Bailey®
control systems®

Application Guide

AG-0000-100-01

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

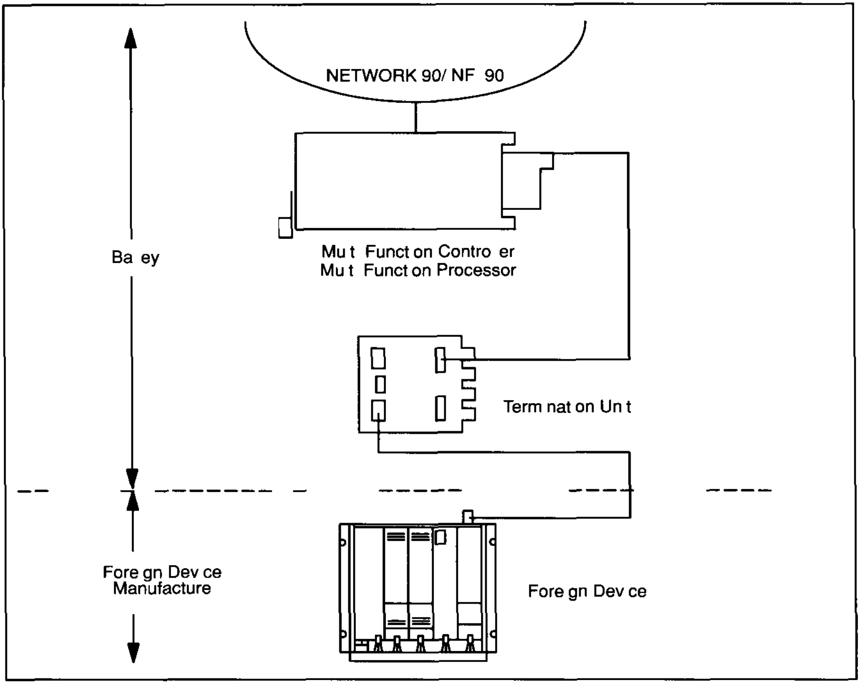

FIGURE 1 NETWORK 90/INFI 90 Interface to Programmable Controller

Interfaces between NETWORK 90/ NF 90 and programmab e contro ers or other dev ces are ava ab e as standard packages These nterfaces are ac comp shed n severa ways based on the tota num ber of og c states and/or ana og va ues to be transferred and the speed of transfer requ red The fo ow ng represents a genera d scuss on of the methods and techn ques used n ach ev ng these n terfaces

Bailey — Seamless, Real-Time Process Management Solutions

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 interface and 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 / Infi 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 suggest 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

¯he t m ng wnen tne MFC or MFF s a master cons sts of

- Conso e Scan T me
  1 sec for P ant Loop
  5 sec for Super oop or nf ne

- MFC cyc e t me
  MFC02 01 sec X number of read and wr te po nts
  MFC03 003 sec X number of read and wr te po nts
  MFP01 003 sec X number of read and wr te po nts
  MFP02 0015 sec X number of read and wr te po nts
  MFP03 0015 sec X number of read and wr te po nts

- Transm ss on t me(Number o bytes/message X Number of b ts/byte [nc ud ng start b t stop b t par ty b t] X Number of messages/dev ce X Number of dev ces) / Baud rate

- Fore gn Dev ce Process ng

- Return Transm ss on T me
  MFC Cyc e (read po nts)
  Conso e and oop de ay

Th s t m ng s a ru e of thumb method to ca cu ate an average de ay The asynchronous nature of MFC cyc e t me versus conso e process ng versus fore gn dev ce process ng creates a var ab ty n execut ng any g ven command

Genera y t m ng s counted from a Ba ey conso e dev ce the Management Command System (MCS) the Operator nterface Un t (O U) the Operator nterface System (O S) or the Process Contro V ew (PCV) to the fore gn dev ce and back f funct on code og c rather than operator commands s the cr t ca path then conso e process ng and oop de ay can be gnored

n order to m n m ze response t me data wh ch s to be exchanged through the nterface may be b ocked together on the programmab e contro er s de so that a mean ngfu b ts are ass gned to consecut ve reg sters w th n the dev ce Th s reduces the number of commands requ red to acqu re the nformat on s nce the overhead to obta n one b t s the same as obta n ng an ent re reg ster

A so most dev ces support commands wh ch can obta n mu t p e reg sters n one response B ocked data therefore reduces the number of command/response operat ons wh ch m n m zes the number of t me ags ncurred and max m zes the nterface throughput Genera y data shou d be arranged n four areas that can be read or wr tten w th one command The four cont guous memory areas are

