI 90 modules in that they are designed to be function block engines with module to module and loop to loop communications. These modules also provide the ability to run linear programs in BASIC and C languages. The programs operate similar to programs in personal computers. 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 Bailey NETWORK 90 or INFI90 loop.

The BASIC 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 communications in a programmable environment can be used as masters or slaves in the interfaces. This allows communications to the programmable controllers directly or to other devices that are made to communicate to programmable controllers.

Communications to the ports on the Bailey modules are under asynchronous program control with assignable port buffer sizes in the MFC03 and MFP01/02/03 or fixed buffers in 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 diagnostic 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, IEEE488, etc., standard adaptors can be placed between the MFC's or MFP's RS232 port and the programmable controller's device. If synchronous communications of bit oriented messages are required, a specially designed adaptor is used.

The interfaces established between the Bailey modules and programmable controllers or other similar devices have the ability to transfer digital and analog data, as well as operator commands in either direction. While programmable controllers typically maintain logic states and/or analog values only, NETWORK 90 and INFI 90 have the ability to process logic states and analog values with quality, alarm conditions and current or last state or value. Thus, importing data to the Bailey system gives the operations personnel the ability to realize more information about their system.

This document discusses the methods of selecting a module for a particular NETWORK 90/INFI 90 to foreign device interface. It also gives a method for estimating the execution time of the interfaceand a structure for collecting the information and data required to implement the interface. Several examples and lists 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 / Inf 90 interface. The considerations are:

- the amount of data required to be transferred (i.e. point count) and whether data is contiguous or broken.
- the timing required to update data points.
- the type of data: analog, digital, or operator commands and the logic used to implement the commands.
- the communications characteristics.
- the arrangements of the data in the foreign device.

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

TABLE 1

Module Type	Maximum Point Count
Multifunction Controller MFC02	400 BASIC ONLY
Multifunction Controller MFC03	950
Multifunction Processor MFP01	300
Multifunction Processor MFP02	1200
Multifunction Processor MFP03	>1200

(Multifunction Controller MFC02 has only BASIC language on board, whereas the other modules mentioned above have C language. While interfaces have been done in the past in BASIC, Bailey is recommending the C language interfaces for all current and future interfaces. This is because of the extra features employed by C language and the fact that the Bailey library of interfaces is maintained in C language.)

Generally, a single PCU with one or more interface modules can transport:

- 1000 points on Plant Loop
- 2000 points on Superloop

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

This is an upperbound estimate considering a mixture of digital, analog and command points. The actual sizing limit for an MFC or MFP is the amount of battery backed RAM for program and function block storage. The point capacities above are based on simple function block logic moving data to and from the plant loop. With more logic required point counts diminish. Also if fewer point counts are used in the interface the rest of the module memory can be used for function block logic. However, the module cycle time must be examined before placing critical controls in an interface module.

For devices that require point counts above these limits, several MFCs or MFPs can be used and located in one or more PCUs.

TIMING INFORMATION

The execution time of a NETWORK 90/INFI 90 foreign device 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 reply sequences
- the number of requests needed to poll all of 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 passing or commands
- the response time of the radio, microwave or modems used for transmission equipment
- the foreign device processing time
- the baud rate of communications
- whether Infinet (Superloop) or Plant Loop is used
- whether operator acknowledgment of commands is required

00 10 50 04 11 07

The timing when the MFC or MFP is a master consists of

- Console Scan Time
  - 1 sec for Plant Loop
  - 5 sec for Superloop or Infinet

- MFC cycle time
  - MFC02 .01 sec X number of read and write points
  - MFC03 .003 sec X number of read and write points
  - MFP01 .003 sec X number of read and write points
  - MFP02 .0015 sec X number of read and write points
  - MFP03 .0015 sec X number of read and write points

- Transmission time(Number of bytes/message X Number of bits/byte [including start bit, stop bit, parity bit] X Number of messages/device X Number of devices) / Baud rate

- Foreign Device Processing

- Return Transmission Time
  - MFC Cycle (read points)
  - Console and loop delay

This timing is a rule of thumb method to calculate an average delay. The asynchronous nature of MFC cycle time versus console processing versus foreign device processing creates a variability in executing any given command.

Generally, timing is counted from a Bailey console device, the Management Command System (MCS), the Operator Interface Unit (O.I.U.), the Operator Interface System (O.I.S.) or the Process Control View (PCV) to the foreign device and back. If function code logic, rather than operator commands, is the critical path then console processing and loop delay can be ignored.

In order to minimize response time, data which is to be exchanged through the interface may be blocked together on the programmable controller side so that all meaningful bits are assigned to consecutive registers within the device. This reduces the number of commands required to acquire the information since the overhead to obtain one bit is the same as obtaining an entire register.

Also, most devices support commands which can obtain multiple registers in one response. Blocked data therefore reduces the number of command/response operations, which minimizes the number of time lags incurred and maximizes the interface throughput. Generally data should be arranged in four areas that can be read or written with one command. The four contiguous memory areas are:

- digitals to be read from the foreign device
- analogs to be read from the foreign device
- digitals to be written to the foreign device
- analogs to be written to the foreign device

When operator supervisory control is required (i.e. start/stop of a motor), at least two points are required: a write to the foreign device to send the command and a read from the foreign device to acknowledge the action. Using the timing calculations on the previous page a maximum time for operator acknowledgment can be calculated. Closed loop control or safety interlocks should never be attempted through a data link unless a complete time analysis is performed.

When a single device is data linked to NETWORK 90 with blocked messages and a baud rate of 9600 or greater, the transmission time becomes minimal and a rough timing estimate can be made by considering only module (MFC or MFP) cycle time, console processing time and loop delay.

