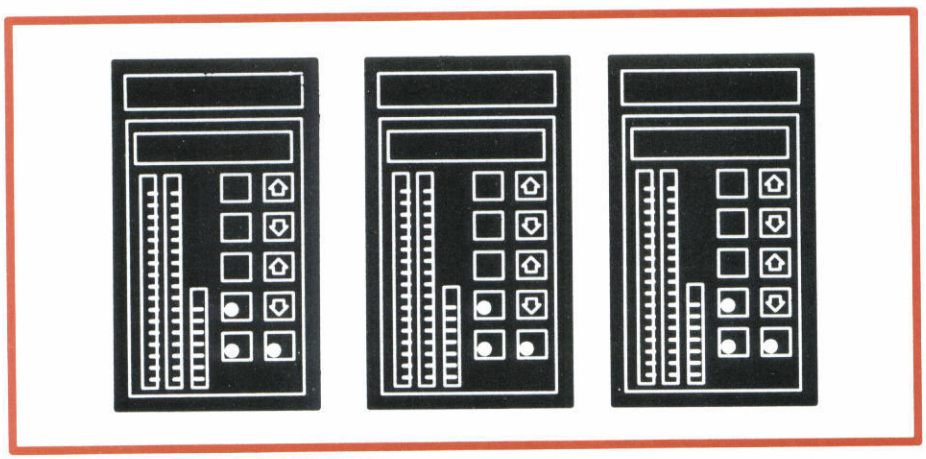
Bailey

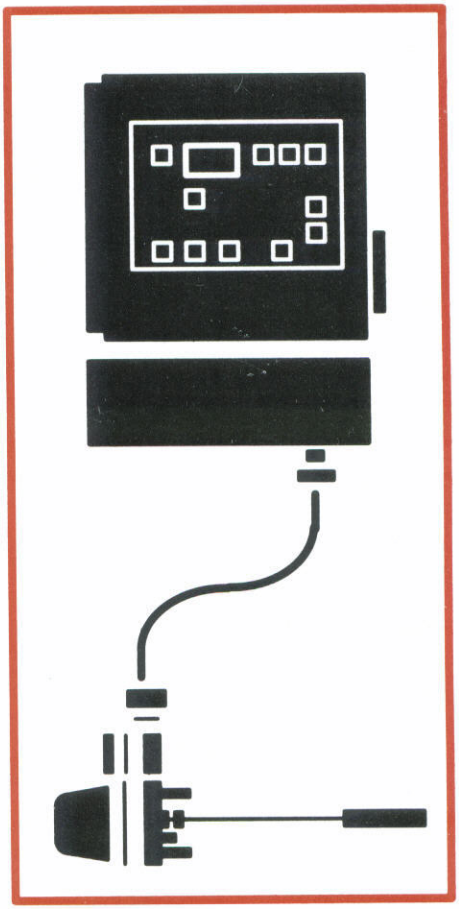
PRODUCT INSTRUCTION

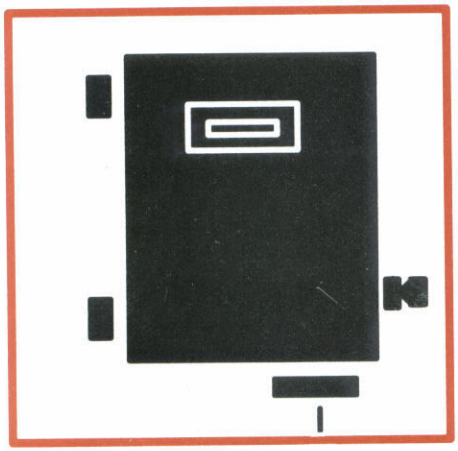
E92-501-2

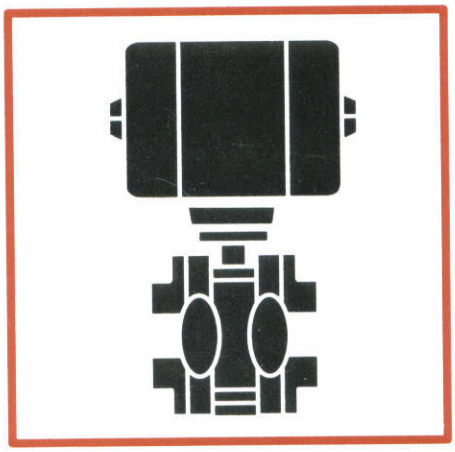
Configuration And Tuning Terminal

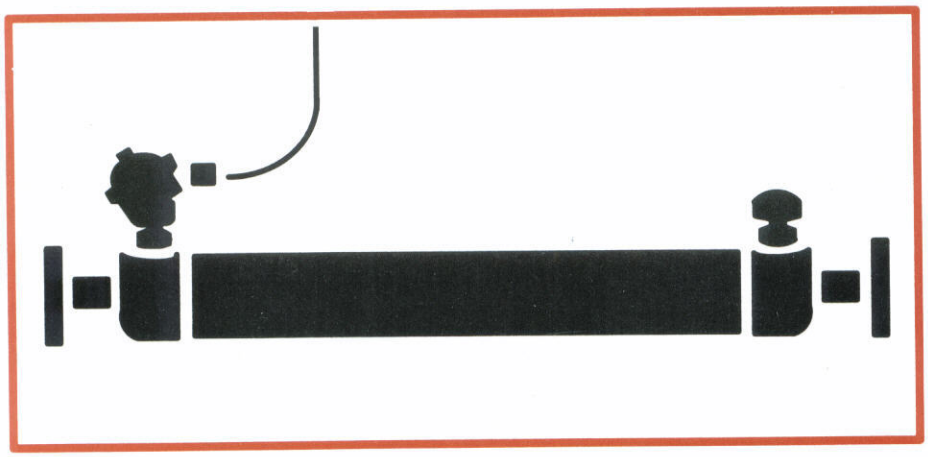
Type CTT02

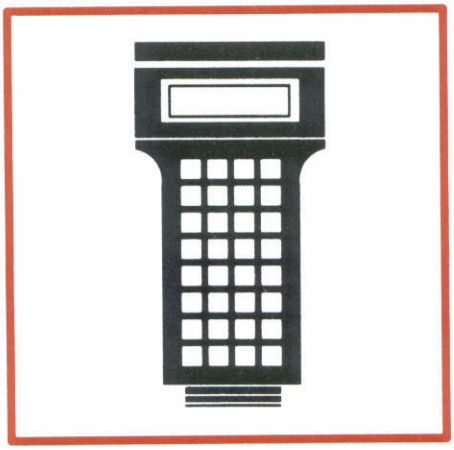












Bailey Process Control and Automation Solutions from Elsag Bailey Group

WARNING notices as used in this manual apply to hazards or unsafe practices which could result in personal injury or death.

CAUTION notices apply to hazards or unsafe practices which could result in property damage.

NOTES highlight procedures and contain information which assist the operator in understanding the information contained in this manual.

WARNING

INSTRUCTION MANUALS

DO NOT INSTALL MAINTAIN OR OPERATE THIS EQUIPMENT WITHOUT READING, UNDERSTANDING AND FOLLOWING THE PROPER **Bailey Controls** INSTRUCTIONS AND MANUALS, OTHERWISE INJURY OR DAMAGE MAY RESULT.

RADIO FREQUENCY INTERFERENCE

MOST ELECTRONIC EQUIPMENT IS INFLUENCED BY RADIO FREQUENCY INTERFERENCE (RFI). CAUTION SHOULD BE EXERCISED WITH REGARD TO THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT IN THE AREA AROUND SUCH EQUIPMENT. PRUDENT PRACTICE DICTATES THAT SIGNS SHOULD BE POSTED IN THE VICINITY OF THE EQUIPMENT CAUTIONING AGAINST THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT.

POSSIBLE PROCESS UPSETS

MAINTENANCE MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND ONLY AFTER SECURING EQUIPMENT CONTROLLED BY THIS PRODUCT. ADJUSTING OR REMOVING THIS PRODUCT WHILE IT IS IN THE SYSTEM MAY UPSET THE PROCESS BEING CONTROLLED. SOME PROCESS UPSETS MAY CAUSE INJURY OR DAMAGE.

AVERTISSEMENT

MANUELS D'OPERATION

NE PAS METTRE EN PLACE REPARER OU FAIRE FONCTIONNER CE MATERIEL SANS AVOIR LU, COMPRIS ET SUIVI LES INSTRUCTIONS REGLEMENTAIRES DE **Bailey Controls** TOUTE NEGLIGENCE A CET EGARD POURRAIT ETRE UNE CAUSE D'ACCIDENT OU DE DEFAILLANCE DU MATERIEL.

PERTURBATIONS DE LA FREQUENCE RADIOPHONIQUE

LA PLUPART DES EQUIPEMENTS ELECTRONIQUES SONT SENSIBLES AUX PERTURBATIONS DE LA FREQUENCE RADIO. DES PRECAUTIONS DEVRONT ETRE PRISES LORS DE L'UTILISATION DE MATERIEL DE COMMUNICATION PORTATIF. LA PRUDENCE EXIGE QUE LES PRECAUTIONS A PRENDRE DANS CE CAS SOIENT SIGNALEES AUX ENDROITS VOULUS DANS VOTRE USINE.

PERTES ROCEDE RENVERSEMENTS

L'ENTRETIEN DOIT ETRE ASSURE PAR UN PERSONNE QUALIFIE ET EN CONSIDERATION DE L'ASPECT SECURITAIRE DES EQUIPMENTS CONTROLES PAR CE PRODUIT. L'ADJUSTMENT ET/OU L'EXTRATION DE CE PRODUIT LORSQU'IL EST INSERE A UN SYSTEME ACTIF PEUT OCCASIONNER DES A-COUPS AU PROCEDE CONTROLE. SUR CERTAINS PROCEDES, CES A-COUPS PEUVENT EGALEMENT OCCASIONNER DES DOMMAGES OU BLESSURES.

NOTICE

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Preface

This product instruction provides installation, operation and configuration information for the handheld Configuration and Tuning Terminal, CTT02. This document is intended as a supplement to Product Instructions for all Bailey Command Series equipment using the CTT02 Configuration and Tuning Terminal.

NOTE: Throughout this Product Instruction, the module or equipment being used with the CTT02 will be referred to as the "target unit". Refer to **ASSOCIATED DOCUMENTS** for a list of the target units and their applicable Product Instruction number. The user should thoroughly read and understand the information in this document before attempting to operate the equipment.

There are Appendices at the back of this Instruction Book, one for each target unit. Each Appendix contains a configuration example (operational sequence) and an example keystroke procedure necessary to configure the target unit.

ASSOCIATED DOCUMENTS

Additional information is given in the following publications.

- Function Code Application Manual, I– E93–900–20
- CLC01/02 Loop Command™ Controller Product Instruction , I– E92–500–1
- CLC03/04 Loop Command™ Controller Product Instruction , I– E92–500–7
- Sequence Command™ Controller Product Instruction, I – E92–500–4
- Batch Command™ Controller Product Instruction, I – E92–500–3
- Configuration Port Module Product Instruction, I – E93–903–2

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Safety Summary

GENERAL WARNINGS

WARNING

The equipment described herein may be used only in the those classes of hazardous locations identified on the nameplate.

AVERTISSEMENT

L'equipment descrit par cette notice ne peut etre installe que dans les emplacements specifies sur la plaque signalitique de l'appareil.

WARNING

Any substitution of components may impair safety and performance.

AVERTISSEMENT

La substitution de composants peut compromettre la performance de l'appareil et son accreditation concernant la securite.

SPECIFIC WARNINGS AND CAUTIONS

CAUTION

If a Batch or Sequence Command Controller other than the master Batch Command Controller is used to store the recipe data, make certain that Controller is placed into the CONFIGURE mode before entering the EASY STEP PLUS mode. The existing configuration in this unit will be lost. (p. 18)

AVERTISSEMENT

Si l'on utilise un controleur de traitement par lots ou de traitement sequentiel (Batch Command Controller ou Sequence Command Controller) autre que le controleur maitre a des fins de stockage des donnees du procede, s'assurer que le controleur est en mode de CONFIGURATION avant de passer au mode "EASY STEP PLUS". Sinon, la configuration de cet appareil serait effacee. (p. 19)

List Of Effective Pages

Total number of pages in this manual is 169, consisting of the following:

Page No.	Change No.
ii through vii	Original
1 through 46	Original
A–1 through A–10	Original
B–1 through B–24	Original
C–1 through C–64	Original
D–1	Original
Worksheets (17 sheets)	Original

When an update is received, insert the latest changed pages and dispose of the superseded pages.

NOTE: On an update page, the changed text or table is indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure is indicated by a vertical bar in the outer margin next to the figure caption. The date the update was prepared will appear under the page number.

Introduction

PRODUCT DESCRIPTION

The Configuration and Tuning Terminal (CTT02) is an engineering and maintenance terminal for the Bailey Command Series™ product line. It provides a local means for configuration, tuning and diagnostics. A complete description of applicable function blocks, codes and specifications is given in Bailey **Function Code Application Manual I–E93–900–20.**

The CTT02 is a handheld device. A blank cartridge which is inserted in the bottom of the unit is provided for storing configurations. A cable connects to the Command Series unit and provides the necessary power and signal inputs (Figure 1). One end connects to the top of the CTT02 and the other plugs into the Command Series unit.

COMMUNICATIONS

The Command Series unit receives and transmits signals by way of the Module Bus. This system of communication allows the unit to act as a "stand–alone product" or as part of a larger system.

Module Bus

The Module Bus (Figure 2) is the local level communication bus and is required when using multiple Command Series units. It is the bi–directional communication link between each unit. A maximum of 32 active (or addressable) units can be grouped together. Each unit must have a valid address. Address values range from 0 to 30, with 31 typically being assigned to the CTT02.

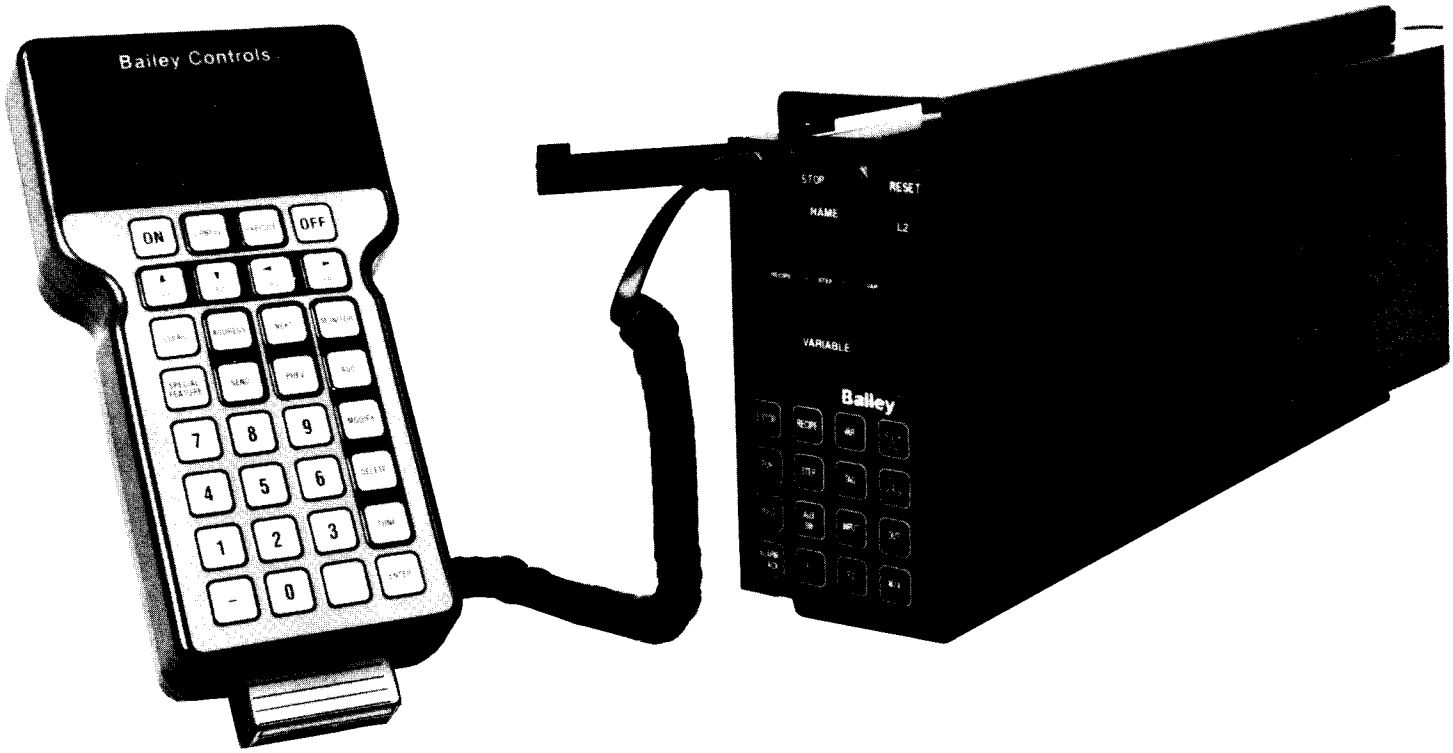


FIGURE 1 – Configuration and Tuning Terminal CTT02 and Typical Command Series Controller.