- d g ta s to be read from the fore gn dev ce

- ana ogs to be read from the fore gn dev ce

- d g tals to be wr tten to the fore gn dev ce

- ana ogs to be wr tten to the fore gn dev ce

When operator superv sory contro s requ red (e start/stop of a motor) at east two po nts are requ red a wr te to the fore gn dev ce to send the command and a read from the fore gn dev ce to acknow edge the act on Us ng the t m ng ca cu at ons on the prev ous page a max mum t me for operator acknow edgment can be ca cu ated C osed oop contro or safety nter ocks shou d never be attempted through a data nk un ess a comp ete t me ana ys s s performed

When a s ng e dev ce s data nked to NETWORK 90 w th b ocked messages and a baud rate of 9600 or greater the transm ss on t me becomes m n ma and a rough t m ng est mate can be made by cons der ng on y modu e (MFC or MFP) cyc e t me conso e process ng t me and oop de ay

The fo ow ng tab e conta ns nk t mes recorded on actua s te nsta at ons n each of these cases the nks conta n consecut ve reg ster a gnments tt e or no contro og c n the modu es re ab e response t mes from the fore gn dev ce and data be ng read and wr tten w th word range commands Cyc e t me denotes the t me to send/rece ve data to/from the fore gn dev ce Conso e Scan T me s not f gured n these est mates

The tab e demonstrates that there are vary ng factors for each d fferent type of nk The ca cu at on g ven above attempts to account for the average c rcumstances

Interface Type	Module	Baud	I/O Count	# MSGS	Cycle Time
ALLEN BRADLEY PLC 540	MFP02	19200	750 D G	4	4 Sec
REL ANCE AUTOMATE 40	MFP02	9600	123 D G 37 ANA	4	5 Sec
MODICON EMULATOR	MFP01	9600	992 D G	2	9 Sec
L & N RECORDER (4) 24000	MFP01	9600	512 ANA	4	5 Sec
GE MARK V	MFC03	9600	344 D G	1	1 Sec Data Dump

OPERATOR COMMANDS

Severa cons derat ons are taken nto account n the MFC programm ng when commands are ssued to fore gn dev ces Be ow are the quest ons and descr pt ons that resu t n severa poss b e methods of ssu ng operator commands

Is control to be transferred from the foreign device to Bailey? The operator may have the opt on of re nqu sh ng contro to the fore gn dev ce operator or ma nta n ng contro It s necessary to dec de whether commands can be ssued from e ther system or on y from the Ba ey system

Will the Bailey system track or alarm when the foreign device is in a different state than the issued commands? The track and a arm og c ut zes a t mer to a ow n t a execut on of a command Th s cons derat on s dependent on the f rst dec s on f contro s transferred from one dev ce to the other the non–contro ng dev ce shou d ock n a track ng mode

f e ther dev ce can contro severa track ng ph osoph es can be mp emented When the Ba ey operator s n contro the a arm/track ng ph osophy can a arm on non n t ated state changes and force the operator to a gn states a arm for m ted per od and automat ca y a gn or a gn on any other comb nat on of og c that can be des gned w th funct on b ocks

Will the Bailey system pulse the foreign device or issue a maintained status? Th s tem can be d ctated by the nature of the fore gn dev ce by the fore gn dev ce adder og c or by the cho ce n the f rst cons derat on f e ther operator can contro a dev ce a pu se s genera y used Note that pu sed outputs to a fore gn dev ce can be ndependent of presentat on to the operator An operator can v ew the ast command state wh e a pu se was ssued to the fore gn dev ce

f the customer has a part cu ar method for operat ng commands the customer may need to supp y a og c draw ng to Ba ey

TRANSMISSION MEDIA

The usua method of transm ss on of commun cat on w th the NETWORK 90/ NF 90 s v a an RS232 connect on f the fore gn dev ce uses another method of commun cat ons Ba ey w spec fy a commerc a convers on box or modem for the trans at on For ong d stance commun cat on t may be necessary to spec fy modem phone nes rad o or m crowave connect ons as we f the customer has a ready purchased or nsta ed a commun cat on system then Ba ey w need the spec f cat ons of the transm ss on equ pment

The fo ow ng p cture (**Figure 2**) shows a typ ca hardware conf gurat on us ng commun cat ons equ pment