The following table contains link times recorded on actual site installations. In each of these cases the links contain consecutive register alignments, little or no control logic in the modules, reliable response times from the foreign device and data being read and written with word range commands. Cycle time denotes the time to send/receive data to/from the foreign device. Console Scan Time is not figured in these estimates.

The table demonstrates that there are varying factors for each different type of link. The calculation given above attempts to account for the average circumstances.

Interface Type	Module	Baud	I/O Count	# MSGS	Cycle Time
ALLEN BRADLEY PLC 5/40	MFP02	19200	750 DIG	4	4 Sec
RELIANCE AUTOMATE 40	MFP02	9600	123 DIG 37 ANA	4	5 Sec
MODICON EMULATOR	MFP01	9600	992 DIG	2	9 Sec
L & N RECORDER (4) 24000	MFP01	9600	512 ANA	4	5 Sec
GE MARK IV	MFC03	9600	344 DIG	1	1 Sec Data Dump

OPERATOR COMMANDS

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

Is control to be transferred from the foreign device to Bailey? The operator may have the option of relinquishing 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 and alarm logic utilizes a timer to allow initial execution of a command. This consideration is dependent on the first decision. If control is transferred from one device to the other, the non–controlling device should lock in a tracking mode.

If either device can control, several tracking philosophies can be implemented. When the Bailey operator is in control, the alarm/tracking philosophy can alarm on non-initiated state changes and force the operator to align states, alarm for limited period and automatically align or align on any other combination of logic that can be designed with function blocks.

Will the Bailey system pulse the foreign device or issue a maintained status? This item can be dictated by the nature of the foreign device, by the foreign device ladder logic or by the choice in the first consideration. If either operator can control a device a pulse is generally used. Note that pulsed outputs to a foreign device can be independent of presentation to the operator. An operator can view the last command state while a pulse was issued to the foreign device.

If the customer has a particular method for operating commands, the customer may need to supply a logic drawing to Bailey.

TRANSMISSION MEDIA

The usual method of transmission of communication with the NETWORK 90/INFI 90 is via an RS232 connection. If the foreign device uses another method of communications, Bailey will specify a commercial conversion box or modem for the translation. For long distance communication, it may be necessary to specify modem, phone lines, radio or microwave connections as well. If the customer has already purchased or installed a communication system, then Bailey will need the specifications of the transmission equipment.

The following picture (**Figure 2**) shows a typical hardware configuration using communications equipment.

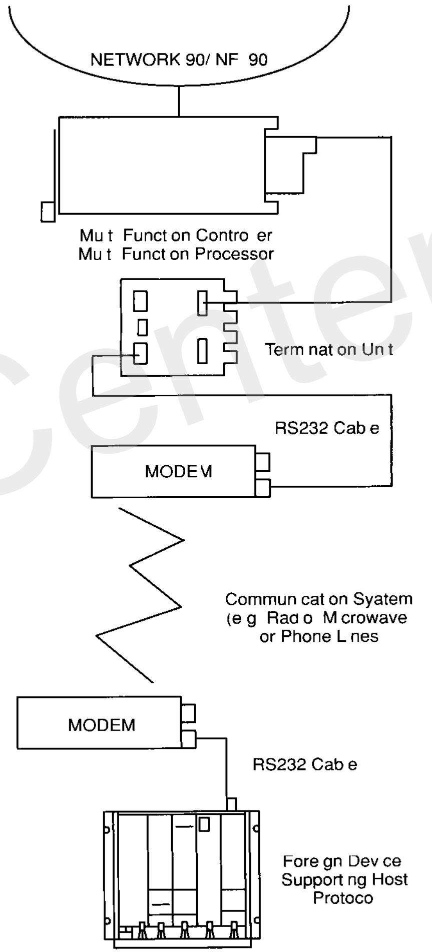

FIGURE 2. Interface with Communications Equipment

00 10 52 04 11 07

Hardware Layout

SINGLE DROP

The fo ow ng p cture (**Figure 3**) shows a modu e conf g urat on of a s ng e drop MFC/MFP to fore gn dev ce nter face The MFC/MFP term nat on un t port s connected to the fore gn dev ce port

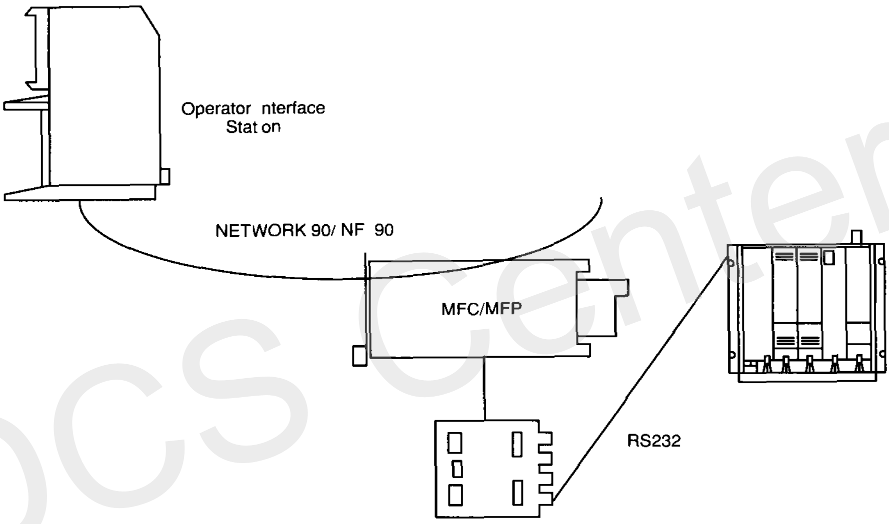

FIGURE 3 Single Drop MFC/MFP to Foreign Device Interface

MULTIDROP

An MFC/MFP interface can be used successfully for data acquisition in a multidrop arrangement. In this case the MFC/MFP will poll each foreign device in series, thus requiring 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/INFI 90 node. The MUX denotes some type of multiplexer such as multipoint modems wired together, current loops, or a radio broadcast system. (This hardware may be provided by the foreign device vendor or a commercial communications equipment vendor.)