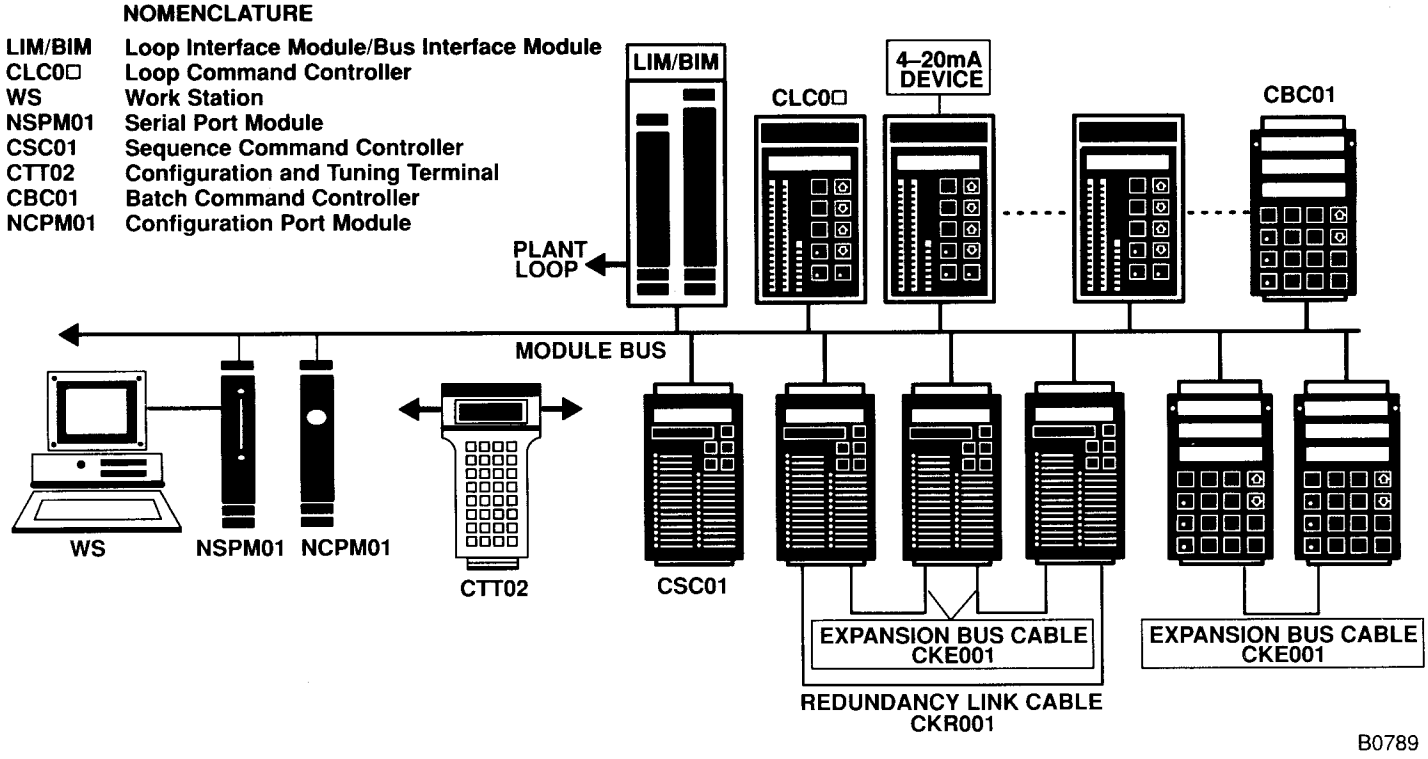


FIGURE 2 – Communications Loop Block Diagram

DESIGN DESCRIPTION

The Configuration and Tuning Terminal consists of a microprocessor section, front panel alphanumeric display, front panel keyboard, and a cartridge (Figure 3). The microprocessor section controls the operation of the CTT02 and executes the functions. In the course of operation, information is presented to the user on the front panel display.

The operations of the CTT02 have been designed to provide a maximum of information to the user. Prompts are given wherever possible and data is handled in familiar formats. Displays are used to indicate error or fault conditions, while simple, one word responses or indicators are used when operations are normal and expected.

FACEPLATE DESCRIPTION

The CTT02 has 32 available keys, 12 of which are used in a numeric keypad (Figure 4). There are 12 operation keys which allow the user to follow step–by–step procedures for performing various functions. There are four function/cursor keys that aid in menu selection, allowing control algorithms to be added, modified and reviewed. An ON key, OFF key, Special Features key and ENTER key are also included. A large alphanumeric LCD readout display allows four lines, 16 characters per line for easy operator interface.

NOMENCLATURE

The appropriate nomenclature for the Configuration and Tuning Terminal is:

CTT02

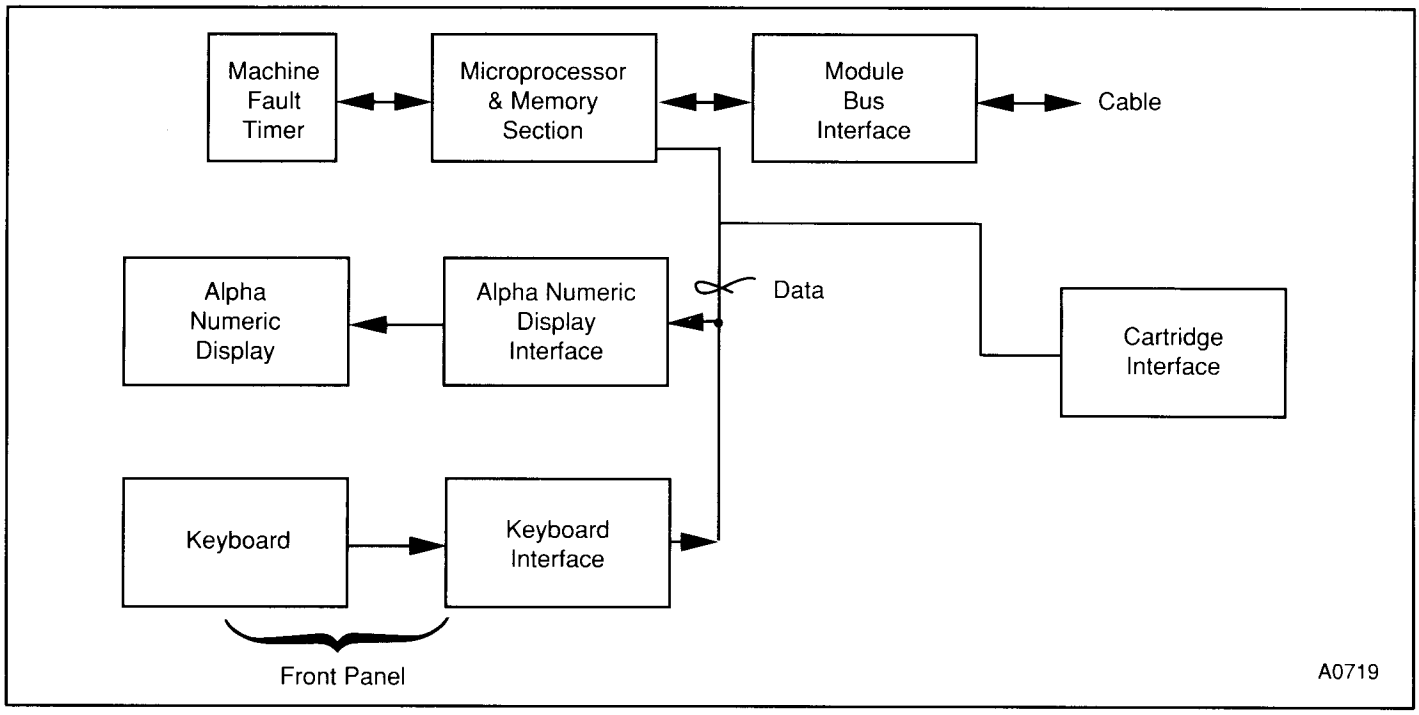


FIGURE 3 – Block Diagram of Configuration and Tuning Terminal, CTT02

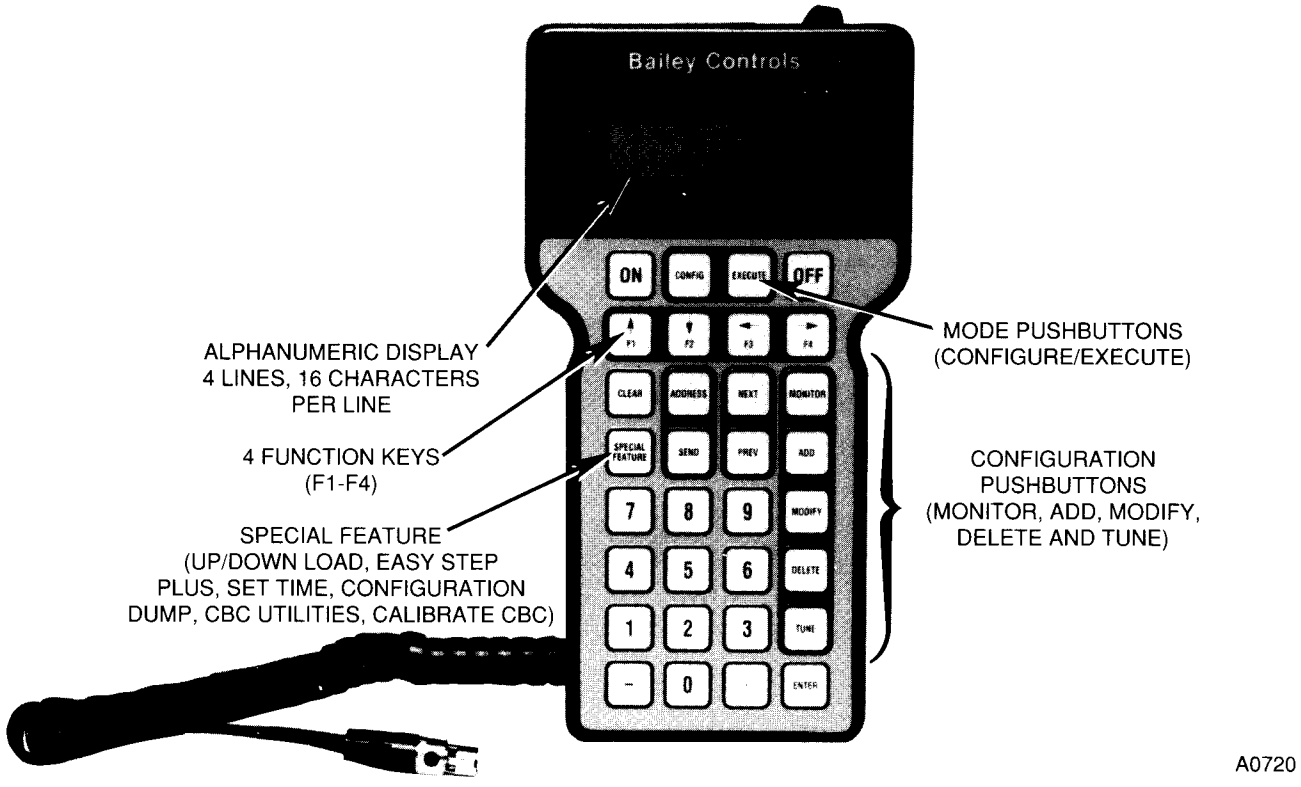


FIGURE 4 – Configuration and Tuning Terminal Faceplate

SPECIFICATIONS

TABLE 1 – Specifications

Display Format	LCD (liquid crystal display) Number of Rows: 4 Characters per Row: 16
Keyboard Type	Tactile feedback embossed membrane, 32 keys
Flexible Cord Length	6 ft. (1.8 m)
Operating Temperature Range	32°F to 122°F (0°C to 50°C)
Power	+5 V dc (±5%) at 85 mA max. (0.43 W)
Storage Temperature Range	–4°F to +158°F (–20°C to +70°C)
Humidity	95%, non–condensing
Weight	1 lb. (0.454 kg)
Dimensions (hxwxd)	8.00 x 4.27 x 1.71 in. (203 x 108 x 43 mm)
Case Material	Lexan®
Certification (pending)	FM (Factory Mutual) approval and CSA (Canadian Standards Assoc.) certification in the following categories: Nonincendive for Class I, Division 2, Groups C and D.
Accessories	NCPM01, Configuration Port Module allows connection of the CTT02 to Bailey INFI 90™/ NETWORK 90® PCU rack. Cartridges – Part No. 6637531–1. Blank cartridges available for storing configurations.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Lexan® – Registered tradename of General Electric Co., Noryl Products Dept.

Installation

RECEIVING AND HANDLING

The CTT02 is packaged in a single container which includes the handheld unit, the connecting cable and a blank cartridge for storing configurations.

Normal precautions for storage and handling of electronic equipment should be followed. Upon receipt of the shipment, the equipment should be examined for possible damage in transit. If damage is found or there is evidence of rough handling, a damage claim should be filed with the responsible transportation company. The nearest Bailey Sales Office should also be notified as soon as possible.

Remove the equipment from the shipping container and examine for damage. Carefully inspect the packing material, before discarding it, to make certain that all equipment, instructions and any paperwork have been removed. Careful handling will ensure satisfactory performance of your unit.

Storage should make use of original packing material and the container. The storage environment should be protected and free from extremes of temperature and high humidity as indicated in the environmental constraints listed in Table 1, **Specifications**.

SPECIAL HANDLING PROCEDURES FOR MOS DEVICES

Metal Oxide Semiconductor (MOS) devices are subject to damage by static electricity. Therefore, the following techniques should be observed during servicing, troubleshooting, and repair.

1. Most assemblies with MOS devices are shipped in a special anti–static bag. Keep the assembly in the bag as much as possible whenever the assembly is not in use.

2. Assemblies containing MOS devices should be removed from their anti–static protective containers only under the following conditions:

   a. When at a designated static–free workstation or when the bag is grounded at the field site.

   b. Only after conductive area of container has been neutralized.

   c. Only after firm contact with an anti–static mat and/or firmly gripped by a grounded individual.

3. Personnel handling assemblies with MOS devices should be neutralized to a static–free workstation by a grounding wrist strap that is connected to the station or to a good ground point at the field site.

4. Do not allow clothing to make contact with MOS devices. Most clothing generates static electricity.

5. Avoid touching edge connectors and components.

6. Avoid partial connection of MOS devices. Most devices can be damaged by floating leads, especially the power supply connector. If an assembly must be inserted in a live system, it should be done quickly. Do not cut leads or lift circuit paths when troubleshooting.

7. Ground test equipment.

8. Avoid static charges during maintenance. Make sure circuit board is thoroughly clean around its leads but do not rub or clean with an insulating cloth.

NOTE: An anti–static kit (ESD Field Service Kit, Bailey Part No. 1948385–1) is available for personnel working on devices containing MOS components. The kit contains a static–dissipative work surface (mat), a ground cord assembly, wrist bands and alligator clip.

INSTALLING THE CTT02

Installation of the CTT02 consists of connecting the handheld unit to the local module bus or to a Command Series target unit that requires configuration, tuning or diagnostic procedures.

To connect to a local module bus and interface with a Bailey NETWORK 90 or INFI 90 system, a Configuration Port Module (NCPM01) is required. This module occupies one slot in a standard Module Mounting Unit (MMU). The NCPM01 printed circuit card routes power and communication signals from the MMU to a five–pin receptacle on the faceplate of the NCPM01. The CTT02 flexible cable plugs into this receptacle (Figure 5).