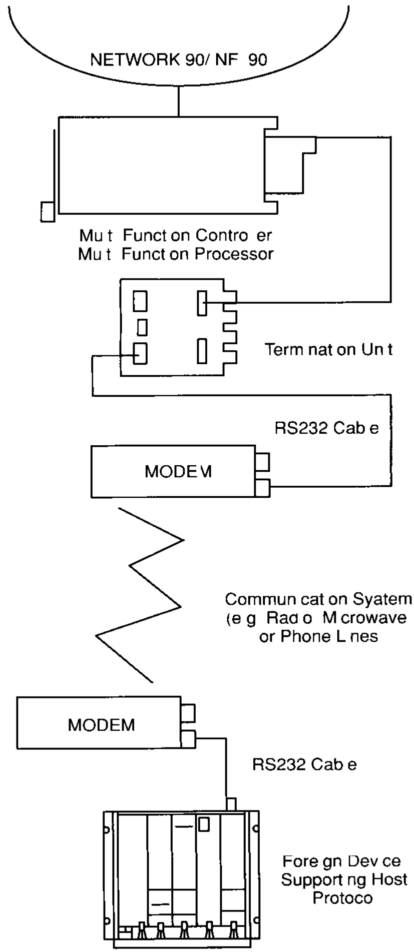

FIGURE 2 Interface with Communications Equipment

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

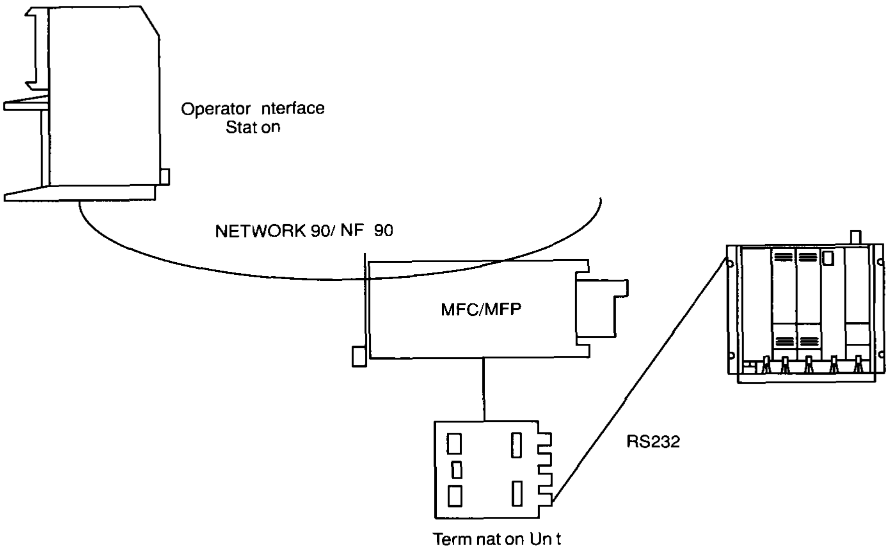

FIGURE 3 Single Drop MFC/MFP to Foreign Device Interface

MULTIDROP

An MFC/MFP nterface can be used successfu y for data acqu s t on n a mu t drop arrangement n th s case the MFC/MFP w po each fore gn dev ce n ser es thus requ r ng the fore gn dev ces to have an address ng scheme The fo ow ng p cture (**Figure 4**) shows an nterface modu e conf gurat on for commun cat on w th severa fore gn dev ces to one NETWORK 90/ NF 90 node The MUX denotes some type of mu t p exer such as mu t po nt modems w red together current oops or a rad o broadcast system (Th s hardware may be prov ded by the fore gn dev ce vendor or a commerc a commun cat ons equ pment vendor)