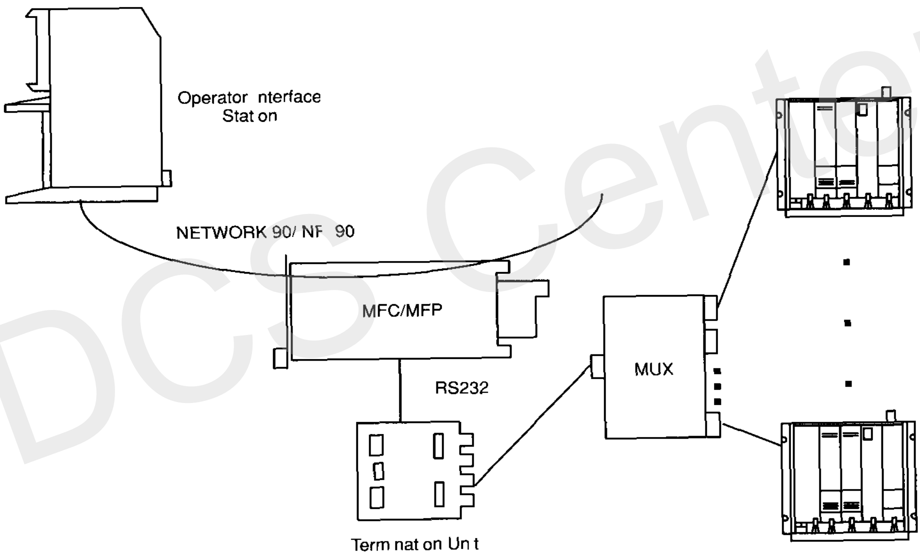

FIGURE 4   Multidrop MFC MFP to Foreign Device Interface

Software Layout

INTRODUCTION

Generic protocol drivers are a collection of C language programs which drive data over a serial data link to various devices which conform to a common communications protocol. All of the interfaces are constructed in a very similar manner. A dBASE data point list is converted to a data file and a set of Bailey blockware. This data file and the blockware are loaded into an MFC or MFP along with the C code for the appropriate protocol such as Allen Bradley or MODBUS. There are three parts to every interface.

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

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

3. The data file (point list) which cross references the Bailey block locations to the foreign device locations, such as register addresses. See the POINT LIST section of this manual for more information of the data to be provided in the datafile.

   There is an OPTIONAL fourth part of an interface.

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

Bailey does not recommend doing time critical control logic in the same module as a data link. The control logic is dependent upon the operation time of the data link. The memory capacity of the module available for the control logic is dependent upon the data link point list size.

Drivers are written for each unique type of protocol. All of these drivers are capable of reading standard format data point files and converting the file information into a series of message packets. All of the drivers are compatible with the standard first CADEWS sheet. They all take advantage of the functions contained in a generic digital interface library. The library consists of common functions and diagnostics routines used by most of the drivers. Examples of library functions are the message SCHEDULER, the BINBOUT routine which does block input and block output, the diagnostic TELL function and many others.

Because of all of these similarities, users of one of the drivers are able to learn to use others in the collection quickly.

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

1. CADEWS/TXTEWS for Bailey logics

2. Lattice C Cross Compiler (for compiling code) and the C Utility Package for loading C Code and data files

3. KWIKEDIT for modifying an interface database

4. MFUTILities for loading code and data files (used if the C Utility package is 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 f rst standard funct on b ock sheet s a bas c temp ate used for a gener c protoco dr vers t conta ns standard MFC/MFP Funct on B ocks Program Report ng/Contro B ocks Port Mode Parameters an Error H stor an and Redundancy nter ocks