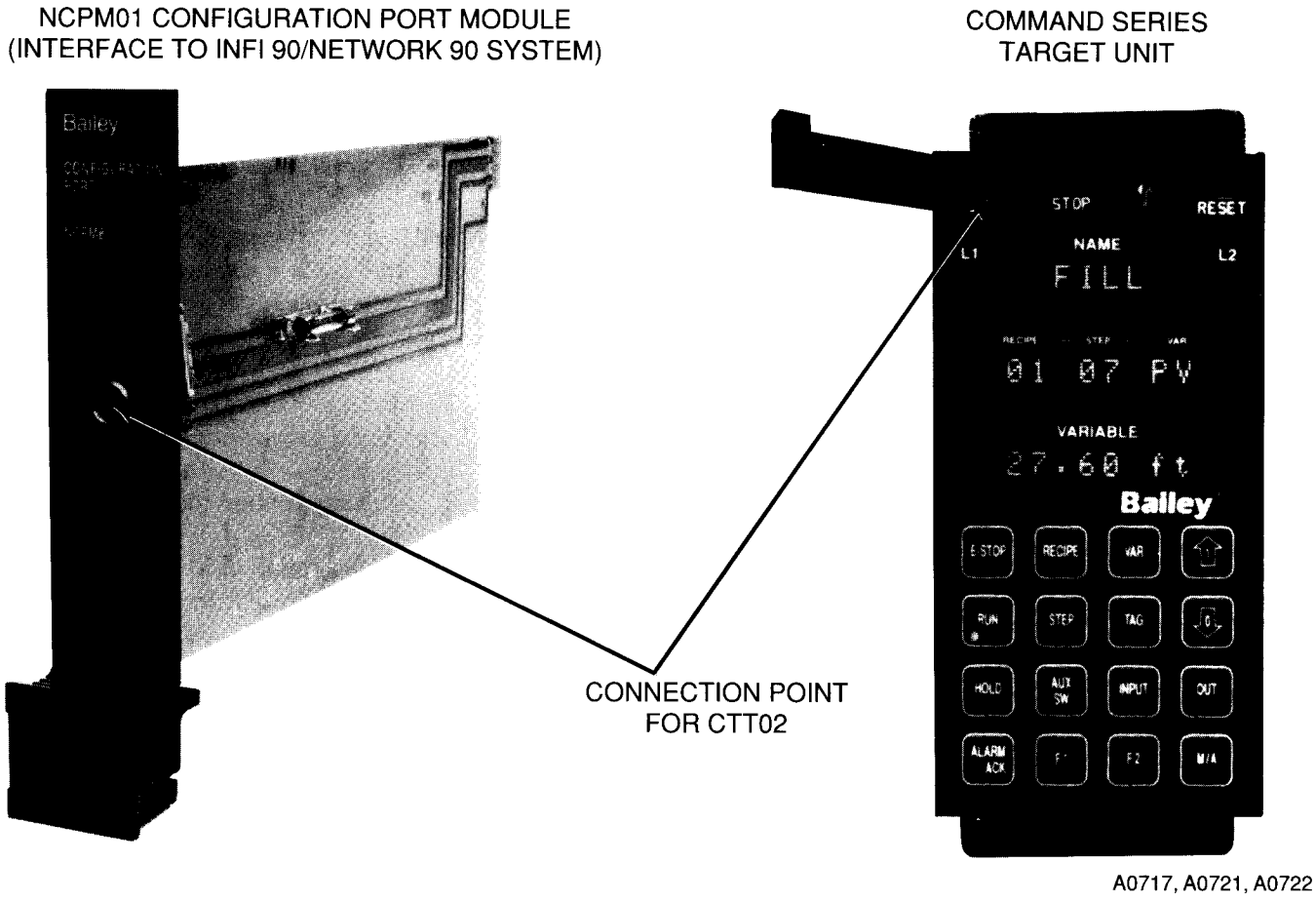


FIGURE 5 – Connecting the CTT02 to a Typical Target Unit or to a Configuration Port Module (NCPM01)

To connect to a Command Series target unit, swing open the legend/access door on the front of the Controller faceplate and plug the CTT02 connector into the connector at the left side of the Controller (Figure 5).

Installing and Removing the CTT02 Cartridge

A blank cartridge is provided with the CTT02. It is inserted in the bottom of the CTT02 housing and provides storage for configurations. The cartridge must be installed during uploading or downloading of configurations to the target unit.

1. Installation or removal of the cartridge while the CTT02 is under power is not recommended.

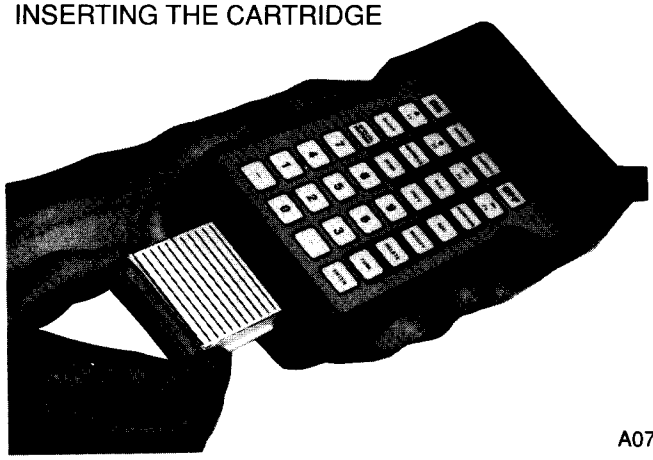
2. The cartridge is polarized and can only be installed one way.

3. Grasp the cartridge between your thumb and forefinger and insert into the opening in the bottom of the CTT02 housing (Figure 6).

4. Press firmly into place to ensure good connection.

5. When removing, place your thumb on the top of the cartride and your forefinger on the bottom and pull the cartridge straight out of the housing.

INSERTING THE CARTRIDGE



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REMOVING THE CARTRIDGE

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FIGURE 6 – Installing and Removing the CTT02 Cartridge

Changing the Module Bus Address of the CTT02

The module address of the CTT02 has been factory set to 31 prior to shipment. If it is necessary to check or change that setting, complete the following procedure.

1. Press the ON key on the faceplate of the CTT02. The following screen will appear:

CTT02 HANDHELD Rev. A_0 Bailey Controls Company

2. Press F3 and the following screen will appear:

CURRENT CTT02 MODULE ADDRESS IS: XX NEW ADDRESS:

Range = 0–31

Enter new address and press ENTER. The next screen will be:

CTT02 HANDHELD Rev. A_0 Bailey Controls Company

Operation

The Configuration and Tuning Terminal is used to configure control loops, make control strategy changes and define required specifications. The keyboard and associated display (Figure 3) are used for the data entry. Function blocks within the Command Series target unit may be added, deleted, modified and tuned by the user. A Function Block consists of: 1) a Block Address (block number) assigned by the user, 2) a Function Code, selected by the user from a predefined list for the target unit, and 3) a specification list predefined for the Function code. The specification list contains the specs that the user must define to make that Function Block operative.

To gain a better understanding of Function Blocks, Codes, Specifications and configuration of control systems, refer to the **Function Code Application Manual**, E93–900–20.

DISPLAYS

The alphanumeric display is used as a visual feedback of the pushbutton pressed as well as a visual memory aid when configuring and tuning. It displays such information as target unit number, mode selected, action requested, block number, or specification number.

KEYBOARD

The keyboard consists of 32 tactile feedback pushbuttons. The pushbutton functions are defined in Table 2.

TABLE 2 – Keyboard Functions

Pushbutton Legend	Definition	Description
NUMERIC PUSHBUTTONS		
0–9	Numeric Entry	Input keys which represent numerical values used for address, codes and data.
.	Decimal	The decimal point is used when entering a Real number.
–	Minus	The minus sign is used when specifying a negative value such as a negative integer or real value.
PROCESS OR ESCAPE PUSHBUTTONS		
CLEAR	Clear Entry	The CLEAR key clears the target unit record of the previous entry.
ENTER	Enter	The ENTER key terminates a data entry sequence.
NEXT*	Next	Shows the next display in sequence.
PREV*	Previous Display	Shows the previous display in sequence.
MODE PUSHBUTTONS		
CONFIG	Configure	Pressing the CONFIGURE and F2 keys will cause the target unit to go into the configure mode. Pressing F2 after CONFIGURE is a confirmation by the user that the correct mode has been selected. Once in a configuration mode, the user may add, modify or delete the function blocks.
EXECUTE	Execute	Pressing the EXECUTE and F2 keys will cause the target unit to go into the execute mode. Pressing F2 after EXECUTE is a confirmation by the user that the correct mode has been selected. The target unit executes its configuration. The user may tune or monitor the function blocks in EXECUTE mode.
MODULE PUSHBUTTONS		
ADDRESS	Module Address	This key informs the CTT02 that the next sequence of numbers is the address of the target unit with which you wish to communicate. The target unit must be on the same module bus.

* To scroll the displays, depress the key and hold in the down position.

TABLE 2 – Keyboard Functions (continued)

Pushbutton Legend	Definition	Description
SEND	Send	The send key is used when the user wants the target unit to add the new configuration data to the non–volatile memory, or alter its permanent record to reflect the previously performed action. This is used at the end of some action performed on a control block such as : Add, Modify or Tune.
CONFIGURATION PUSHBUTTONS		
MONITOR	Monitor	The Monitor function permits the user to call up any function block in the target unit and observe its output value and the status of that point.
ADD	Add	This function is used to configure a new function block in the target unit. The block number, function code and spec values are defined by the user with this function.
MODIFY	Modify	This key selects the Modify function, which is similar to the Tune function. In Modify, however, any spec may be changed.
DELETE	Delete	This function is used to delete an existing function block in the target unit.
TUNE	Tune	The TUNE key is used to select the Tune function. The function block in the target unit on which the operation is to occur is then selected. Only certain designated specification specs are tunable, however the Tune operation permits review of the entire block which the operator selects.
SPECIAL FEATURES KEY		
SPECIAL FEATURE	Special Feature	When the SPECIAL FEATURE key is depressed, the first features menu will display four features. Use the NEXT key to advance to the next features menu. Use PREVIOUS key to return to a previous feature menu. **FIRST FEATURES MENU** F1 – UPLOAD/DOWNLOAD. Allows the user to store configurations to a cartridge inserted into the bottom of the CTT02. UP/DOWN LOAD selection will display an additional submenu: F1 – Upload. (Allows the user to upload configurations to the CTT02 cartridge from the target unit.) F2 – Download. (Allows the user to download a configuration to the target unit.) F3 – Delete Entry. (Allows the user to delete a stored configuration in the CTT02 cartridge.) F4 – Re–Initialize. (Allows the user to delete all stored configurations in the CTT02 cartridge at one time.) F2 – EASY STEP PLUS (Sequence and Batch Command Controllers only). Simplified configuration mode for creating a 1 to 32 step sequencer. The Controller creates the basic configuration required and prompts the user to fill in the details. The handheld will automatically determine whether a Sequence Command or Batch Command Controller is connected. The submenu(s) that appear will depend on which Controller is being configured. Refer to Figure 7. F3 – SET TIME. Allows user to set day, date and time in the target unit. F4 – CONFIGURATION DUMP (Sequence and Batch Command Controllers only). Allows user to dump a configuration to the RS–232 port on the Controller. If selected, the following submenu will be displayed: F1 – Proceed F2 – Abort

TABLE 2 – Keyboard Functions (continued)

Pushbutton Legend	Definition	Description
		SECOND FEATURES MENU F1 – CBC UTILITIES – Provides various features to simplify configuration of a Batch Command Controller. F2 – CALIBRATE CBC – Allows the user to calibrate the Batch Command Controller for thermocouple, RTD or millivolt inputs. F3 – UNUSED F4 – UNUSED
MISCELLANEOUS PUSHBUTTONS		
ON	On	Turns CTT02 on.
OFF	Off	Turns CTT02 off.
FUNCTION PUSHBUTTONS		
The pushbuttons have multiple functions. In addition to the functions described below, they are also used in the sub–menus when the SPECIAL FEATURE key is depressed. The arrow portion of the keys also allows the user to scroll up, down, to the left and right during certain steps of the configuration procedure.		
F1	Change Block/ Status Request	Allows the selection of a new block number in DELETE mode.
F2	Confirmation/ Select	Used to confirm CONFIGURE, EXECUTE, or SEND operations and also to select current block for DELETE operations.
F3	Specification Selection	Allows the operator to select the desired specification for display when in the TUNE, MODIFY and ADD modes. In ADDRESS mode, pressing F3 will display the status bytes.
F4	Next Tunable/ Diagnostics	In TUNE mode, F4 is used to index the specifications to the next tunable spec of a specific block. In ADDRESS mode, pressing F4 displays any erorrs existing in the target unit.

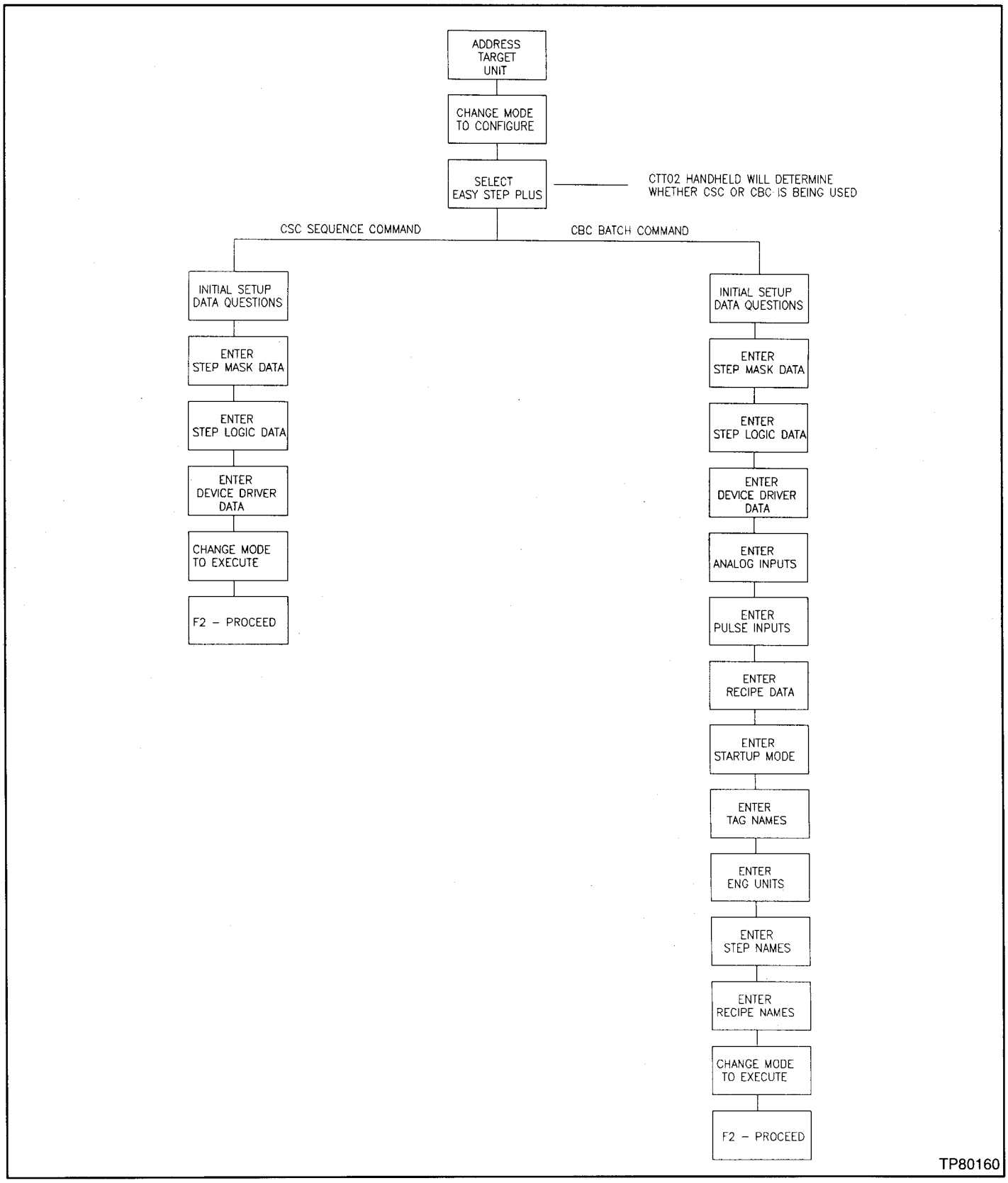


FIGURE 7 – EASY STEP PLUS Submenus for Sequence and Batch Command Controllers

Configuration

The Configuration and Tuning Terminal is the primary means of interacting with a Command Series Controller. With it, a control strategy defined in function blocks, can be reviewed, modified and monitored in detail. To perform these functions, a set of defined steps must be followed for each function. These steps initiate a sequence of events which lead from one to another and are displayed using simple key words with status and error messages. Recovery from error conditions are well defined and usually involve going back to a previous step and starting over.