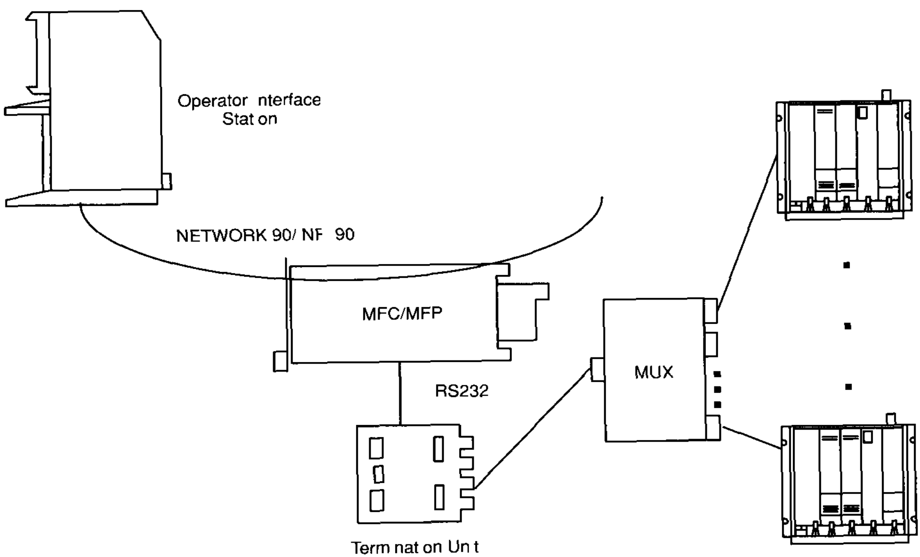

FIGURE 4 Multidrop MFC MFP to Foreign Device Interface

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

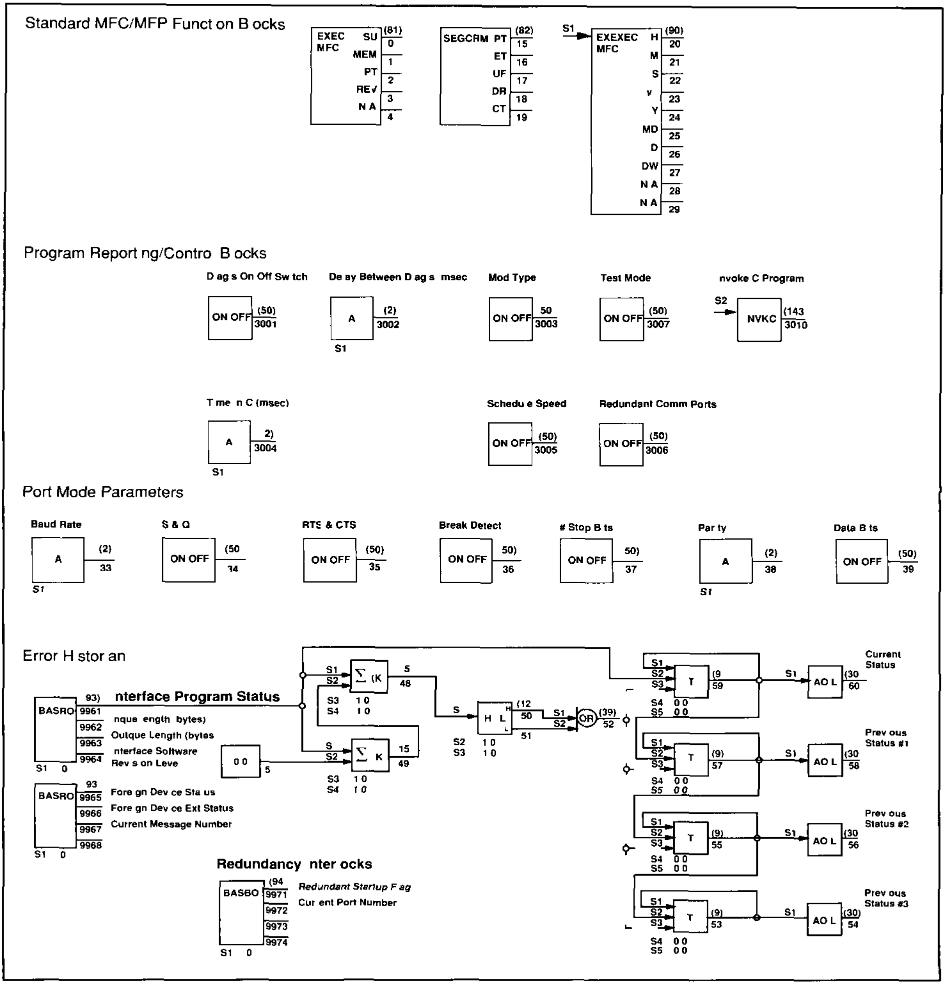

FIGURE 5 Standard First Blockware Sheet for Interfaces

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

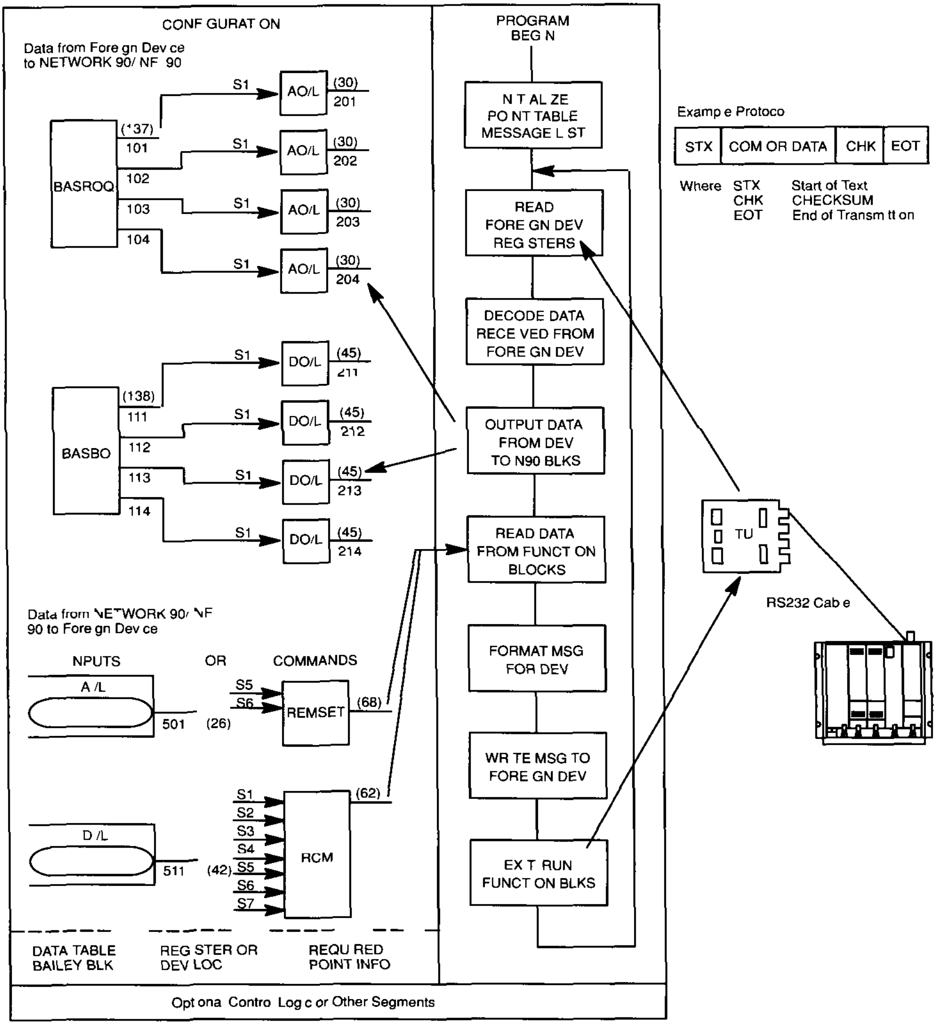