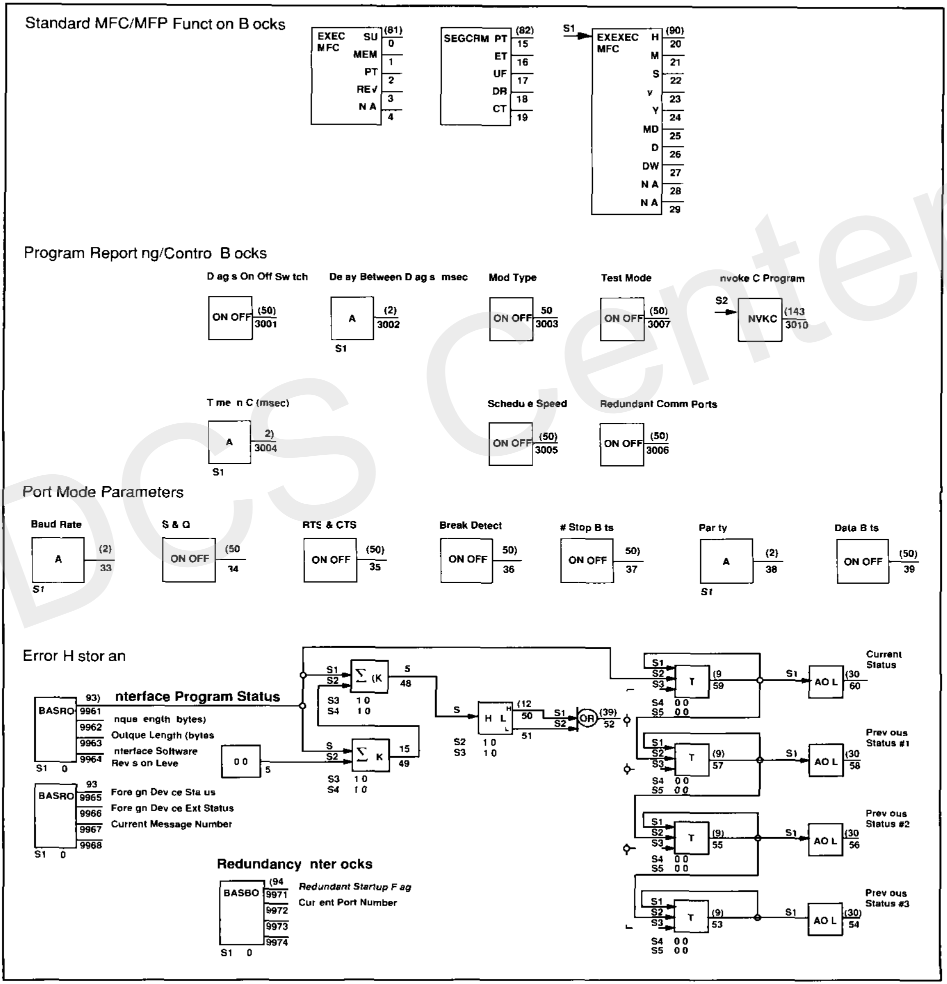

FIGURE 5 Standard First Blockware Sheet for Interfaces

EXAMPLES

The next p cture (**Figure 6**) shows a C or BAS C program and b ockware nterface conf gurat on w th the MFC/MFP act ng as the MASTER

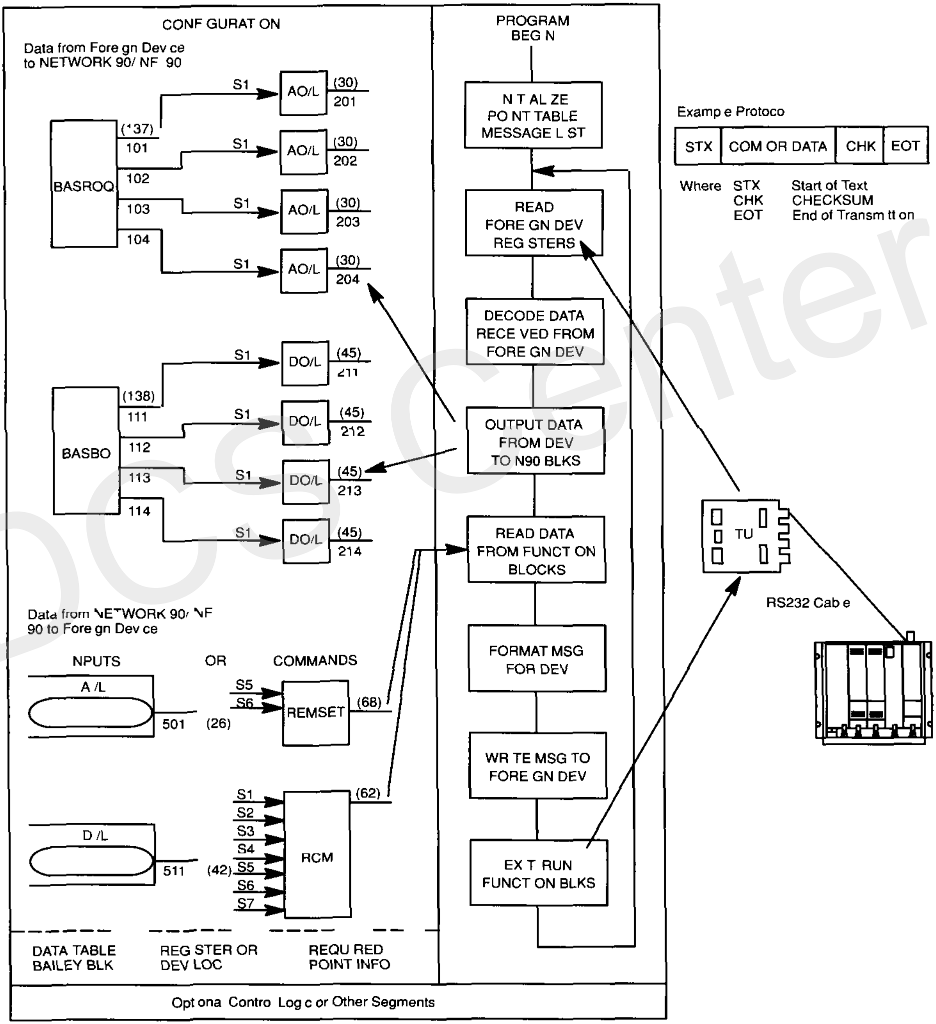

FIGURE 6 Program and Logic for MFC/MFP as the Master in a Single Drop Arrangement

00 10 56 04 11 07

The fo ow ng p cture (**Figure 7**) shows a program and b ockware conf gurat on for the MFC act ng as a SLAVE