A detailed description of each function is given in the following subsections. It is followed by Appendices, one for each target unit using the Configuration and Tuning Terminal. Each Appendix includes a configuration example (operational sequence) and a sample keystroke example required to enter and execute the sample configuration. An overview of the CTT02 operation is shown in Figure 8.

USER CONFIGURATION —NVRAM

The NVRAM (Non–Volatile Random Access Memory) in the target unit holds the user's configuration data (Function Blocks). This type of RAM is used because it can be written to electrically, but will retain data in the event of a power failure. **THE USER MUST INITIALIZE THE NVRAM ON A TARGET UNIT BEFORE ENTERING A NEW CONFIGURATION.** Refer to the Product Instruction for the target unit being configured to determine the proper method for initializing the NVRAM.

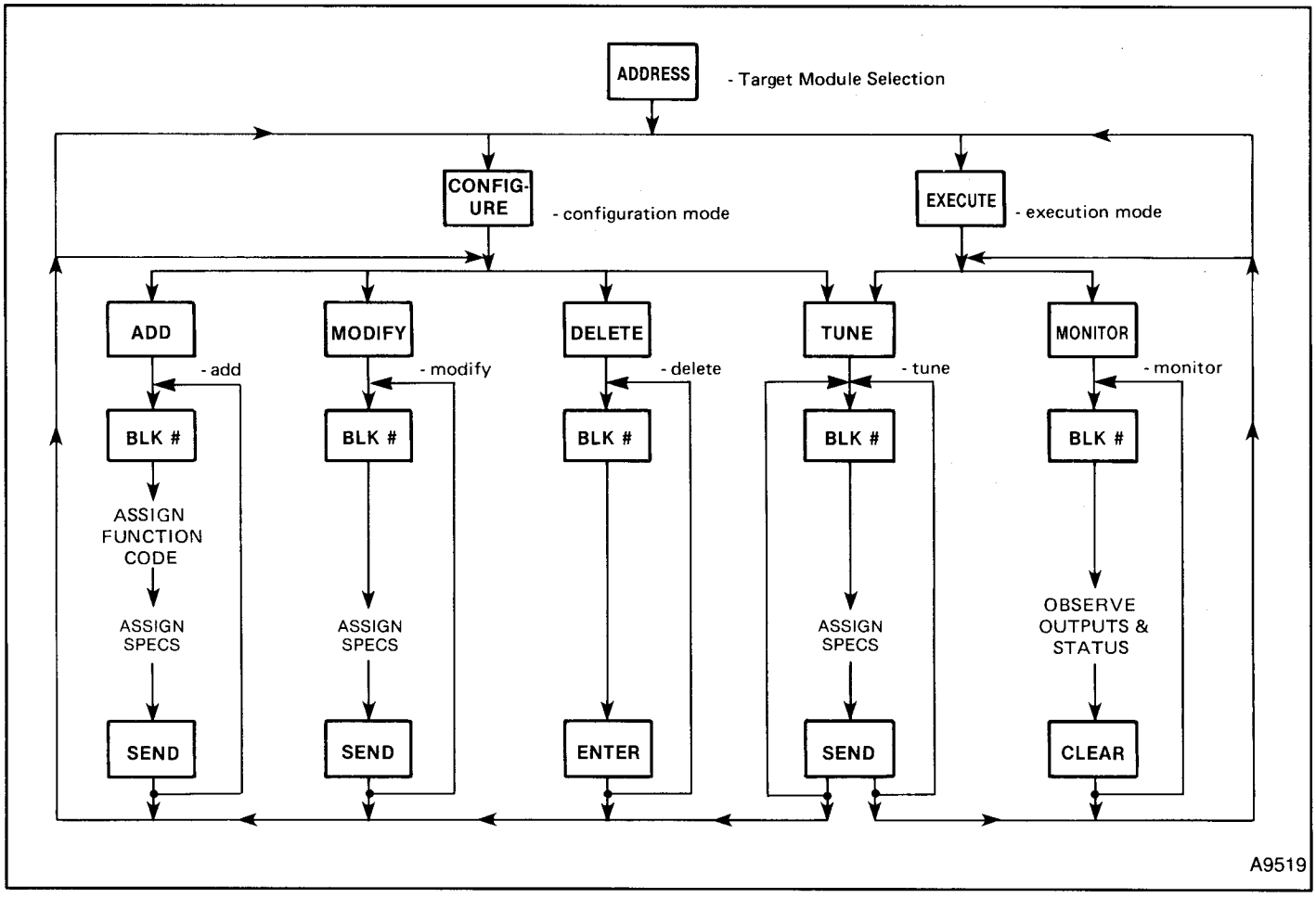


FIGURE 8 – CTT02 Operation Overview

TARGET UNIT SELECTION

The first step required to perform any action with the Configuration and Tuning Terminal is to select the Command Series target unit address. The CTT02 then sets up communications by reading its current operating status and saves this address for all future communications, until that address is changed. The status of the Command Series target unit contains information about the present mode of operation (CONFIGURE, EXECUTE or ERROR) and any operating conditions or error conditions. See section titled **Operating Status Display** in the **DIAGNOSTICS** section for a detailed explanation of the target unit operating status.

The target unit mode affects the CTT02 since the mode determines what functions are permitted. The modes and permitted functions are as follows:

CONFIGURE: Algorithms are not executed. The target unit will permit alteration of its configurations by Addition, Deletion, Modification or Tuning.

EXECUTE: Algorithms are executed. Target unit in control of the process, inputs being read, etc. The target unit will permit TUNING of its configuration and MONITORING of its block outputs.

ERROR: Algorithms are not executed. The target unit has detected fault or error condition(s) which prohibit continuation of normal operation. No configuration alteration or block output monitoring permitted. The target unit must be placed into CONFIGURE mode before operations can continue.

FAILED: Module has failed. Applies only to a BIM (Bus Interface Module) if the Command Series unit is being used in conjunction with a Bailey INFI 90 system or NETWORK 90 system.

To select a target unit, the following key sequence is used:

where XX is the address of the target unit (00 to 31).

The Configuration and Tuning Terminal will respond by displaying the target unit address, type, mode and a message line, F4 – diagnostics, which is an error summary line.

```
MODULE – 4>
TYPE – SEQ CMD
MODE – CONFIGURE
F4 – diagnostics *
```

MODULE: The module address of the target unit being addressed.

TYPE: LOOP CMD, SEQ CMD, BATCH CMD, LIM/BIM, etc. will be displayed.

MODE: EXECUTE, CONFIGURE, ERROR or FAILED will be displayed.

F4 – diagnostics: An error summary line. An asterisk will appear after the word "diagnostics" if there is a current error in the target unit. Refer to the **DIAGNOSTICS** section.

NOTE: If an error message occurs such as "VACANT" instead of the above screen, refer to Table 7, Error Messages.

MODE CHANGE

Each mode allows certain functions to be performed. Figure 8 summarizes which functions are permitted in a particular mode and the mode must be changed accordingly.

The Configuration and Tuning Terminal can command the target unit to change modes at the user's request. The keystroke sequence is as follows:

To place the target unit in the configure mode, press

To place the target unit in the execute mode, press

The new mode, CONFIGURE or EXECUTE must be entered and then confirmed by pressing F2 to prevent accidental mode change by erroneous key entries. The Configuration and Tuning Terminal then reads and displays the target unit status. If the change was successful,

the new mode will be displayed. If not, the condition which prevented the change will be displayed. The CLEAR function will normally allow the user to abort the entry.

Addition

The ADD function permits a user to select and define a new function block. This new function block can be used to configure a control scheme or add to an existing control scheme. After selecting the target device and changing the mode to CONFIGURE, the ADD function may be selected by pressing:

The number for the block to be added must then be specified by pressing:

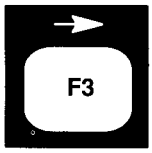
ENTER – add at the current block, or

XXXXX,ENTER – to select a different block number

NOTE: The NEXT and PREV keys may be used to move through the block numbers. Holding the key in the depressed position will permit scrolling.

If the block number to be added is not a valid number, a display will indicate the reason. Otherwise, the operator will be prompted (CODE–XXX >) to enter the block function code in decimal (1 to 255). When entered, the Configuration and Tuning Terminal asks the target unit for the function code and default values for that function code. If there is some error in the function code and/or block number, an appropriate status message will be displayed. If the entry is valid, SPEC #1 of the function code will be displayed, and a new value may be entered. Once that value is correctly entered, the display will automatically advance to SPEC #2. Pressing the PREV key will allow you to go to the previous spec. A spec may be skipped (left unchanged) by pressing the NEXT, ENTER or PREV key.

Pressing Function Key 3 (F3) allows the user to select a specification number to view. The key sequence is:



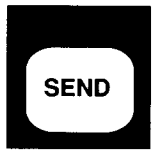
,XXX,

where XXX is the desired specification number. This function is valid in ADD, MODIFY, and TUNE modes.

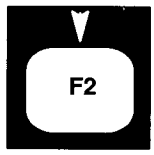
When entering a new value, the Configuration and Tuning Terminal checks for agreement with data type only. The value will be changed only when it is valid, otherwise, an error code is displayed indicating an invalid entry. To recover from this, press the CLEAR key and continue with the operation (data entry, etc.).

NOTE: To review a previous spec, press the PREV key. Holding the key in a depressed position will permit scrolling.

The Configuration and Tuning Terminal will display "END" when the end of the spec list is reached and cycle back to SPEC #1 if the NEXT key is pressed again. When the beginning of the spec list is reached, "START" is displayed and will cycle back to the last spec if the PREV key is pressed again. The specs may be changed and reviewed as needed. When complete to the user's satisfaction, the block must be sent to the target unit by entry of:



,



The Configuration and Tuning Terminal then commands the target unit to write the block and verifies that it is correct by reading it back and comparing it to what was sent. The result of this will be displayed as *SEND CONFIRMED*. Another block number may be entered now, or another function may be selected.

Modify

The configuration of a target unit may also be altered by modifying an existing block. To modify an existing block, press:

and then press:

XXXXX,

to change the number of the block which is to be modified, or press:

to change the block shown.

NOTE: NEXT and PREV keys may be used to move through the block numbers. Holding the key in a depressed position will permit scrolling.

The Configuration and Tuning Terminal reads the block from the target unit and displays its function code to indicate that modification can continue. If the target unit does not return the block and its data, a status message is displayed indicating the reason.

Block modification can then proceed using the same procedures as outlined above for block addition. When modification is completed, the modifications must be sent to the target unit by pressing:

The Configuration and Tuning Terminal will then command the target unit to write the block and verifies that it is correct by reading it back and comparing it to what was sent. The result of this will be displayed as *SEND CONFIRMED*. At this point, block modification may continue by entering another block number, or terminated by selecting another function.

Delete

Function blocks already configured in a target unit may be removed. To enter the delete mode, press:

and then specify the number of the block which is to be deleted. Press F2 to delete that block.

The Configuration and Tuning Terminal issues a command to the target unit to delete the block and verifies the result by attempting to read it back. If the block is not returned, it is assumed deleted and the user is told "DELETED". Otherwise, an error is indicated on the display. Deletion may continue by entering another block number or another function may be selected.

NOTE: The deletion of a Function Block does not remove references to it by other blocks. These other blocks must be modified to reflect the change.

Tune

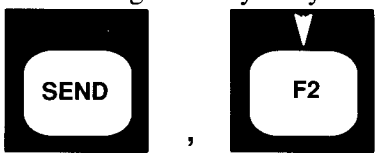
The process of tuning a block is identical to modifying a block except that it can occur when the target unit is in the CONFIGURE or EXECUTE mode, but only those specs indicated as tunable may be changed. To enter the Tune mode, press:

and enter the block number using the same procedure as for ADD and MODIFY.

NOTE: The tunable specs in a block are marked by a T at the end of the value line.

In the TUNE mode, pressing Function Key 4 (F4) causes the display to advance to the next tunable spec.

When the tuning changes are completely specified, they are then sent to the target unit by entry of:



The Configuration and Tuning Terminal will then command the target unit to write the block and verifies that it is correct by reading it back and comparing it to what was sent. The result of this will be displayed as *SEND CONFIRMED*. At this point, another block may be entered or another function selected.

Monitor

The MONITOR function permits a user to observe the output of any block and the status associated with that output when the device is in the EXECUTE mode. This status includes quality and alarm state.

Detailed Point Status Display:

Q–Good	– point quality good
Q–Bad	– point quality bad
HIGH ALARM	– high alarm
LOW ALARM	– low alarm
ALARM	– Boolean alarm

A block output may be observed by selecting the Monitor function:

and specifying the block number to be monitored:

XXXXX,  OR 

The Configuration and Tuning Terminal then displays the point value or a status message if the value cannot be read. The point value is updated several times a second. If the Configuration and Tuning Terminal cannot send its message to the target unit due to Module Bus activity, it will continue to retry. The MONITOR function may be terminated by pressing the CLEAR, NEXT or PREV key or selecting a new function.

UPLOAD/DOWNLOAD

NOTE: To use this feature, a configuration cartridge must be installed in the CTT02. Installation or removal of the cartridge while the CTT02 is under power is not recommended.

UP/DOWNLOAD is selectable through the SPECIAL FEATURE key, allowing the user to 1) upload configurations to the Configuration and Tuning Terminal from the target unit, 2) download a configuration back to the target unit, and 3) to delete any configuration stored in the cartridge. A maximum of 32 configurations can be stored on a cartridge. An ERROR code notifies the user when the maximum memory is reached. This UPLOAD/DOWNLOAD feature also permits the user to download configurations to multiple target units by just plugging in the CTT02, selecting the address of the target unit, and executing the procedure.

When the UP/DOWNLOAD choice (F1) is selected on the SPECIAL FEATURE menu, the following screen will appear:

```
F1 – UPLOAD TO CTT
F2 – DOWNLOAD
F3 – DELETE ENTRY
F4 – RE–INITIALIZE
```

If an error message appears when selecting any of the above choices, refer to Table 7 in the **DIAGNOSTICS** section for a description of the error and a recovery procedure.

F1 – Upload to CTT

If this option is selected, the following screen will appear:

```
ID: A
    ^

(USE F1–F4 KEYS)
```

Enter an ID to be assigned to the configuration. It may be up to eight characters long and may include the alpha letters A through Z or the numbers 0 through 9. To enter an ID, use the F1 (UP) and F2 (DOWN) keys to scroll through the character set. When you have selected the proper character, press the F4 key to advance to the next character. The F3 key may be used to change a previously selected character.

After entering the complete ID, press the ENTER key. The following screen will be displayed:

```
UPLOADING
CONFIGURATION
```

This message will remain on the screen the entire time the configuration is being read from the target unit. The length of time will depend on the module bus utilization and/or complexity of the configuration. When the upload is complete, the module status screen will appear.

F2 – Download

Target unit must be in the CONFIGURE mode. When this option is selected, the following screen will be displayed:

```
SELECT ID

XXXXXXXX
(USE F1 AND F2):
```

Use the F1 and F2 keys or the PREV and NEXT keys to select one of the stored configurations in the CTT02 cartridge. When the configuration name is displayed, press

the ENTER key. The following warning message will appear:

```
*** WARNING ***
THE EXISTING
TARGET CONFIG.
WILL BE LOST
```

After a few seconds, the following display will appear:

```
PROCEED?

F1 – YES
F2 – NO
```

NOTE: Pressing F1 erases any existing configuration in the target unit before downloading a new configuration.

If ready to proceed, respond by pressing the F1 (YES) key. The following will be displayed:

```
DOWNLOADING
CONFIGURATION
```

The CTT02 is now writing the selected configuration to the target unit. The length of time this message will appear is dependent on module bus utilization and/or the complexity of the configuration. When the download is complete, the module status screen will appear.

If F2 (NO) is pressed, the module status menu will appear and the existing target unit configuration will remain intact.

F3 – Delete Entry

The following screen will appear when this option is selected:

```
SELECT ID

XXXXXXXX
(USE F1 AND F2):
```

Use the F1 and F2 keys or the PREV and NEXT keys to view the stored configurations in the CTT02 cartridge. When the ID of the configuration to be deleted is displayed, press the ENTER key. The following screen will appear:

```
DELETE CONFIG.
NAMED XXXXXXXX
F1 – YES
F2 – NO
```

This screen verifies that XXXXXXXX is the configuration to be deleted. If true, press the F1 key. Once the deletion is complete, the module status menu will appear. If you do not want to delete configuration named XXXXXXXX, press the F2 key to return to the module status menu and have the stored configuration remain intact.