FIGURE 6 Program and Logic for MFC/MFP as the Master in a Single Drop Arrangement

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

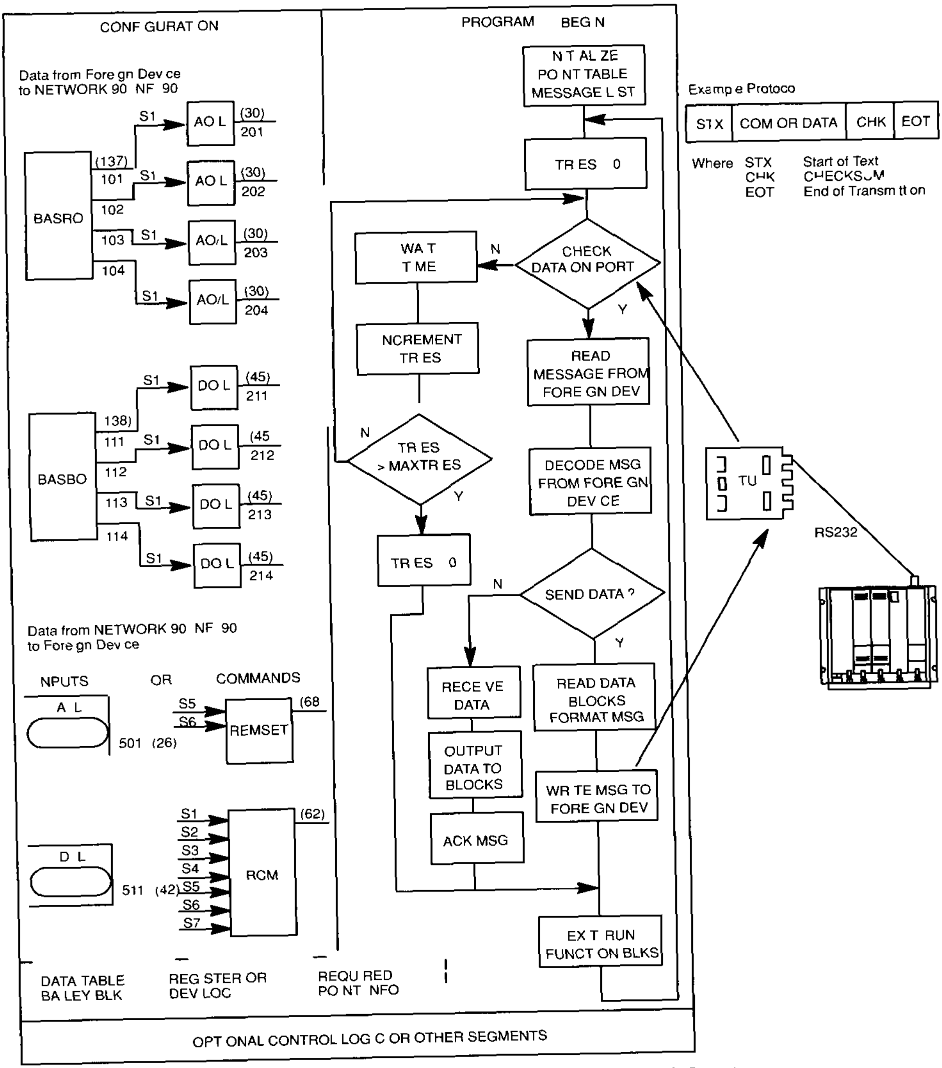

FIGURE 7 Program and Logic for MFC MFP as the Slave in a Single Drop Arrangement

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.