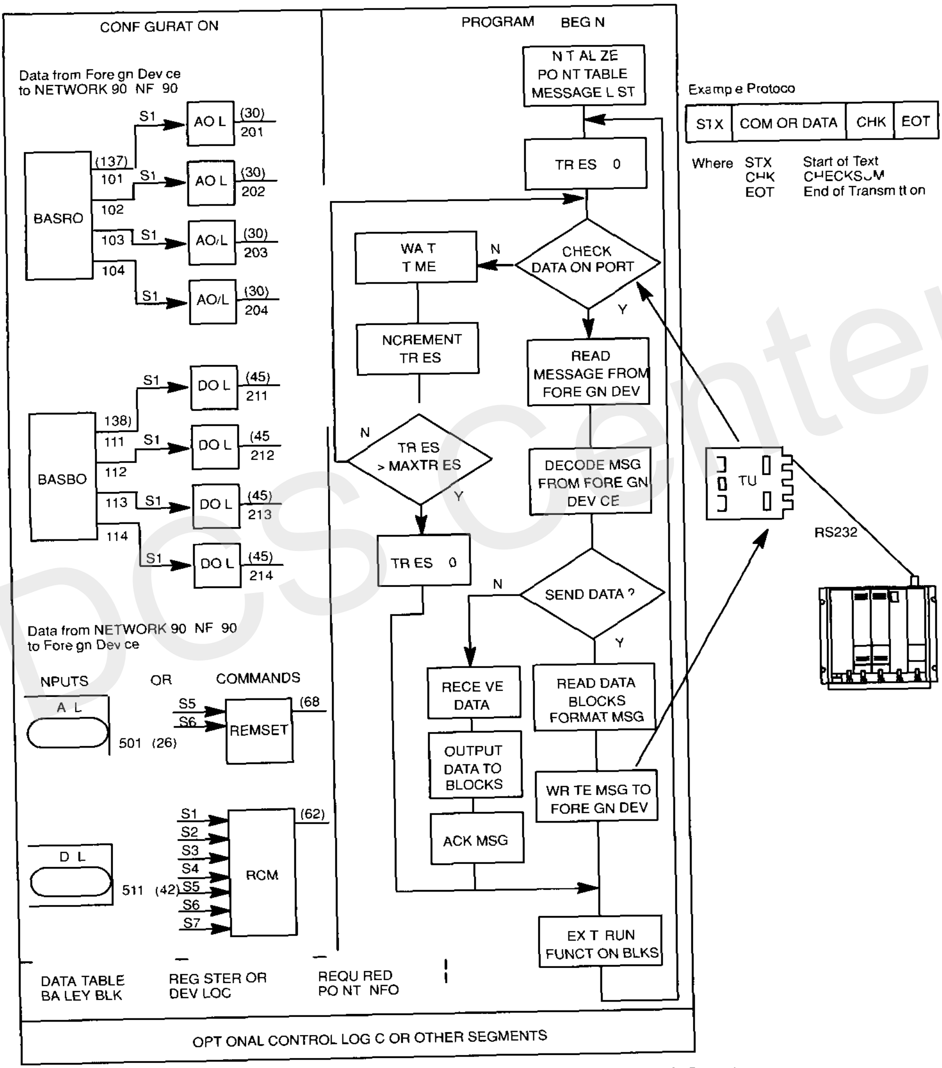

FIGURE 7 Program and Logic for MFC MFP as the Slave in a Single Drop Arrangement

00 10 57 04 11 07

The next picture (**Figure 8**) shows a program and blockware configuration for a multidrop 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 blockware has been duplicated and orderly numbered for the multiple stations.

The program and configuration operate similar to that of the single drop arrangement. Each message sent to the remote network contains an address following the start character. The polling of the multiple foreign devices is done serially. Each message from the MFC/MFP is broadcast to all of the remote devices. The remote device with the corresponding address is expected to answer the message.

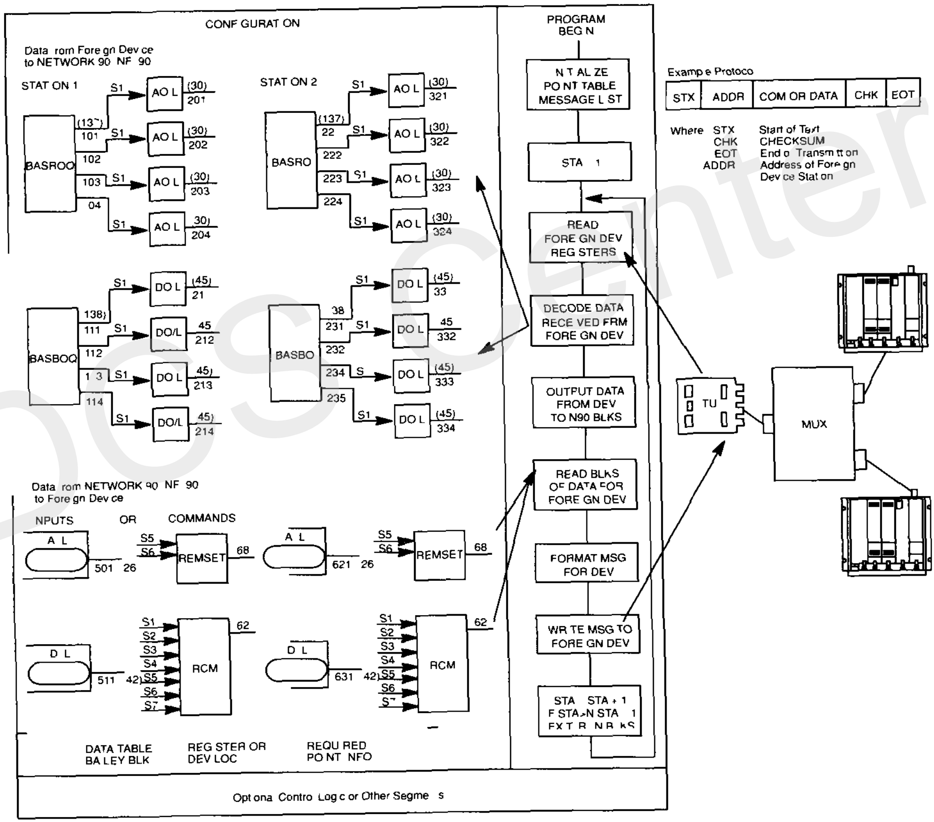

FIGURE 8 Program and Logic for MFC/MFP Multidrop Arrangement

FILES

The fo ow ng st summar zes the data and program f es that are requ red to conf gure an nterface Note that the word dr ver refers to the part cu ar protoco dr ver name (e g modbus ab etc) The word projname refers to the f ename that was n t a y ass gned to the project database f e