F4 – Re–Initialize

The following screen will appear when this option is selected:

```
DELETE ALL
STORED CONFIG?
F1 – PROCEED
F2 – ABORT
```

This feature allows the user to delete all of the stored configurations in the CTT02 cartridge at one time, re–initializing the cartridge. Pressing the F1 key deletes all of the stored configurations in the CTT02 cartridge. Once complete, the module status menu will appear. If the F2 key is pressed, the module status menu will appear and all stored configurations will remain intact.

EASY STEP PLUS (Batch and Sequence Command Controllers Only)

The EASY STEP PLUS feature is selectable through the SPECIAL FEATURE key on the CTT02. EASY STEP PLUS provides a simplified configuration method for creating a 1 to 32 step sequencer. In this mode, the Batch or Sequence Command Controller creates the basic configuration required for the user and then prompts the user to "fill in the blanks". The Controller must be in the CONFIGURE mode for this procedure.

CAUTION

If a Batch or Sequence Command Controller other than the master Batch Command Controller is used to store the recipe data, make certain that Controller is placed into the CONFIGURE mode before entering the EASY STEP PLUS mode. **The existing configuration in this unit will be lost.**

AVERTISSEMENT

Si l,on utilise un controleur de traitement par lots ou de traitement sequential (Batch Command Controller ou Sequence Command Controller) autre que le controleur maitre a des fins de stockage des donnees du procede, s'assurer que le controleur est en mode de CONFIGURATION avantnde passer au mode "EASY STEP PLUS". Sinin, la configuration de cet appareil serait effacee.

After selecting the EASY STEP PLUS option (F2) on the SPECIAL FEATURE menu, one of two possible screens will be displayed. If the target unit already has an EASY STEP PLUS configuration residing in its internal memory, it will ask you if you wish to begin a new EASY STEP PLUS configuration or edit the existing configuration. For more information on editing an existing EASY STEP PLUS configuration, refer to **Editing an Existing EASY STEP PLUS Configuration**.

If this is the first time the EASY STEP PLUS feature is being used, the following message will appear immediately after invoking EASY STEP PLUS.

```
***WARNING***
THE EXISTING
TARGET CONFIG.
WILL BE LOST
```

After this message is displayed for a few seconds, another screen will appear:

```
PROCEED?
F1 – YES
F2 – NO
```

In order to begin a new EASY STEP PLUS configuration, the existing configuration is deleted from the target unit. If you DO NOT wish to proceed with the EASY STEP PLUS configuring procedure, press the F2 (NO) key. The module status display will appear and the existing target unit configuration will still be intact.

Pressing the F1 (YES) key will cause the Configuration and Tuning Terminal to ask a series of questions about your particular sequence (Table 3) or batch (Table 4) application. The CTT02 will check which target unit it is connected to (CBC or CSC) and automatically choose the corresponding set of questions associated with that target unit.

NOTE: Not all of the questions listed in Tables 3 and 4 will be asked. Only those questions that apply will appear.

TABLE 3 – EASY STEP PLUS Sequence Command Initial Setup Data

NO.	QUESTION	RANGE OF ALLOWABLE REPLY	REPLY
1	ENTER # OF STEPS	1 – 32	NUMBER OF STEPS IN SEQUENCE PROCESS
2	ENTER # OF INPUTS	1 – 64	NUMBER OF DIGITAL INPUTS IN SEQUENCE PROCESS
3	ENTER # OF OUTPUTS	1 – 48	NUMBER OF DIGITAL OUTPUTS IN SEQUENCE PROCESS
4	ENTER I/O ADDRESS OF SLAVE #X	2 – 30 (even numbers only)	I/O ADDRESS OF CSC SLAVE #X
5	ENTER MODULE BUS ADDRESS OF SLAVE # X	0 – 31	MODULE BUS ADDRESS OF CSC SLAVE # X
6	ENTER STATION ADDRESS OF SLAVE # X	0 – 7	STATION ADDRESS OF CSC SLAVE # X
7	AUTOMATIC RESTORE OPTION F1 – YES F2 – NO	F1, F2 KEYS	NONE

NOTE: Each CSC Master can have 0–3 CSC Slaves.

TABLE 4 – EASY STEP PLUS Batch Command Initial Setup Data

NO.	QUESTION	RANGE OF ALLOWABLE REPLY	REPLY
1	ENTER # OF BATCH COMMAND UNITS	1–2	NUMBER OF BATCH COMMAND CONTROLLERS BEING USED
2	ENTER # OF SEQUENCE COMMAND UNITS	0–4	NUMBER OF SEQUENCE COMMAND CONTROLLERS BEING USED
3	ENTER # OF STEPS	1–32	NUMBER OF STEPS IN BATCH PROCESS
4	ENTER # OF CBC DIGITAL INPUTS	0–4	NUMBER OF CBC DIGITAL INPUTS IN BATCH PROCESS
5	ENTER # OF CSC DIGITAL INPUTS	0–64	NUMBER OF CSC DIGITAL INPUTS IN BATCH PROCESS
6	ENTER # OF CBC DIGITAL OUTPUTS	0–4	NUMBER OF CBC DIGITAL OUTPUTS IN BATCH PROCESS
7	ENTER # OF CSC DIGITAL OUTPUTS	0–48	NUMBER OF CSC DIGITAL OUTPUTS IN BATCH PROCESS
8	ENTER # OF HIGH LEVEL ANALOG INPUTS	0–12	NUMBER OF HIGH LEVEL ANALOG INPUTS IN BATCH PROCESS
9	ENTER # OF LOW LEVEL ANALOG INPUTS	0–6	NUMBER OF LOW LEVEL ANALOG INPUTS IN BATCH PROCESS
10	ENTER # OF PULSE INPUTS	0–4	NUMBER OF PULSE INPUTS IN BATCH PROCESS
11	ENTER # OF ANALOG LOOPS	0–4	ENTER NUMBER OF ANALOG CONTROL LOOPS IN BATCH PROCESS
12	ENTER # OF RECIPES	0–32	ENTER NUMBER OF RECIPES IN BATCH PROCESS
13	ENTER # OF RECIPE PARAMETERS	0–10	ENTER NUMBER OF RECIPE PARAMETERS IN BATCH PROCESS
14	ENTER MODULE ADDRESS TO STORE RECIPE	0–31	MODULE ADDRESS OF UNIT TO STORE RECIPES
15	ENTER CBC SLAVE I/O ADDRESS	1–15	I/O ADDRESS OF CBC SLAVE
16	ENTER CBC SLAVE STATION ADDRESS	0–7	STATION ADDRESS OF CBC SLAVE
17	ENTER CSC SLAVE #X I/O ADDRESS	2–30	I/O ADDRESS OF CSC SLAVE #X
18	ENTER CSC SLAVE #X STATION ADDRESS	0–7	STATION ADDRESS OF CSC SLAVE #X
19	AUTO RESTORE OPTION F1 = YES, F2 = NO	F1, F2	NONE

NOTE: Each CBC Master can have 0–1 CBC Slaves and 0–4 CSC Slaves.

Enter a response to questions using the 0 – 9 numeric keys and pressing the ENTER key for all questions except the Auto Restore Option. If the reply to any of the questions is out of range (i.e., # of steps = 45), the entry will be cleared from the screen and the correct response must be re–entered. Use the CLEAR key to enter a new reply or to clear an improper entry.

Automatic Restore Option

Normally, if the Batch or Sequence Command Controller's CPU goes into a reset condition while in EXECUTE mode due to power loss or operator–induced reset or if the mode is changed to CONFIGURE and back to EXECUTE, all the control parameters are reset. However, if the restore Function Code #140 is configured and

referenced to a particular function code, then that function code's parameters are saved in NVRAM. The parameters will be restored to their last saved state after the reset condition, allowing that function to pick up where it left off at the time of the reset condition. If the automatic restore option is selected, EASY STEP PLUS will configure restore blocks for certain function codes used in the configuration (refer to Function Code Application Manual, E93–900–20 for more details).

Refer also to the EASY STEP PLUS Block Address Map and Restore Function, Section B2 of Appendix B for Sequence Command and Section C2 of Appendix C for Batch Command.

Entering EASY STEP PLUS Specific Details

EASY STEP PLUS sets up all of the sequence monitors, sequence master, and auxiliary blocks needed to configure a sequence. EASY STEP PLUS will set up a sequencer in which logic goes from Step 1 to the number of steps inputted in the opening menus by setting the specs in the sequence monitors. Note that the last step will automatically point back to the first step.

After all of the responses to the initial setup questions have been answered, the following menu will be displayed:

```
F1 – STEP MASK
F2 – STEP LOGIC
F3 – DEVICE DRIVER
F4 – END
```

STEP MASK. The STEP MASK selection allows the user to enter the state of the digital outputs for each step in the process. The outputs may be specified by using a 0, 1 or 2 (2 is used to specify that you want an output to remain in the previous state).

When the STEP MASK environment is chosen, the following screen will appear:

```
STEP MASK INPUT

ENTER STEP #:
(OR F1 TO END)
```

Enter the step number for the mask you wish to enter or edit. If you enter an invalid step number, the number will be cleared and you must re–enter the step. When you have entered a valid step number, press the ENTER key and the following screen will be displayed:

(SEQUENCE COMMAND)

```
MASK  STEP # XX
1     0
2     0
3     0
```

(BATCH COMMAND)

```
MASK  STEP # XX
B1    0
B2    0
S1    0
```

This screen displays the current mask for the step selected. When EASY STEP PLUS is initially set up, each mask will contain all zeros. Note that the screen when configuring a Batch Command will list B's and S's to denote Batch Command or Sequence Command digital outputs under the MASK column.

Use the F1 or PREV key to scroll up or the F2 or NEXT key to scroll down to view each output in the mask. To set a particular output in the mask, use the 0, 1 and 2 keys. After any of these keys are pressed, the screen will automatically scroll down one line to speed the entry process. When editing is complete, press the ENTER key. This will return you to the initial step mask screen where you may select another step mask to edit. Press the F1 key to return to the main EASY STEP PLUS selection menu.

STEP LOGIC. The STEP LOGIC environment allows the user to enter a series of Function Code blocks that are to be executed for a particular step. These Function Codes are typically used to generate logic which indicates when all step conditions have been completed and it is all right to proceed to the next step. This logic output is called the "step done trigger". A timer function is a typical example. The step indicator is used to trigger the timer. The timer output is used as the step done trigger. Thus the step must be executed for a set amount of time before moving on to the next step.

Functions may also be added to cause certain operations to occur when the step is reached such as incrementing a counter or changing a set point.

If no step logic is entered for a step, EASY STEP PLUS assumes that it is alright to proceed to the next step as soon as the outputs reach their correct states for the step.

The "step indicator" is available to signal the step logic that the Controller is currently executing the step. (Boolean value: Logic 1 = step being executed.) The block address of the indicator for the step is displayed upon entering the step logic environment. It is also listed in EASY STEP Block Address Map, Appendix B2 for the Sequence Command Controllers and Appendix C2 for Batch Command Controllers.

When the STEP LOGIC selection is chosen, the following screen will appear:

```
STEP LOGIC INPUT

ENTER STEP #:
(OR F1 TO END)
```

Enter a valid step number and a second display will appear:

```
STEP  XX  LOGIC
STEP INDICATOR
AT BLOCK # XXX
ENTER FCODE:
```

The step indicator block address (indicated by XXX) is a boolean signal that is on only when step XX is activated. It is to be used to turn on step XX function blocks when required.

Enter the Function Code number for the first block to be executed for Step # XX.

NOTE: If you enter an invalid Function Code number when adding any of the step logic blocks, an error message will be displayed at the bottom of the ADD environment (INVALID FNC CODE). If this occurs, press ENTER and you will be prompted to enter a new Function Code number. After entering the new Function Code number, press ENTER and continue.

NOTE: You are allowed 15 block addresses for each step.

Once the Function Code is entered and the ENTER key is depressed, you will automatically go into the ADD environment. The block number is chosen for you by the CTT02 and all you need to do is change any of the specifications associated with the selected Function Code. When all the necessary specifications have been entered, press the SEND and F2 keys just as you would in the normal ADD environment. After pressing the SEND and F2 keys, the following display will appear:

```
STEP  XX  LOGIC
CONTINUED
ENTER FCODE:
(OR F1 TO END)
```

Up to 14 additional Function Codes can be added for this particular step in the same manner as the first Function Code was added. If you do not wish to add additional blocks for this step, press the F1 key to return to the initial STEP LOGIC INPUT display menu. EASY STEP PLUS uses the output of the last Function Code entered as the "step done trigger" for that step. To exit the STEP LOGIC environment, press the F1 key again to return to the main EASY STEP PLUS menu.

NOTE: If the last Function Code added to step logic sequence has more than one output, EASY STEP PLUS uses the first output as the "step done trigger".

If it is necessary to edit the Step Logic, refer to section, **Editing Step Logic.**

DEVICE DRIVER. The DEVICE DRIVER environment allows the user to modify the Device Driver blocks (Function Code 123) in the EASY STEP PLUS configuration. There is one device driver block associated with each digital output. The device driver blocks are used to control and monitor the discrete control devices in the field. They accept one or two inputs (feedback) from the field which define the status of the device.

When the F3 DEVICE DRIVER selection is chosen, the display(s) will appear as follows: When configuring a Batch Command Controller, an additional screen will appear asking you to designate which outputs you wish to modify: CBC or CSC.

(SEQUENCE COMMAND)

```
DEVICE DRIVER
SET–UP
CSC OUTPUT #:
(OR F1 TO END)
```

(BATCH COMMAND)

```
DEVICE DRIVER
SET–UP                (1)
F1 – CBC OUTPUTS
F2 – CSC OUTPUTS
```

```
DEVICE DRIVER
SET–UP                (2)
CBC OUTPUT #:
(OR F1 TO END)
```

Select a digital output number. When the ENTER key is pressed, you will automatically be placed in the MODIFY environment. The CTT02 will also determine which device driver block is associated with the output previously selected. The device driver block can be modified once in the MODIFY environment. Modify the device driver specs and press the SEND, F2 keys. After the CTT02 displays *SEND CONFIRMED*, you will be returned to the DEVICE DRIVER environment. At this

point, you can select another output to be modified or press F1 to return to the main EASY STEP PLUS menu.

NOTE: For those users configuring a Sequence Command Controller, the configuration is complete. After returning to the EASY STEP PLUS menu, press F4 to END. The module status display will appear. Press EXECUTE and then F2 to proceed. For those users configuring a Batch Command Controller, it is necessary to continue with the configuration process.

For those continuing the Batch Command Controller configuration, pressing the NEXT key will bring up the following submenu.

```
F1 – ANALOG INPUT
F2 – PULSE INPUT
F3 – RECIPE DATA
F4 – STARTUP MODES
```

ANALOG INPUT. The ANALOG INPUT environment allows the user to select or edit the various parameters required for the analog input's operation. The Analog Input Definition (Function Code 182) defines the inputs and also performs the various calibration operations required for the analog inputs. Pressing F1 will bring up the following screen:

```
ANALOG INPUT
SET–UP
ENTER AI #:
(OR F1 TO END)
```

Select an analog input number. When the ENTER key is pressed, a Function Code 182 will be added for you in the correct block number. This Function Code 182 will also be linked to the Batch I/O block associated with this input. The screen will show the MODIFY environment and the analog input definition block can be modified. Once the values have been entered or edited, press the SEND, F2 keys. After the CTT02 displays *SEND CONFIRMED*, you will be returned to the analog input set–up screen to choose another input or F1 to END. Pressing F1 to END will return you to the following submenu.

```
F1 – ANALOG INPUT
F2 – PULSE INPUT
F3 – RECIPE DATA
F4 – STARTUP MODES
```

PULSE INPUT. The PULSE INPUT environment allows the user to select or edit various parameters required for the pulse input operation. Pressing F2 – PULSE INPUT will cause the following screen to appear.

```
PULSE INPUT
SET–UP
ENTER PI #:
(OR F1 TO END)
```

Once the pulse input number is selected and the ENTER key is pressed, another screen will appear:

```
SELECT ONE:
F1 – FREQUENCY
F2 – PERIOD
F3 – TOTALIZE
```

In the FREQUENCY mode, a counter records the number of input pulses or cycles that occur per second. In the PERIOD mode, a counter measures the time between input pulses. In the TOTALIZE mode, an internal counter records the number of input pulses up to 1.9×10^{19} or until it is reset. When the user selects the desired mode, the correct function code for that choice will be added. The screen will automatically go to the MODIFY environment and the pulse input values can be added or modified. Using the CLEAR key will allow you to re–enter a value if a mistake is made.