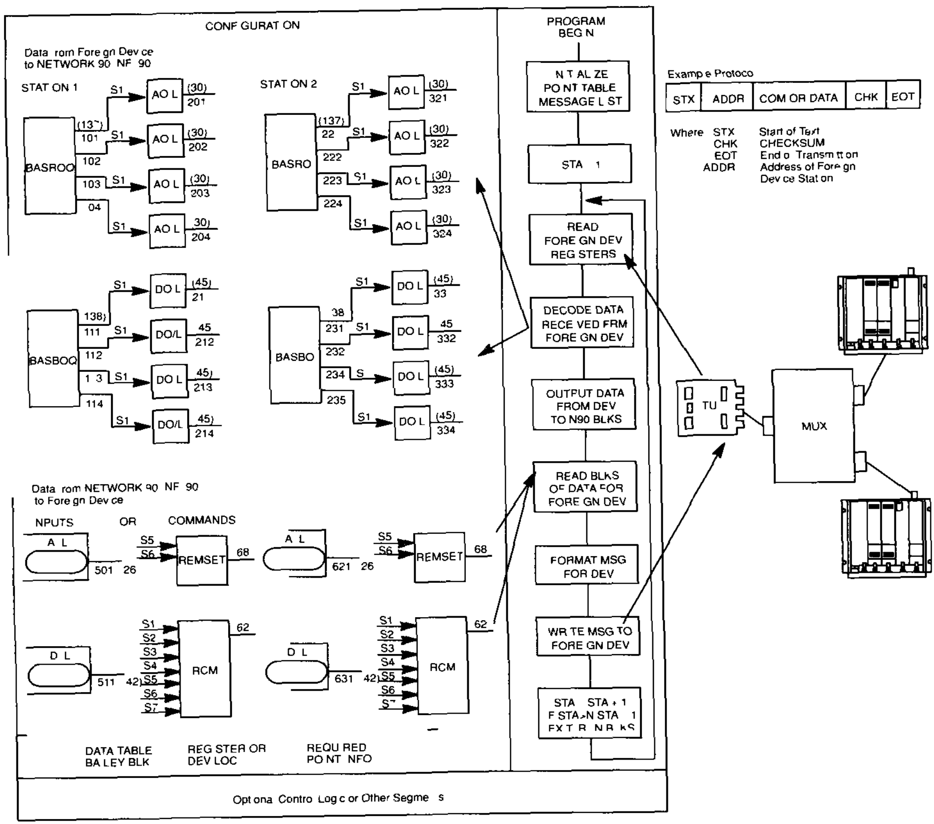

FIGURE 8 Program and Logic for MFC/MFP Multidrop Arrangement

FILES

The following list summarizes 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 function code logic configuration file. This file is produced by the CADEWS compiler from CAD sheets generated by CADEWS.

projname.nbs – This is the EWS save of the C program and data files. It allows the code and data to be loaded to the module through the EWS Workstation.

projname.mhd This is the module header file. This file is produced before CADEWS is run.

projname.dta This is the standard format data link point list file. This file contains information on each point in the data point list.

Redundancy

Interfaces from NETWORK 90/INFI 90 MFCs or MFPs to foreign devices can be configured in redundant arrangements. There are several levels 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 Termination Unit for communications
- Both redundant modules and redundant ports