driver.lms – Th s s the comp ed and nked dr ver program f e that s oaded nto the MFC/MFP

driver.csp – Th s s the C spec f cat on f e for the above dr ver program

driver.map Th s s the C map f e for the above dr ver program

projname cfg Th s s the funct on code og c conf gu rat on f e Th s f e s produced by the CADEWS comp er from CAD sheets generated by CADEWS

projname.nbs – Th s s the EWS save of the C program and data f es t a ows the code and data to be oaded to the modu e through the EWS Workstat on

projname.mhd Th s s the modu e header f e Th s f e s produced before CADEWS s run

projname dta Th s s the standard format data nk po nt st f e Th s f e conta ns nforma t on on each po nt n the data po nt st

Redundancy

nterfaces from NETWORK 90/INF 90 MFCs or MFPs to fore gn dev ces can be conf gured n redundant arrangements There are severa eve s of redundancy ava ab e n the nterfaces

- Redundant MFCs/MFPs and / or redundant LOOP NTERFACE and BUS NTERFACE MODULES
- Redundant ports us ng both ports on the MFC/MFP Term nat on Un t for commun cat ons
- Both redundant modu es and redundant ports

The customer must choose what eve of redundancy s appropr ate for the system wh ch s be ng nsta ed See the f gures be ow (**Figure 9**) for examp es of the three eve s of redundancy

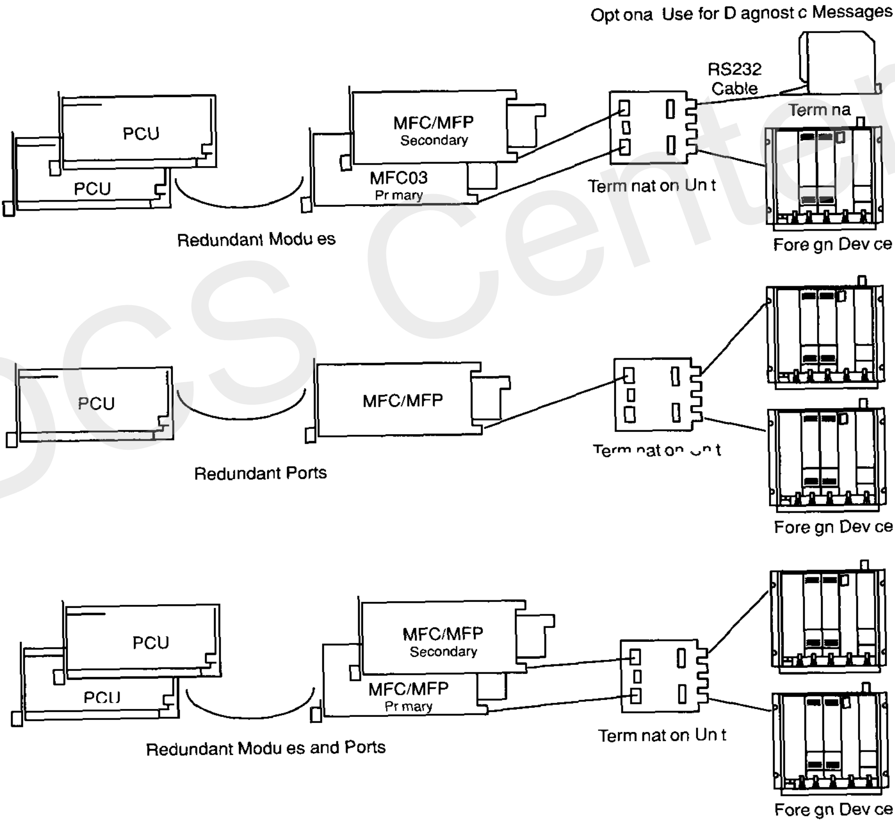

FIGURE 9 Redundant Interface Hardware Configurations

Error Checking

There are several levels of error checking provided in the NETWORK 90/INFI 90 interface.

- Program timeouts for port problems or other device not communicating errors.
- Diagnostic messages printed to an unused port.
- Diagnostic codes printed to blockware for console display.
- Checksums in the message based on device defined protocol (for example CRC, LRC or straight summation checksums).
- Forcing bad quality on all or part of the data transferred from the foreign device (The customer must be aware that this may cause many alarms 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 link.)
- 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 link by viewing the designated MFC/MFP link error block. The user may read the program diagnostic messages by attaching a dumb terminal to an unused port and setting matching baud rates on the MFC/MFP switches and terminal switches.

Information Checklist

The following is a checklist of the information required for a NETWORK 90/INFI 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 displaying link alarms/error (i.e. alarm all points, alarm each foreign device)

G The distance between the MFC termination and the foreign device

H The arrangement of the devices

- single drop
- multidrop

I The communications equipment used

- modems
- radios or microwave
- phone lines
- other transmission 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 level of redundancy

O The data storage characteristics

- MSB, LSB
- HI byte, LO byte
- implied decimal points
- other notation

P The data point list (See the next section for more details about this.)