Once the input values have been added or modified, press the SEND, F2 keys. After the CTT02 displays *SEND CONFIRMED*, you will be returned to the pulse input set–up screen to choose another input or F1 to END.

RECIPE DATA. The RECIPE DATA environment allows the user to enter the recipe parameter values. The recipe data will be placed in the chain of recipe blocks (Function Code 118) in the module that was specified during the inital questions (Table 4). A maximum of ten parameters can be entered for each of 32 recipe steps maximum. Pressing F3 - RECIPE DATA will cause the following screen to appear.

```
RECIPE DATA
ENTER
PARAMETER #:
(OR F1 TO END)
```

Once the parameter number (0–10) is entered and the ENTER key is pressed, the following screen will appear:

```
PARAMETER # XX
(F1 TO END)
RECIPE  VALUE
1       _______
```

Enter the value (real data value). Press the ENTER key. The parameter # screen will reappear with the next recipe number displayed. Continue with this procedure until all the recipe values are entered for each parameter. Press F1 to end and return to the submenu.

STARTUP MODES. The STARTUP MODES environment allows the user to select the values that will determine the state of the process when the mode is changed from CONFIGURE to EXECUTE in the Batch Command Controller. MAN/AUTO refers to the mode of the outputs and RUN/HOLD refers to the state of the sequencer. Pressing F4 – STARTUP MODES will cause the following screen to appear:

```
SELECT USING F1:
MAN     >>AUTO
SELECT USING F2:
RUN     >>HOLD
```

When this screen appears, the current mode will be displayed. Pressing F1 will toggle the selector ">>" between MAN and AUTO. Pressing F2 will toggle the selector ">>" between RUN and HOLD. Once your selection is complete, press ENTER and the submenu will again appear. Press NEXT and the following screeen will appear:

```
F1 – TAG NAMES
F2 – ENG UNITS
F3 – STEP NAMES
F4 – RECIPE NAMES
```

TAG NAMES. The TAG NAME environment allows the user to select a tag name for each loop. Loop tag names are displayed when the TAG pushbutton is pressed on the Batch Command Controller faceplate. Pressing F1 will cause the following screen to appear:

```
TAG NAME ENTRY
LOOP     NAME
1        A_______
          ^
```

(8 characters max.)

When this screen appears, the current name for Loop #1 is displayed. Enter the tag name for Loop #1 using the F1–F4 arrow keys. The F1 and F2 keys (up and down arrows) will scroll the characters available. Once the character has been selected, use the F3 and F4 keys (right and left arrows) to move the ^ cursor to the next position and select another character. Refer to Table 5 for available name characters. Once selection has been completed, press the ENTER key and the next screen to appear will be for entering the tag name for Loop #2. Once Loop #2 is completed the submenu will again appear.

NOTE: When entering data for TAG NAMES, the data entered is modifying the fixed block at address 2046.

NOTE: When using a Batch Command Controller as a slave, the Tag Names and Engineering Units for the slave must be entered separately from EASY STEP PLUS using CBC UTILITIES while addressing the slave unit over the module bus.

ENGINEERING UNITS. The Engineering Units environment allows the user to select the engineering unit to be displayed for the Process Variable, Set Point and Auxiliary Input. The Control Output (CO) variable is ALWAYS displayed in percent of span and, therefore, is NOT selectable by the user. The engineering units are displayed in the three rightmost character positions of the VARIABLE display of the Batch Command Controller

TABLE 5 – Available ASCII Characters for Data Input

(space)	!	"	#	$	%	&	'	(	)	*
+	,	–	.	/	0	1	2	3	4	5
6	7	8	9	:	;	<	=	>	?	@
A	B	C	D	E	F	G	H	I	J	K
L	M	N	O	P	Q	R	S	T	U	V
W	X	Y	Z	[	\	]	^	_	‘	a
b	c	d	e	f	g	h	i	j	k	l
m	n	o	p	q	r	s	t	u	v	w
x	y	z	{	|	}	~				

faceplate. Pressing F2 will cause the following screen to appear:

```
ENG   UNIT   ENTRY
LOOP  VAR    NAME
1     PV     A__
             ^
```

(3 characters max.)

Enter the engineering units for the Process Variable using the F1–F4 arrow keys. The F1 and F2 keys (up and down arrows) will scroll the characters available. Once the character has been selected, use the F3 and F4 keys (right and left arrows) to move the ^ cursor to the next position and select another character. Refer to Table 5 for available characters. Once selection has been completed, press the ENTER key and enter the data for Set Point and Auxiliary Input in the same manner. Once completed, the next screen to appear will be for entering the engineering units for Loop 2. When the data has been entered for Loop 2, press ENTER and the submenu will again appear.

NOTE: When entering data for ENGINEERING UNITS, the data entered is modifying the fixed block at address 2046.

NOTE: When using a Batch Command Controller as a slave, the Tag Names and Engineering Units must be entered separately from EASY STEP PLUS using CBC UTILITIES while addressing the slave unit over the module bus.

STEP NAMES. The Step Names environment will allow the user to select a step name for the various steps in the process. The step name is displayed on the top alphanumeric display of the Batch Command Controller faceplate whenever the Controller is in the EXECUTE mode and there are ASD function blocks (Function Code 113) configured for the step names. If no name is assigned to a step, the display on the faceplate will be blank. When a step name is entered, an automatic search of the ASCII string descriptors will begin. If there are not any containing the step number you selected, one will be made and the blocks will be relinked. If one exists, it will pick it out and modify it. Pressing the F3 key will cause the following screen to appear:

```
STEP NAME ENTRY
STEP   NAME
1      A_______
       ^
```

(8 characters max.)

Enter the step name using the F1–F4 arrow keys. The F1 and F2 keys (up and down arrows) will scroll the characters available. Once the character has been selected, use the F3 and F4 keys (right and left arrows) to move the ^ cursor to the next position and select another character. Refer to Table 5 for available characters. Once selection has been completed, press the ENTER key and the next screen to appear will be for entering the next step name. When the last name is entered, the submenu will again appear.

RECIPE NAMES. The Recipe Names environment will allow the user to select a name for the recipe. The recipe name is displayed on the top alphanumeric display of the Batch Command Controller faceplate whenever the user selects the RECIPE key. If no name is assigned to the recipe, the display on the faceplate will be blank. When a recipe name is entered, an automatic search of the ASCII string descriptors (Function Code 113) will begin. If there are not any containing the recipe number you selected, one will be made and the blocks will be relinked. If one exists, it will pick it out and modify it. Pressing the F4 key will cause the following screen to appear:

```
RECIPE NAMES
REC #   NAME
1       A_______
        ^
```

(8 characters max.)

Enter the step name using the F1–F4 arrow keys. The F1 and F2 keys (up and down arrows) will scroll the characters available. Once the character has been selected, use the F3 and F4 keys (right and left arrows) to move the ^ cursor to the next position and select another character. Refer to Table 5 for available characters. Once selection has been completed, press the ENTER key and the next screen to appear will be for entering the next recipe name. When the last recipe name has been entered, press the ENTER key and the submenu will appear. Press the PREV key twice to return to the main EASY STEP PLUS menu. Press F4 to END.

END. This selection will immediately end the EASY STEP PLUS configuration and the module status display will appear. The configuration created by EASY STEP PLUS now exists in the target unit.

EDITING AN EXISTING EASY STEP PLUS CONFIGURATION (Batch or Sequence Command Controllers Only)

Once an EASY STEP PLUS configuration has been created, it is possible to edit the existing configuration by re–entering the EASY STEP PLUS environment.

When EASY STEP PLUS is first selected in the SPECIAL FEATURE menu and an EASY STEP PLUS configuration currently exists in the module, the following screen will be displayed:

```
SELECT OPTION:

F1 – BEGIN NEW CFG.
F2 – EDIT OLD CFG.
```

Pressing the F1 key will delete the previous EASY STEP PLUS configuration and begin a new configuration.

Pressing the F2 key will cause the following display:

```
F1 – STEP MASK
F2 – STEP LOGIC
F3 – DEVICE DRIVER
F4 – END
```

The CTT02 will skip over the initial setup questions that were asked when the existing configuration was originally set up. Select one of the environments and proceed with the editing.

It is also possible to edit an existing configuration using the conventional ADD, MODIFY and DELETE procedures. For this reason, a complete table of the EASY STEP PLUS block structure is provided in Appendix B, Section B2 (Sequence Command) and Appendix C, Section C2 for Batch Command at the end of this Instruction Book. In the STEP LOGIC environment, each time a step is entered the corresponding output block of the real signal demultiplexer (Function Code 126) is displayed. This will further help the user in editing or appending to the EASY STEP PLUS configuration using the conventional ADD procedure.

Editing Step Logic

If editing step logic and the blocks are already in place, the following screen will appear:

```
STEP XX  LOGIC

F1 – ADD TO LOGIC
F2 – REDO LOGIC
```

Pressing F1 will allow you to add blocks to the step logic. If blocks are to be inserted or deleted, pressing F2 will erase all of the function blocks for STEP XX and it will be necessary to re–enter the blocks for that step.

SET TIME

The target unit must be in the EXECUTE mode. The SET TIME feature is selectable through the SPECIAL FEATURE key. It allows the user to set the day, date and time in the target unit. When the F3 key is selected from the SPECIAL FEATURE menu, the following screen will appear:

```
SET TIME & DATE
SUN  /  /
     :  :
```

Set the day first by using the F1 and F2 keys to scroll through the days of the week. When the correct day appears on the display, press the ENTER key.

Next set the date by using the 0 – 9 numeric keys. Format to use is MM/DD/YY. If an invalid date is entered, the date area will automatically be cleared. Re–enter the date. To re–enter the date at any time, push the CLEAR key. When the date is correct, press the ENTER key.

After the day and the date have been entered, enter the time using the 0 – 9 numeric keys. Format to use is HH:MM:SS (24 hour format). An invalid time entry will automatically clear the display and the time will have to be re–entered. When the correct time is entered, press the ENTER key. When the target unit has accepted the new time and date, the CTT will return to the module status display.

CONFIGURATION DUMP (Batch and Sequence Command Controllers Only)

The target unit must be in the CONFIGURE mode. The CONFIGURATION DUMP feature is selectable through

the SPECIAL FEATURE key. This feature allows the user to dump the configuration in the target unit to the RS–232 port located on the back of the Controller. This port can be interfaced to a serial device such as a printer or terminal.

Once the CONFIGURATION DUMP is selected using the F4 key, the following display appears:

```
CONFIGURATION
DUMP
F1 – PROCEED
F2 – ABORT
```

If F1 is selected, the target unit will begin to dump its configuration to the RS–232 port and the CTT02 will return to the main status menu.

If F2, ABORT, option is selected, the CTT02 will return to the main status menu.

NOTE: If the target unit is placed in the EXECUTE mode while a configuration dump is in progress, the dump will be aborted.

CBC UTILITIES (Batch Command Controllers Only)

The CBC Utilities is selectable through the SPECIAL FEATURE key and is listed under the second features menu (refer to Table 2). This feature allows those users not using EASY STEP PLUS to enter data for the configuration process. Press the SPECIAL FEATURE key. The first feature menu will be displayed: F1 – UP/DOWNLOAD, F2 – EASY STEP PLUS, F3 – SET TIME and F4 – CONFIGURATION DUMP. Press the NEXT key and the second feature menu will be displayed. The following screen will appear:

```
F1 – CBC UTILITIES
F2 – CALIBRATE CBC
F3 – UNUSED
F4 – UNUSED
```

Pressing F1 – CBC UTILITIES will cause the following screen to appear:

```
F1 – TAG NAMES
F2 – ENG UNITS
F3 – STEP NAMES
F4 – RECIPE NAMES
```

Tag Names and Engineering Units differ in that for EASY STEP PLUS you will get a submenu that will allow you to select between TAGS or ENG UNITS for master/slave or backup units.

```
SET NAMES FOR:
F1–MASTER/SLAVE
F2–BACKUP UNIT
(SELECT ONE)
```

Select F1 to set the TAG NAME or ENG UNITS for the Batch Master or Slave unit, modifying Block 2046.

Select F2 to set the TAG NAMES or ENG UNITS for the Batch Backup, modifying the ASD (ASCII String Descriptor) at Block 2045.

Once the data has been entered, the Tag Name or Eng. Unit screen will appear that is shown in the section **Entering EASY STEP PLUS Specific Details.**

Step Names and Recipe Names differ in that for EASY STEP PLUS these are fixed blocks at a specific location and for CBC Utilities these functions will be editing ASCII String Descriptor Blocks that can be placed in any location. Because these blocks are not fixed, the following screen will appear:

```
ENTER BLOCK
NUMBER OF 1ST
ASCII STRING
DESCRIPTOR:
```

Once the block is entered, the Step Name or Recipe Name screen will appear that is shown in the section **Entering EASY STEP PLUS Specific Details**. The information can then be entered as described in that section.

NOTE: When using CBC Utilities, it is necessary for the user to link the start of the ASCII String Descriptor Blocks into the ASD spec of the Batch Station.

CALIBRATE CBC (Batch Command Controllers Only)

NOTE: Refer to the Batch Command Controller Instruction Book, E93–500–3 for complete information on calibration.

The CBC Calibrate function is selectable through the SPECIAL FEATURE key and is listed under the second features menu (refer to Table 2). This feature allows the user to calibrate the Batch Command Controller thermocouple, RTD or millivolt inputs. Press the SPECIAL FEATURE key. The first feature menu will be displayed: F1 – UP/DOWNLOAD, F2 – EASY STEP PLUS, F3 – SET TIME and F4 – CONFIGURATION DUMP. Press the NEXT key and the second feature menu will be displayed. The following screen will appear:

```
F1 – CBC UTILITIES
F2 – CALIBRATE CBC
F3 – UNUSED
F4 – UNUSED
```

1. Press F2, CALIBRATE CBC. The following screen will appear:

```
**CALIBRATION**
ENTER CBC I/O SLAVE
ADDRESS: _____
INPUT #:_____
```

(Select 1 – 15)
(Select 4, 5 or 6*)

* – Of the six analog inputs on the CBC01, only analog inputs No. 4, 5, and 6 can accept direct temperature inputs, i.e., thermocouples, RTD's, or millivolt inputs.

2. Enter the CBC01 I/O Slave address. Press ENTER and then enter the input number of the point to be calibrated. Once entered, the following screen will appear:

```
STANDBY
PROCESSING
CALIBRATION DATA
```

3. The next screen(s) to appear are dependent on the input selection; thermocouple, mV or RTD. The specs inputted during configuration for the Analog Input Definition (Function Code 182) have determined your input and, therefore, have also determined the correct screen(s).

Thermocouple/mV Inputs

The screen shown in Step 1 will only appear if the input is a thermocouple. Proceed to Step 2 if the input is mV.

1. Enter the ambient temperature at the CBC01's terminal block in degrees C.

```
ENTER AMBIENT TEMP
AT CBC TERMINAL
BLOCK IN°C:
(OR F1 TO ABORT)
```

2. Connect the 0 mV precision low signal value (Table 6) to the temperature/mV input terminals (Figure 9).

```
APPLY 0 mV TO
CBC INPUT # X
THEN PRESS ENTER
(OR F1 TO ABORT)
```

where X is the input selected

TABLE 6 – Temperature/mV/RTD Calibration Signals, Batch Command Controllers

Measurement Device Type	Signal	
	Precision Low Value	Precision High Value
TC/mV	0 mV	80 mV
RTD	100 ohms	400 ohms

NOTE: Signals applied should be within ±0.01% of the values listed.