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

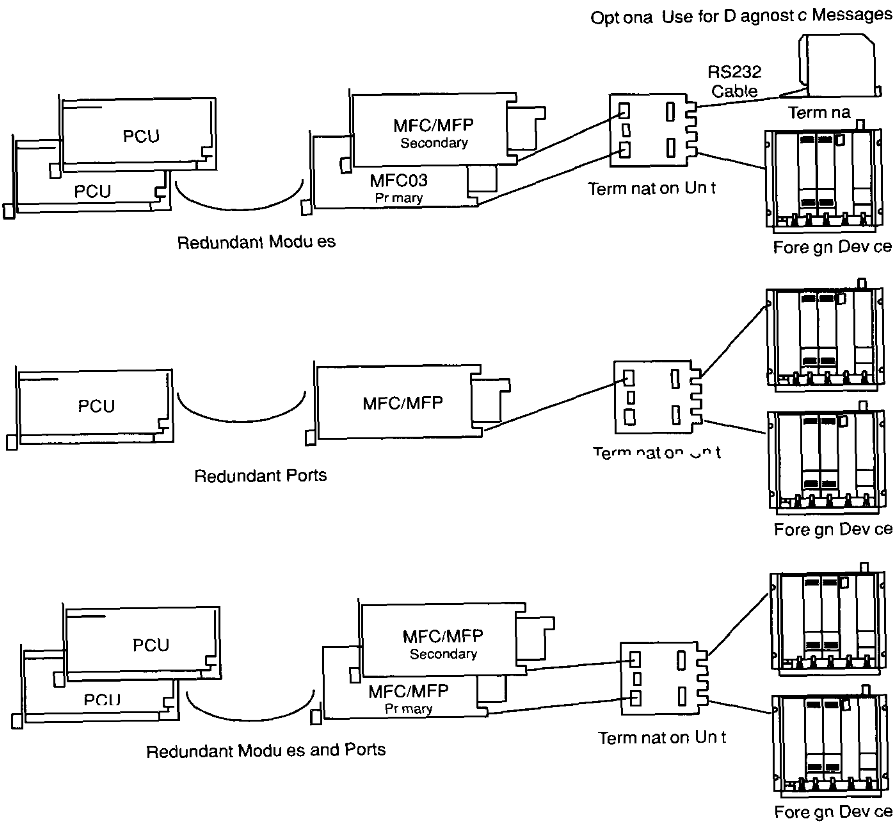

FIGURE 9 Redundant Interface Hardware Configurations

Error Checking

There are severa eve s of error check ng prov ded n the NETWORK 90/ NF 90 nterface

- Program t meouts for port prob ems or other dev ce not commun cat ng errors
- D agnost c messages pr nted to an unused port
- D agnost c codes pr nted to b ockware for conso e d sp ay
- Checksums n the message based on dev ce def ned protoco (for examp e CRC LRC or stra ght summat on checksums)
- Forc ng bad qua ty on a or part of the data transferred from the fore gn dev ce (The customer must be aware that th s may cause many a arms on the conso e and therefore may prefer to keep the ast good va ue of the data po nt and mon tor one b ock for the status of the nk)
- Pr or to rece v ng a byte the f rmware of the modu e checks for par ty and fram ng b ts for each byte

The user may mon tor the status of the nk by v ew ng the des gnated MFC/MFP nk error b ock The user may read the program d agnost c messages by attach ng a dumb term na to an unused port and sett ng match ng baud rates on the MFC/MFP sw tches and term na sw tches

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 define the point list of data and commands to be transferred over the interface link. 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 wide database with appropriate interface elements.

The following notes describe the entries needed on the database sheets, the DOS file or the dBASE III+ system wide database. Note that a separate point list file or database is required for each device interface. The list should consist of all points to be included in the interface. It should also include notation of SPARE points.

The diskette accompanying this manual contains the file DATA.DBF which is a dBASE III+ system wide database structure for entering the database information. To enter data into the file DATA.DBF use the APPEND function of dBASE.

The diskette also contains a 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 III+ 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 fields.

TABLE 2 Critical Database Fields

Field Name	Description	Type	Size
TAGNAME	interface point tag name	char	14
DESCRIPTOR	i/o text descriptor	char	30
UNITS	engineering units	char	8
EUINDEX	engineering units index	numeric	3
DL_STORAGE	type of data point	char	8
DL_DIRECT	data flow direction	char	8
DL_DEV_ADR	foreign device node addr	char	5
DL_LOC	location in foreign device	char	10
DL_SUB_LOC	sub location	char	10
DL_LOC_BLK	local block number	numeric	4
RING	x report ring number	numeric	3
PCU	x report pcu number	numeric	3
MADR	x report module number	numeric	2
BLKN	x report block number	numeric	4
DL_SCALE	scale factor	numeric	9
DL_OFFSET	offset value	numeric	9
VAL0	low point of data range	numeric	11
SPAN	span of data range	numeric	11
SIGCHG	significant change (%span)	numeric	11
HALARM	analog alarm high limit	numeric	11
LALARM	analog alarm low limit	numeric	11
ALMST_IND	digital alarm status	numeric	1
BIN_MODE	pulse/maintain mode	char	1
REV_LEVEL	point revision level	char	4
TEMPLATE	CADEWS logic template #	numeric	2
SPECIAL_1	first special use field	char	1
SPECIAL_2	second special use field	numeric	3
DL_TIME	message time interval	numeric	6

See the following pages for a detailed explanation of each field.

TAGNAME – An alphanumeric name used to reference the data point.

DESCRIPTOR – A brief description of the data point's use, generally in terms of the client's process. This field is used to fill in I/O text descriptions on CADEWS drawings.

UNITS – The engineering units of the value carried by the data point. For example, gals, lbs, fpm, kW, etc.

EUINDEX The Bailey console engineering unit descriptor's index number (see MCS/OIS instruction manuals). This value is used in spec 2 of AO/L function codes. Valid 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 direction that the point flows over the data link. Enter >DCS for data moving from the foreign device to the Bailey system. Enter DCS> for data moving from the Bailey system to the foreign device.

DL DEV ADR The node number of a message destination on the foreign device's network. Valid 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 field allows 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) in this field. The bit position must be separated from the address by a colon (:). If only a bit position is desired, the field must begin with the colon character. Valid entries for the address range from 0 through 65535. Valid entries for the bit position range from 0 through 255.

The following five fields refer to the Bailey locations of the points. For points input from the foreign device or for points output to the device from other Bailey configured logic, Bailey can fill in the locations.