Q The digital data information to be included on the NETWORK 90/INFI 90 displays

- the logic state descriptors
- the alarm conditions

R The analog data information

- the method of encoding the value
- BCD
- binary
- integer
- ASCII representation of the digits
- other
- the engineering units and a conversion from scale units to engineering units if necessary
- the alarm limits
- engineering unit range

S The control logic 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 defined in the manuals for the foreign device. The point list 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 def ne the po nt st of data and commands to be transferred over the nterface nk There are severa opt ons for subm tt ng a database database sheets such as the one on the fo ow ng page a DOS f e n the format of the database sheet a dBASE I + system w de database w th appropr ate nterface e ements

The fo ow ng notes descr be the entr es needed on the database sheets the DOS f e or the dBASE I+ system w de database Note that a separate po nt st f e or database s requ red for each dev ce nterface The st shou d cons st of a po nts to be nc uded n the nterface t shou d a so nc ude notat on of SPARE po nts

The d skette accompany ng th s manua conta ns the f e DATA DBF wh ch s a dBASE I + system w de database structure for enter ng the database nformat on To enter data nto the f e DATA DBF use the APPEND funct on of dBASE

The d skette a so conta ns a f e

DSHEET DOC

wh ch s a DOS f e of the datasheet on the fo ow ng page To type the database nto DSHEET DOC use an ed tor such as PE2 or WORDSTAR n NONDOCUMENT MODE

The entr es for the database are as fo ows

dBase III+ DATABASE STRUCTURE

To create the standard f e the fo ow ng nformat on s entered nto the dBase + structure DATAB DBF n order to accurate y spec fy the conf gurat on of an nterface program certa n ru es and restr ct ons are p aced on the structure and content of the database The structure of the database f e must nc ude the fo ow ng f e ds

TABLE 2 Critical Database Fields

Field Name	Description	Type	Size
TAGNAME	nterface po nt tag name	char	14
DESCR PTOR	/o text descr ptor	char	30
UN TS	eng neer ng un ts	char	8
EU NDEX	eng neer ng un ts ndex	numer c	3
DL STORAGE	type of data po nt	char	8
DL D RECT	data f ow d rect on	char	8
DL DEV ADR	fore gn dev ce node addr	char	5
DL LOC	ocat on n fore gn dev ce	char	10
DL SUB LOC	sub ocat on	char	10
DL LOC BLK	oca b ock number	numer c	4
R NG	x report r ng number	numer c	3
PCU	x report pcu number	numer c	3
MADR	x report modu e number	numer c	2
BLKN	x report b ock number	numer c	4
DL SCALE	sca e factor	numer c	9
DL OFFSET	offset va ue	numer c	9
VAL0	ow po nt of data range	numer c	11
SPAN	span of data range	numer c	11
S GCHG	s gn f cant change (%span)	numer c	11
HALARM	ana og a arm h gh m t	numer c	11
LALARM	ana og a arm ow m t	numer c	11
ALMST ND	d g ta a arm status	numer c	1
B N MODE	pu se/ma nta n mode	char	1
REV LEVEL	po nt rev s on eve	char	4
TEMPLATE	CADEWS og c temp ate #	numer c	2
SPEC AL 1	f rst spec a use f e d	char	1
SPEC AL 2	second spec a use f e d	numer c	3
DL T ME	message t me nterva	numer c	6

See the fo ow ng pages for a deta ed exp anat on of each f e d

TAGNAME – An a pha numer c name used to reference the data po nt

DESCRIPTOR – A br ef descr pt on of the data po nt s use genera y n terms of the c ents process Th s f e d s used to f n /o text descr pt ons on CADEWS draw ngs

UNITS – The eng neer ng un ts of the va ue carried by the data po nt For examp e ga s bs fpm kW etc

EUINDEX The Ba ey conso e eng neer ng un t descr ptor s ndex number (see MCS/ O S nstruct on manua s) Th s va ue s used n spec 2 of AO/L funct on codes Va d entr es range from 0 through 255

DL STORAGE – The storage type of the data po nt n terms of the fore gn dev ce Enter A for ana og storage type Enter D for d g ta storage type

DL DIRECT – The d rect on that the po nt f ows over the data nk Enter >DCS for data mov ng from the fore gn dev ce to the Ba ey system Enter DCS > for data mov ng from the Ba ey system to the fore gn dev ce

DL DEV ADR The node number of a message dest nat on on the fore gn dev ce s network Va d entr es range from 0 through 65535

DL LOC – The ocat on of the data po nt n the fore gn dev ce For examp e 40001 D007 etc

DL SUB LOC – A sub category of the above ocat on Th s f e d a ows further decompos t on of the data po nt s ocat on n the fore gn dev ce such as an address va ue (numer c) fo owed by a b t pos t on va ue (numer c) n th s f e d The b t pos t on must be separated from the address by a co on ( ) f on y a b t pos t on s des red the f e d must beg n w th the co on character Va d entr es for the address range from 0 through 65535 Va d entr es for the b t pos t on range from 0 through 255

The fo ow ng f ve f e ds refer to the Ba ey ocat ons of the po nts For po nts nput from the fore gn dev ce or for po nts output to the dev ce from other Ba ey conf gured og c. Ba ey can f n the ocat ons

DL LOC BLK – The oca b ock number d rect y referenced by the nterface program For examp e, f the data f ow d rect on s >DCS the oca b ock wou d nd cate where the po nt s output f the data f ow d rect on s DCS > the oca b ock wou d nd cate from where the po nt s nput Va d entr es n the DCS > d rect on range from 0 through 9998 Va d entr es n the >DCS d rect on range from 30 through 9998