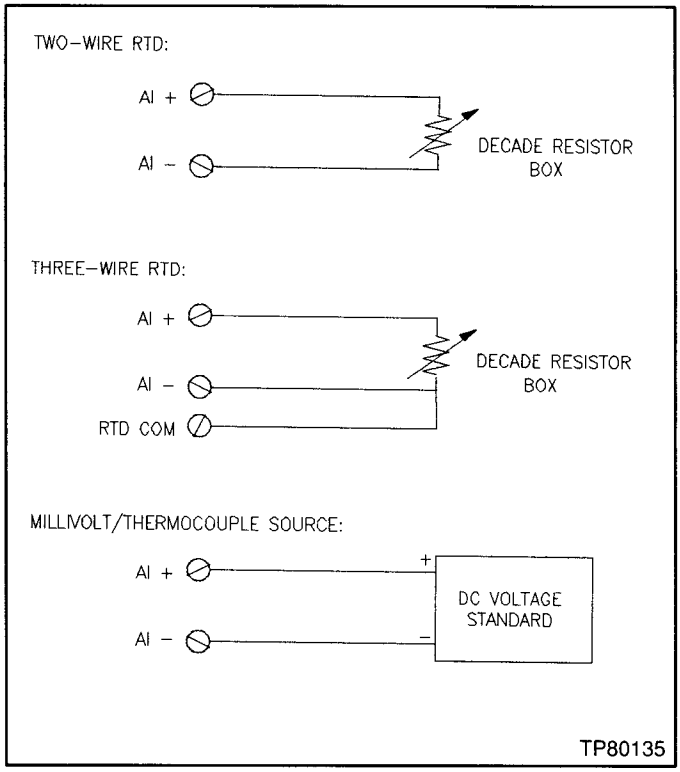


FIGURE 9 – Calibration Connections, Batch Command Controller

3. Wait for the Batch Command Controller to read the calibration signal and perform the necessary calculations. The following screen will appear:

```
STANDBY
PROCESSING
CALIBRATION DATA
```

NOTE: This screen could be displayed for 30 to 60 seconds while the calculations are being completed before the next screen appears.

4. The CTT02 will prompt you when to proceed. Connect the precision high signal value (Table 6) to the temperature/mV input terminals.

```
APPLY 80 mV TO
CBC INPUT # X
THEN PRESS ENTER
(OR F1 TO ABORT)
```

5. During the necessary calculations by the CBC01, the following screen will again appear on the CTT02:

```
STANDBY
PROCESSING
CALIBRATION DATA
```

NOTE: This screen could be displayed for 30 to 60 seconds while the calculations are being completed before the next screen appears.

6. Once the procedures are complete, the following screen will appear:

```
CAL COMPLETE
RECONNECT FIELD
INPUT # X
(F2 TO CONTINUE)
```

7. Press F2 to continue:

```
F1 – CALIBRATE ANOTHER
     INPUT
F2 – EXIT CAL MODE
```

RTD Inputs

1.Connect the 100 ohms precision low value (Table 6) to the temperature/mV input terminals (Figure 9).

```
CONNECT 100 OHMS
TO CBC INPUT # X
THEN PRESS ENTER
(OR F1 TO ABORT)
```

where X is the input selected

2. Press ENTER and the following screen will appear:

```
STANDBY
PROCESSING
CALIBRATION DATA
```

3. Connect the 400 ohms precision high value (Table 6) to the temperature/mV input terminals.

```
CONNECT 400 OHMS
TO CBC INPUT # X
THEN PRESS ENTER
(OR F1 TO ABORT)
```

4. Press ENTER and the STANDBY screen will again appear. Once the procedure is complete, the following screen will appear:

```
CAL COMPLETE
RECONNECT FIELD
INPUT # X
(F2 TO CONTINUE)
```

5. Press F2 and the following screen will appear:

```
F1 – CALIBRATE ANOTHER
INPUT
F2 – EXIT CAL MODE
```

Once calibration for a specific analog input is invoked, the output of the batch I/O block associated with the analog input holds its last value all through the calibration process. The output of batch I/O starts updating its value as soon as the calibration is either finished successfully or is aborted.

During calibration, a number of errors may occur. The CTT02 Configuration and Tuning Terminal displays a brief description of these errors. Refer to Table 7 for a description of the calibration error codes.

Diagnostics

Error Messages

Error messages are displayed whenever an incorrect entry occurs using the Configuration and Tuning Terminal. An example of their use and a summary of the Error Messages is given in Table 7.

TABLE 7 – Error Messages

GENERAL ERROR MESSAGES

Display	Error Description	Recovery
SEND NOT ALLOWED	Send not allowed.	Enter correct block, module, or mode action.
ABORTED	Action aborted by user.	Proceed with intended action.
UNIT NOT IN CONFIGURE MODE	Unit not in CONFIGURE mode.	The action requested first requires the unit to be placed in the CONFIGURE mode.
VACANT	Vacant	No unit present or responding at that address location. Enter new address, check target unit, or check wiring. Target unit may be in an error state and need to be reset. Consult target unit Instruction Book.
****ERROR****	Error in the environment area of the screen.	Press CLEAR to return to selections, or give proper response to proceed.
FAILED	BIM (Bus Interface Module) has failed.	Check LIM/BIM pair.
ENTRY MUST BE AN INTEGER FROM 0–31 AND CAN NOT BE CTT ADDRESS	Entry must be an integer from 0 – 31 and can not be the address assigned to the CTT02 unit.	Follow instructions as stated.
BUSY	Target busy with another task. It will respond after current task is completed.	Wait for target unit to respond.
NO BLOCK PRESENT	No block present at that location.	Check block number.
BLK NOT DELETED	Block not deleted.	Check target unit configuration and function code list. Try again.
NOT CONFIRMED	Block not verified.	Check target unit configuration and function code list. Try again.
BLOCK ASSIGNED	Block assigned.	Check configuration – block already assigned.
OUT OF RANGE	Out–of–range.	Block # out of range of addressable blocks. Check block number.
BAD F CODE & BLOCK	Bad Function Code and Block	Block and/or function code not available in addressed unit.
INVALID FNC CODE	Invalid function code.	Function code not available in addressed unit. Check function code number.
MODE CONFLICT	Target unit not in proper mode for command to take place.	Check target unit DIP switches for proper settings. Put target unit into proper mode for command.
****ERROR**** UNIT MUST BE IN EXECUTE MODE TO SET TIME & DATE	The target unit must be in the EXECUTE mode to set the time and date.	Change target unit to EXECUTE mode to set the time and date.

TABLE 7 – Error Messages (continued)

Display	Error Description	Recovery
****ERROR**** UNIT MUST BE IN CONFIG MODE FOR EASY STEP PLUS	The target unit must be in the CONFIGURE mode to use EASY STEP PLUS.	Change target unit to CONFIGURE mode to use EASY STEP PLUS.
****ERROR**** NO RESPONSE (OR F1 TO END)	Unable to communicate with target unit.	Check address of target unit. Enter correct address.
****ERROR**** EASYSTEP PLUS MAY ONLY BE USED WITH BAT. & SEQ.	The EASY STEP PLUS feature can only be used with Batch and Sequence Command Controllers.	Select address of desired Batch or Sequence Command Controller.

UPLOAD/DOWNLOAD ERROR MESSAGES

Display	Error Description	Recovery*
LOAD ERROR OUT OF MEMORY STOPPED STORING AT BLOCK # XXXX	The user has used all the memory in the CTT02 available for configuration storage. XXXX is the last block stored.	Delete a previously stored configuration from the CTT02 and the configuration recently uploaded. Try uploading again or use another cartridge.
****ERROR**** NO MORE MEMORY AVAILABLE TO STORE CONFIG.	The user has used all the memory in the CTT02 available for configuration storage.	Delete a previously stored configuration from the CTT02 or use another cartridge.
****ERROR**** UNIT MUST BE IN CONFIGURE MODE TO DOWNLOAD	The target unit must be in the CONFIGURE mode to download.	Change to CONFIGURE mode.
****ERROR**** MODULE TYPE MISMATCH	The type of target unit you are attempting to download to is of a different type than the configuration stored. Example: Type of configuration stored is a Loop Command configuration and you are trying to download to a Sequence Command.	Select correct target unit. Try again.
****ERROR**** THERE ARE NO CONFIGURATIONS PRESENTLY STORED	No configurations are presently stored in the CTT02 cartridge.	Add configurations. Maximum of 32 configurations can be stored in the CTT02 cartridge.
XXXXXXXXXXXXX ERROR DETECTED AT BLOCK #XXXX DOWNLOAD ABORTED	An error was detected during the download operation at block #XXXX. First line of message displays the problem encountered.	Check stored configuration at Block #XXXX and see Note [1].
****ERROR**** CONFIGURATION BY THE SAME NAME ALREADY EXISTS	Configuration ID name already exists.	Choose another ID name or delete previous configuration by the same name.
ERROR CARTRIDGE NOT INSERTED	Cartridge not installed in CTT02.	Install cartridge in CTT02.

NOTE [1]– Download error will be detected when a stored configuration in an enhanced Loop Command (CLC02) is downloaded to a basic Loop Command (CLC01). The CLC02 has advanced math functions, and therefore has additional function codes that the CLC01 does not have.

CALIBRATION ERROR MESSAGES (Batch Command Controller only)

Display	Error Description	Recovery
CAL ERROR WRONG INPUT TYPE SPECIFIED (F1 TO CONTINUE)	Input type specified in associated analog input definition block (FC 182) is a type that does not require calibration.	Press F1. Change mode to CONFIGURE and modify the analog input definition block (FC 182) that is associated with the input being calibrated. Change mode to EXECUTE start calibration again.
CAL ERROR INVALID MSG (F1 TO CONTINUE)	Invalid message sent by the CTT02.	Reset the CTT02 (turn off and then turn on) and resume calibration.
CAL ERROR CAL INPUT OUT OF RANGE (F1 TO CONTINUE)	Field input connected to CBC01 is out of valid range.	Power down unit and check and correct specified range and hardware setting on the analog board of the CBC01. Power up the CBC01 and wait for 30 seconds. Press F4 while in the address mode of CTT02. Verify no module problem reports exits. Restart calibration.
CAL ERROR CAL INPUT OUT OF RANGE (F1 TO CONTINUE)	Cold junction compensator on CBC01 T.U. not installed or is bad.	Verify cold junction compensator is installed. Install if necessary or replace if bad.
CAL ERROR BATCH I/O BLOCK NOT DEFINED (F1 TO CONTINUE)	Batch I/O block (FC 180) not configured for the batch I/O address specified during calibration.	Press F1. Change mode to CONFIGURE and add/modify batch I/O block. Change mode to EXECUTE and start calibration again.
CAL ERROR ANALOG POINT DEF NOT DEFINED (F1 TO CONTINUE)	Analog input definition (FC 182) not configured for the specified input or the analog input definition block is not linked to the associated batch I/O block (FC 180).	Press F1. Change mode to CONFIGURE. Add analog input definition block. If already added, link it to the batch I/O block. Change mode to EXECUTE and start the calibration again.
CAL ERROR UNDEFINED ERROR CODE (F1 TO CONTINUE)	Invalid message sent to CTT02 by the CBC01. Communication problem.	Check configuration. Reset the CTT02 and start calibration again.

TROUBLESHOOTING USING THE CTTO2

The diagnostics process for the CTT02 is based on a five byte operating status display. For Loop Command Controllers the display is in hexadecimal format for Status Bytes 1 through 5. For Batch and Sequence Command Controllers the display is hexadecimal format for Status Bytes 1 through 3 and in binary coded decimal (BCD) format for Status Bytes 4 and 5. To simplify the process of locating and interpreting errors in the target unit for the user, a quick reference Diagnostics feature is available to aid in troubleshooting. It provides the user with simple message format screens, without having to convert status byte displays from hexadecimal to decimal and referencing tables to determine the errors. For those users that want to see the status byte information, pressing F3 when the module status display screen is displayed will show Status Bytes 1 through 5 in hexadecimal format. Pressing F3 again, will return the screen to its normal mode. Refer to section, **Operating Status Display** for procedures to interpret the data.

Quick Reference Diagnostics

When the target unit is addressed, the last line of the module status display will read: F4 – diagnostics.

```
MODULE – 4>
TYPE – LOOP CMD
MODE – CONFIGURE
F4 – diagnostics *
```

See explanation of asterisk.

An asterisk may or may not be displayed after the word "diagnostics". Whenever an asterisk appears, regardless of the mode, press F4. The asterisk indicates an error exists in

the target unit. A typical example of a diagnostics screen would be:

```
CONFIG ERROR
UNDEFINED INPUT
AT BLK # XX
(REF. BLK # XXX )
```

Another example would be:

```
LOCAL I/O          <—— I/O problem with target unit
Q – BAD            <—— Bad Quality detected.
LOCAL BLK #201     <—— Problem associated with Block
                       Address #201 within target unit.
```

Use the NEXT key to step through the messages. Table 8 lists the possible diagnostic error messages.

TABLE 8 – Quick Reference Diagnostic Error Messages

Display	Error Description	Recovery
NVRAM ERROR: WRITE FAILURE	Problem exists writing to configuration memory (NVRAM).	Reinitialize NVRAM. See target unit Instruction Manual. Retry. If problem still persists, replace NVRAM or board that NVRAM is located on.
NVRAM ERROR: CHECKSUM ERROR	Data corrupted in configuration memory (NVRAM).	
NVRAM ERROR: FORMAT ERROR (BAD DATA)	Data corrupted in configuration memory (NVRAM).	
NVRAM ERROR: RESET/POWERFAIL DURING WRITE	Attempted to write to configuration memory during RESET or power failure.	Reinitialize NVRAM. Retry. See target unit Instruction Manual.
ANALOG INPUT ERROR: OVERRANGE INPUT (OR REF. ERROR)	Overrange analog input or reference out of tolerance.	Check analog inputs to verify that inputs are within proper specifications. If within specications, place unit in CONFIGURE mode and then into EXECUTE. If problem persists, replace I/O board assembly. Refer to target unit Instruction Manual.
CONFIG ERROR UNDEFINED INPUT AT BLOCK # XXX (REF BLK # YYY)	Configuration error at Block XXX. This block is referencing a non–existing block at YYY.	Check and correct configuration.
CONFIG ERROR DATA TYPE CONFLT AT BLOCK # XXX (REF BLK # YYY)	Configuration error at Block XXX. Expected data type from Block YYY is not correct.	Check and correct configuration.
TRIP BLOCK ACTIVATED AT BLOCK # XXXX	Configuration has activated trip block at Block XXXX.	Check configuration logic which activated block.
FUNC NOT ALLOWED IN SEGMENT SEG BLK #: XXX BLK NO ALLW:YYY	Function Code residing at Block YYY is not permitted in segment.	Remove Function Code and place in 1st segment.
TOO MANY SEGMENT CONTROL BLOCKS	Exceeded the maximum number of segment control blocks allowed for the target unit.	Check and correct the configuration.

TABLE 8 – Quick Reference Diagnostic Error Messages (continued)

Display	Error Description	Recovery
SEGMENT CONTROL BLOCK VIOLATION 1ST SEG ERR:XXX SEG IN ERR: YYY	Incorrect priority specified for segment control block at Block # YYY.	Check priorities of segment control blocks.
CONFIG ERROR SEQUENCING TOO COMPLEX	Configuration is too complex to be auto–sequenced.	Simplify configuration or disable auto–sequencer.
PRIMARY FAILED & CONFIGURATION NOT CURRENT	Primary unit has failed and dynamic data in backup unit is not correct.	Reconfigure the primary unit.
PRIMARY FAILED AND CHECKPOINT DATA NOT AVAIL.	Primary unit has failed and configuration in the backup unit is not correct.	Reconfigure the primary unit, reset backup unit.
AI REFERENCE ERR AT BATCH SLAVE BLOCK # : XXXX	Reference voltages are out of range in I/O unit being driven by Block # XXXX.	Check or replace the input assembly. Refer to target unit Instruction Manual.
PCU COMM ERROR OFFLINE PCU: XX	Unable to communicate with PCU XX.	Check LIM/BIM and loop address.
LOCAL I/O ERROR Q–BAD LOCAL BLK # XXX	Input or output at Block # XXX has bad quality.	Check I/O. Retry. If problem persists, replace board assembly. Refer to target unit Instruction Manual.
MODULE BUS I/O Q–BAD ADR XX BLK # YYY	BAD quality or unable to obtain data from Block # YYY in target at module address XX.	Check configuration and mode of target unit at address XX. Verify module bus operation between units.
LOOP INPUTS Q–BAD PCU# XX ADR YY BLK# ZZZ	BAD quality or unable to obtain data from Block ZZZ in unit at PCU XX, module address YY.	Check configuration and mode of target unit at PCU XX, module address YY. Verify module bus and plant loop operation between units.
STATION COMM FAIL LOCAL BLK # XXX STATION ADDR YY	Unable to communicate over station link with station address YY being referenced by Block XXX.	Check configuration and station link.
LOOP OUTPUT Q–BAD LOCAL BLK # XXX	Output at Block XXX has BAD quality.	Check I/O. Retry. If problem persists, replace board assembly. Refer to target unit Instruction Manual.
OPEN THERMOCOUPL Q–BAD LOCAL BLK # XXX	Open wire detected for temperature input being referenced at Block # XXX.	Check wiring of temperature sensing device. Refer to target unit Instruction Manual.
COLD JUNCTION COMPENSATOR BAD T/C BLK # XXX	Cold Junction Compensator bad for thermocouple input being referenced at Block # XXX.	Check/replace Cold Junction Compensator. Refer to target unit Instruction Manual.
UNABLE TO CALIB Q–BAD LOCAL BLK # XXX	Calibration voltage out of range.	Verify proper calibration voltages. Retry calibration procedure. If problem persists, replace the input assembly. Refer to target unit Instruction Manual.
OUT OF SERVICE Q–BAD LOCAL BLK # XXX	Analog input being referenced at Block # XXX requires calibration and has not yet been calibrated.	Calibrate input being referenced at Block # XXX. Refer to target unit or Slave Instruction Manual.
I/O SLAVE ERROR ERROR TYPE XX LOCAL BLK # YYY SLAVE ADR# ZZ	Problem of type XX with slave at address ZZ being referenced by Block YYY. Refer to Slave Instruction Manual for definition of specific error type.	Check configuration and Expander Bus. Refer to target unit Instruction Manual.