DL LOC BLK – The local block number directly referenced by the interface program. For example, if the data flow direction is >DCS, the local block would indicate where the point is output. If the data flow direction is DCS>, the local block would indicate from where the point is input. Valid entries in the DCS> direction range from 0 through 9998. Valid entries in the >DCS direction range from 30 through 9998.

RING – The ring (or loop) number where the data point is exception reported. For example, if the data flow direction is DCS> and the point is exception reported from another module, use the ring number of the other module. If the data flows in the opposite direction, reference the ring number from which it is exception reported onto the loop. If not exception reported, leave this field blank. Valid ring addresses range from 0 through 250.

PCU The process control unit (pcu) number where the data point is exception reported. For example, if the data flow direction is DCS> and the point is exception reported from another module, use the pcu number of the other module. If the data flows in the opposite direction, reference the pcu number from which it is exception reported onto the loop. If not exception reported, leave this field blank. Valid PCU addresses range from 0 through 250.

MADR The module address (madr) number where the data point is exception reported. For example, if the data flow direction is DCS> and the point is exception reported from another module, use that module's address number. If the data flows in the opposite direction, reference the module number from which it is exception reported onto the loop. If not exception reported, leave this field blank. Valid module addresses range from 0 through 31.

BLKN The block number (blkn) where the data point is exception reported. For example, if the data flow direction is DCS> and the point is exception reported from another module, use that module's exception report block number f the data f ows n the oppos te d rect on reference the b ock number where t s except on reported f not except on reported eave th s f e d b ank Va d b ock numbers range from 30 through 9998

DL SCALE A sca e factor (s ope) wh ch s app ed to raw data va ues to convert them to common eng neer ng un ts (EU) The fo ow ng equat on s used

Eu (raw va ue * sca e factor) + offset va ue

Note. Enter a va ue of one (1) f no sca ng requ red Th s va ue s used n F(X) funct on codes

DL OFFSET An offset va ue (ntercept) wh ch s app ed to raw data va ues to convert to common eng neer ng un ts See the above equat on

Note. enter a va ue of zero (0) f no offset s requ red Th s va ue s used n F(X) funct on codes

VALO The ow end (zero) of the va d range for an ana og va ue Requ red for ana og except on reported po nts n >DCS d rect on Th s va ue s used n spec 3 of AO/L funct on codes

SPAN The span (range) of the va d range for an ana og va ue referenced from VALO above Requ red for ana og except on reported po nts n >DCS d rect on Th s va ue s used n spec 4 of AO/L funct on codes

SIGCHG The amount of change (n % of span) n the va ue of an ana og data po nt that s requ red to n t ate an mmed ate except on report ng of the va ue Requ red for ana og except on reported po nts n >DCS d rect on Th s va ue s used n spec 7 of the AO/L funct on code

HALARM – An ana og data po nt s h gh a arm m t spec f ed n eng neer ng un ts Requ red for ana og except on reported po nts n >DCS d rect on Th s va ue s used n spec 5 of AO/L funct on codes

LALARM An ana og data po nt s ow a arm m t spec f ed n eng neer ng un ts Requ red for ana og except on reported po nts n >DCS d rect on Th s va ue s used n spec 6 of AO/L funct on codes

ALMST IND – A b nary data po nt s a arm status as spec f ed by the fo ow ng tab e

0 a arm on zero
1 a arm on one
2 no a arm

Requ red for d g ta except on reported po nts n >DCS d rect on Used n spec 2 of DO/L funct on codes

BIN MODE A b nary data po nt s output status Th s va ue s spec f ed as e ther P for pu sed outputs to the PLC or M for ma nta ned output The pu se durat on w vary from nterface to nterface

REV LEVEL The rev s on eve of each po nt n the database For examp e a va ues are n t a y set to A or 1 As new po nts are added o changes are made to ex st ng po nts the r rev s on eve s ncremented to B or 2 then C or 3 and so on

TEMPLATE F ed n by Ba ey

SPECIAL 1 A spec a purpose f e d wh ch may be used d fferent y by each protoco dr ver program Th s f e d supports a s ng e upper case a phabet c character on y

SPECIAL 2 Another spec a purpose f e d wh ch may be used d fferent y by each protoco dr ver program Th s f e d supports numer c entr es on y Va d entr es range from 0 through 255

DL TIME The t me nterva between transm s s ons of the same message Th s numer c va ue represents the number of 1/100s of a second between trans m ss ons Va d entr es range from 0 through 65535 Th s f e d may be f ed n by Ba ey

Note The DL LOC BLK RING PCU. MADR BLKN may be ass gned by Ba ey

CUSTOMER

INTERFACE NAME

DATE

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

Interface Documentation

The fo ow ng s an examp e of a standard out ne found n the spec f c protoco dr ver manua

Purchasing Interfaces

See your Ba ey Sa es Representat ve

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