RING – The r ng (or oop) number where the data po nt s except on reported For examp e, f the data f ow d rect on s DCS > and the po nt s except on reported from another modu e use the r ng number of the other modu e f the data f ows n the oppos te d rect on reference the r ng number from wh ch t s except on reported onto the oop f not except on reported eave th s f e d b ank Va d r ng addresses range from 0 through 250

PCU The process contro un t (pcu) number where the data po nt s except on reported For examp e f the data f ow d rect on s DCS > and the po nt s except on reported from another mod u e use the pcu number of the other modu e f the data f ows n the oppos te d rect on reference the pcu number from wh ch t s except on reported onto the oop f not except on reported. eave th s f e d b ank Va d PCU ad dresses range from 0 through 250

MADR The modu e address (madr) number where the data po nt s except on reported For examp e f the data f ow d rect on s DCS > and the po nt s except on reported from another modu e use that modu es address number f the data f ows n the oppos te d rect on reference the modu e number from wh ch t s except on reported onto the oop f not except on reported eave th s f e d b ank Va d modu e addresses range from 0 through 31

BLKN The b ock number (b kn) where the data po nt s except on reported For examp e f the data f ow d rect on s DCS > and the po nt s except on reported from another modu e use that modu es except on report b ock number of the data flows in the opposite direction, reference the block number where it is exception reported. If not exception reported, leave this field blank. Valid block numbers range from 30 through 9998.

DL SCALE — A scale factor (slope) which is applied to raw data values to convert them to 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 required. This value is used in F(X) function codes.

DL OFFSET — An offset value (intercept) which is applied to raw data values to convert 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 codes.

VAL0 — The low end (zero) of the valid range for an analog value. Required for analog exception reported points in >DCS direction. This value is used in spec 3 of AO/L function codes.

SPAN — The span (range) of the valid range for an analog value referenced from VAL0 above. Required for analog exception reported points in >DCS direction. This value is used in spec 4 of AO/L function codes.

SIGCHG — The amount of change (in % of span) in the value of an analog data point that is required to initiate an immediate exception reporting of the value. Required for analog exception reported points in >DCS direction. This value is used in spec 7 of the AO/L function code.

HALARM – An analog data point's high alarm limit specified in engineering units. Required for analog exception reported points in >DCS direction. This value is used in spec 5 of AO/L function codes.

LALARM — An analog data point's low alarm limit specified in engineering units. Required for analog exception reported points in >DCS direction. This value is used in spec 6 of AO/L function codes.

ALMST IND – A binary data point's alarm status as specified by the following table:

0 alarm on zero
1 alarm on one
2 no alarm

Required for digital exception reported points in >DCS direction. Used in spec 2 of DO/L function codes.

BIN MODE — A binary data point's output status. This value is specified as either P for pulsed outputs to the PLC or M for maintained output. The pulse duration will vary from interface to interface.

REV LEVEL — The revision level of each point in the database. For example, all values are initially set to A or 1. As new points are added or changes are made to existing points, their revision level is incremented to B or 2, then C or 3, and so on.

TEMPLATE — Filled in by Bailey.

SPECIAL 1 — A special purpose field which may be used differently by each protocol driver program. This field supports a single upper case alphabetic character only.

SPECIAL 2 — Another special purpose field which may be used differently by each protocol driver program. This field supports numeric entries only. Valid entries 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. Valid entries range from 0 through 65535. This field may be filled in by Bailey.

Note The DL LOC BLK RING PCU.MADR BLKN may be assigned by Bailey.

CUSTOMER

INTERFACE NAME

DATE

tag name	DL storage	DL-LOC-BLK	DL Direct	PCU-MADR-BLKN	DL LOC

Interface Documentation

The following is an example of a standard outline 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 Cabling Requirements
- 2.3 Termination Unit Layout
- 2.4 Dipshunt Cuttings
- 2.5 Dipswitch Settings
- 2.6 Communication Parameters
- 2.8 Hardware Checklist

3.0 Software
- 3.1 C Program Description
- 3.2 Blockware Description
- 3.3 Files List
- 3.4 Operation
  - 3.4.1 Startup Procedure
  - 3.4.2 Monitoring Execution
  - 3.4.3 Error Codes
- 3.5 Software Checklist

4.0 Database Point Listing
- 4.1 Analog Points
- 4.2 Digital 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 Bailey Sales Representative.

00 11 07 04 11 07

Appendix — Interface Applications

ABB PROCONTROL
ACCURAY D U
ALARM PR NTER
ALLEN BRADLEY PLC2
ALLEN BRADLEY PLC3
ALLEN BRADLEY PLC5
ALLEN BRADLEY/STROMBERG DR VE SYSTEM
ANNUC ATOR NTERFACE
APPL ED AUTOMAT ON GAS CHROMATOGRAPH
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 NTERFACE
CORE LABS OCTANE ANALYZER
DAN EL UM4000 METER NG SYSTEM
D AMOND POWER SOOTBLOWER
E CM TR SEN SYSTEM
ENV RONMENTAL ELEMENTS ELECTROSTAT C PREC P 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
NDUSTR AL 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 CHROME
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
ROSEMOUNT 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 NSTRUMENTS PLC W TH MODN M
TEXAS NSTRUMENTS 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 RECORDER
WOODWARD GOVERNOR 501 505E
YOKAGOWA RECORDERS MODEL 4081 1 3

00 11 07 04 11 07

For a comp ete l st of censees representat ves and aff l ates n over 50 countr es wor dw de contact

Bailey Controls Company

29801 Euc d Avenue • W ck ffe Oh o 44092 U S A • 216 585 8500
Te ex 980621 • Te efax 216) 585 8756 or 216 943 4609

Form A G0000 100 01A L tho n U S A 1091