After the last diagnostic message has been displayed, pressing the NEXT key displays the following screen:

```
END OF
DIAGNOSTICS

CLEAR – CONTINUE
```

Press the CLEAR key to return to the module address display.

To review the messages again, press the PREV key. When you reach the first diagnostic message, the following display will appear:

```
START OF
DIAGNOSTICS

CLEAR – CONTINUE
```

Operating Status Display

Pressing F3 when the module status screen is displayed will display Status Bytes 1 through 5 in hexadecimal format for Loop Command Controller. For Batch/Sequence Command Controllers, Status Bytes 1 through 3 are in hexadecimal and 4 and 4 are in binary coded decimal (BCD) format. The following will appear:

```
MODULE – 4>
TYPE – LOOP CMD
MODE – CONFIGURE
S: 06 00 00 00 00
```

1 2 3 4 5 (status bytes 1–5 in hexadecimal format)

These three bytes contain specific error information. Refer to Status Byte tables for definitions.

These two bytes have common meaning for all control units.The hexadecimal bytes need to be converted to binary format to obtain the status information. Refer to section **Hexadecimal Conversion** for changing formats and Status Byte tables for the specific status information.

Hexadecimal Conversion

TABLE 9 – Hexadecimal Conversion Table

Hexadecimal Digit	Decimal Value	Binary Value
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
A	10	1010
B	11	1011
C	12	1100
D	13	1101
E	14	1110
F	15	1111

CONVERSION OF HEXADECIMAL TO BINARY. To convert a hexadecimal number to binary, replace each hex digit by its 4–bit binary equivalent.

EXAMPLE: Converting the hexadecimal number, E6, to binary.

$$E = 1110 \qquad 6 = 0110$$

Thus, $E6_{hex} = 11100110_{binary}$

CONVERSION OF HEXADECIMAL TO DECIMAL. The hex system is a base 16 system; therefore, a hex number can be expressed as:

$$(H_0 \times 1) + (H_1 \times 16) + (H_2 \times 16^2) \ldots\ldots,$$

where H_0 is the least significant hex digit and H_1 is the next significant and so on.

EXAMPLE:

Convert the hex number CA to decimal.

The least significant hex digit is A or 10. The next digit is C or 12. Referring to the above equation, the decimal number is as shown:

$$(10 \times 1) + (12 \times 16) = 202$$

Operating Status Bytes #1 through #5

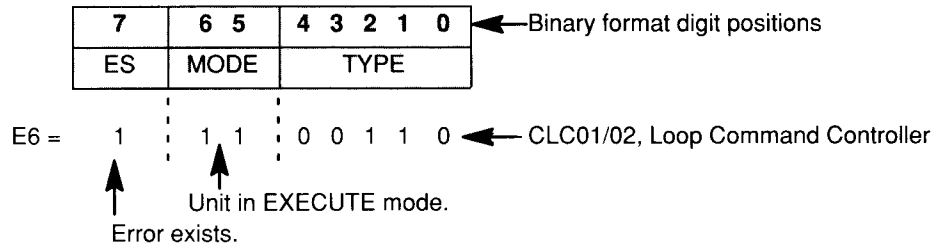
The operating status display screen contains five status bytes. As stated before, status bytes #1 and #2 have a common definition regardless of the target unit being used. Status bytes #3 through #5 are defined on a target unit basis.

For the examples in this section, the Loop Command Controller has been chosen as the target unit, but the procedure to obtain the status information would apply to any Command Series target unit.

LOOP COMMAND CONTROLLER EXAMPLE

Status Byte #1

An example of Status Byte #1 would be:



ES – Error Summary: 0 = no errors

*Error Summary bit will be set if any of the error bits are set in Status Byte #2. Refer to Status Byte #2 for specific information.

1 = error exists*

MODE: 00 = configure

01 = failed (used by BIM only)

10 = error

11 = execute

TYPE: 00000 = reserved

00001 = LIM01/PIM01, Loop Interface Module/ Processor Interface Module pair

00010 = CTM01, Configuration and Tuning Module

00011 = AMM01, Analog Master Module

00100 = AOM01, Analog Output Module

00101 = COM02/03/04, Controller Module

00110 = CLC01/02, Loop Command Controller

00111 = LMM01, Logic Master Module

01000 = LIM01/BIM01, Loop Interface Module/ Bus Interface Module pair

01001 = AMM02, Analog Master Module

01010 = CIU01, Computer Interface Unit

01011 = MFC01/02, Multifunction Controller

01100 = LMM02, Logic Master Module

01101 = MPC01/02, Multiprocess Controller

01110 = BTM01, Bus Transfer Module

01111 = LCM01, Large Capacity Module

10000 = LSM01, Loop Storage Module

10001 – GCM01, Gateway Control Module

10010 = CTT01, Configuration and Tuning Terminal

10011 = CBC01, Batch Command Controller

10100 = CSC01, Sequence Command Controller

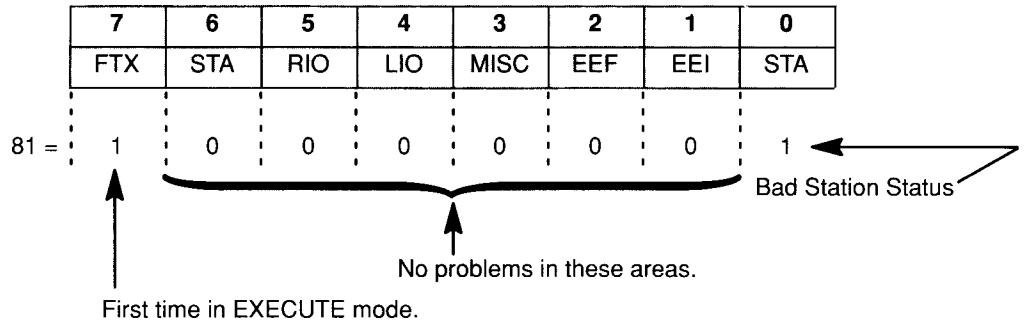
11110 = LCM02, Large Capacity Module

11111 = LCM03, Large Capacity Module

LOOP COMMAND CONTROLLER EXAMPLE

Status Byte #2

An example of Status Byte #2 would be:



FTX = First Time in Execute Mode (0 = no, 1 = yes)

STA = Status Function (0 = Good, 1 = Bad)
CSC/CBC = Backup Status

RIO = Summary Remote I/O Status (0 = OK, 1 = Bad)

LIO = Summary Local I/O Status (0 = OK, 1 = Bad)

MISC = Miscellaneous Status (0 = No, 1 = Yes)
CLC = Summary Segment Alarm Status
CSC/CBC = Backup Configuration is changed

EEF = NVRAM Failure (0 = No, 1 = Yes)

EEI = NVRAM contains default configuration (0 = No, 1 = Yes)

STA = Summary Station Status (0 = OK, 1 = Bad)

LOOP COMMAND CONTROLLER EXAMPLE

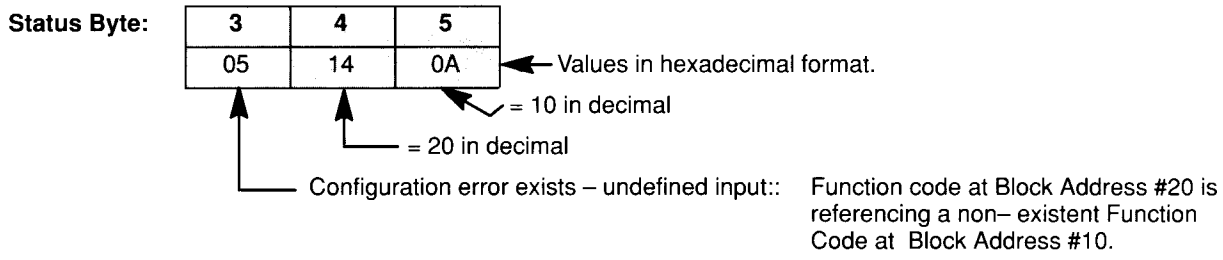
Status Bytes #3 – #5.

NOTE: The contents of status bytes 3, 4, and 5 depend on target unit type and unit mode.

Mode	Byte 3	Byte 4	Byte 5	Description
ALL	00	00	00	No specific error status available.
ALL	01	01	—	NVRAM error: Write failure.
EXCT,ERR		02	—	Checksum error
ERR		03	—	Format error (Bad data)
ERR		FA	—	Reset/powerfail during SP write
ERR		FF	—	Reset/powerfail during write
ERR	02	00	04	Analog input overrange or reference error.
		00	05	Analog input overrange or reference error.
	(X) = block number making reference (in hexadecimal format)			(Y) = block number being referenced (in hexadecimal format)
ERR	05	(X)	(Y)	Configuration error – undefined input (X) = block making reference (Y) = block number
ERR	06	(X)	(Y)	Configuration error – data type conflict (X) = block number making reference (Y) = block number
ERR	08	(X)	—	Trip Block Activated (X) = block number of trip block
	09	(X)	(Y)	Function not allowed in segment (X) = segment block number (Y) = block number not allowed
	0A	—	—	Too many segment control blocks
	0B	(X)	(Y)	Segment control block priority violation (X) = block number of first segment in error (Y) = block number of segment in error
	0C	—	—	Configuration Error – sequencing too complex

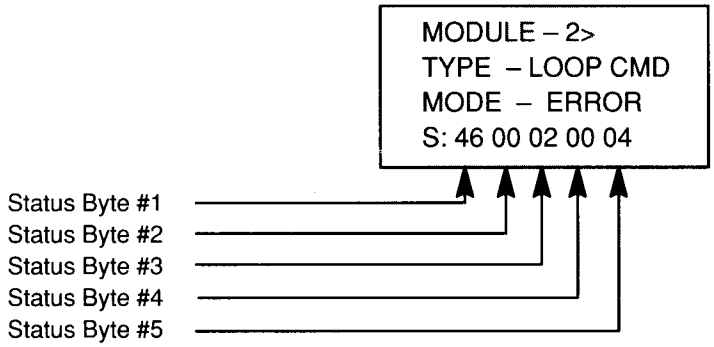
LOOP COMMAND CONTROLLER EXAMPLE

An example of Status Bytes #3, #4 and #5 would be:



How To Obtain Status Code Information

Press F3 while in any mode and the following screen will appear.



Convert the first two status bytes from hexadecimal to binary.

LOOP COMMAND CONTROLLER EXAMPLE

Status Byte #1

Hexadecimal: 4 6

Binary: 0 1 0 | 0 0 1 1 0

7	6 5	4 3 2 1 0
ES	MODE	TYPE

Status Byte #2

0 0 0 0 | 0 0 0 0

7	6	5	4	3	2	1	0
FTX	STA	RIO	LIO	MISC	EEF	EEI	STA

ES: Error Summary:

0 = no errors

1 = error exists

MODE: 00 = configure
01 = failed (used by BIM only)
10 = error
11 = execute

TYPE: 00000 = reserved
00001 = LIM01/PIM01, Loop Interface Module/ Processor Interface Module pair
00010 = CTM01, Configuration and Tuning Module
00011 = AMM01, Analog Master Module
00100 = AOM01, Analog Output Module
00101 = COM02/03/04, Controller Module
00110 = CLC01/02, Loop Command Controller
00111 = LMM01, Logic Master Module
01000 = LIM01/BIM01, Loop Interface Module/ Bus Interface Module pair
01001 = AMM02, Analog Master Module
01010 = CIU01, Computer Interface Unit
01011 = MFC01/02, Multifunction Controller
01100 = LMM02, Logic Master Module
01101 = MPC01/02, Multiprocess Controller
01110 = BTM01, Bus Transfer Module
01111 = LCM01, Large Capacity Module
10000 = LSM01, Loop Storage Module
10001 – GCM01, Gateway Control Module
10010 = CTT01, Configuration and Tuning Terminal
10011 = CBC01, Batch Command Controller
10100 = CSC01, Sequence CommandController
11110 = LCM02, Large Capacity Module
11111 = LCM03, Large Capacity Module

FTX = First Time in Execute Mode (0 = no, 1 = yes)

STA = Status Function (0 = Good, 1 = Bad)
CSC/CBC = Backup Status

RIO = Summary Remote I/O Status (0 = OK, 1 = Bad)

LIO = Summary Local I/O Status (0 = OK, 1 = Bad)

MISC = Miscellaneous Status (0 = No, 1 = Yes)
CLC = Summary Segment Alarm Status
CSC/CBC = Backup Configuration is changed

EEF = NVRAM Failure (0 = No, 1 = Yes)

EEI = NVRAM contains default configuration (0 = No, 1 = Yes)

STA = Summary Station Status (0 = OK, 1 = Bad)

LOOP COMMAND CONTROLLER EXAMPLE

Compare status bytes #3, #4, and #5 to the table below to determine the cause of the error.

Mode	02 Byte 3	00 Byte 4	04 Byte 5	Description
ALL	00	00	00	No specific error status available.
ALL	01	01	—	NVRAM error: Write failure.
EXCT,ERR		02	—	Checksum error
ERR		03	—	Format error (Bad data)
ERR		FA	—	Reset/powerfail during SP write
ERR		FF	—	Reset/powerfail during write
ERR	02	00	04	Analog input overrange or reference error.
		00	05	Analog input overrange or reference error.
	(X) = block number making reference (in hexadecimal format)			(Y) = block number being referenced (in hexadecimal format)
ERR	05	(X)	(Y)	Configuration error – undefined input (X) = block making reference (Y) = block number
ERR	06	(X)	(Y)	Configuration error – data type conflict (X) = block number making reference (Y) = block number
ERR	08	(X)	—	Trip block activated (X) – block number of trip block
	09	(X)	(Y)	Function not allowed in segment (X) = segment block number (Y) = block number not allowed
	0A	—	—	Too many segment control blocks
	0B	(X)	(Y)	Segment control block priority violation (X) = block number of first segment in error (Y) = block number of segment in error
	0C	—	—	Configuration Error – sequencing too complex

EXAMPLE SUMMARY:

Status Byte #1 reveals that the module is a Loop Command Controller in the ERROR mode. This byte also shows that there are no errors defined by Status Byte #2, (ES = 0). Therefore, Status Bytes 3, 4, and 5 must define the error. When Status Bytes 3, 4, and 5 are compared to the table it can be determined that the error is an analog input overrange or reference error. These types of errors can be caused by one of several problems:

1. The absence of an analog input while in the voltage mode.

2. The presence of an analog input greater than +10 Volts.

3. A failure of the on–board voltage references.

COMMAND SERIES CONSTANT BLOCKS

Block addresses 0 through 9 are fixed constant blocks and may be used as inputs to the configuration. Table 10 lists the values of the blocks within the Command Series line of Controllers.

TABLE 10 – System Constant Block Summary

Block Number	Output
0	Logic 0
1	Logic 1
2*	Logic 0, or Real 0.0
3	Real –100.0
4	Real –1.0
5	Real 0.0
6	Real 1.0
7	Real 100.0
8	–9 x 10E18 (maximum negative value)
9	9 x 10E18 (maximum positive value)

* Not used for CLC0 ☐ Loop Command Controllers

Service and Replacement

No periodic maintenance is necessary for the Configuration and Tuning Terminal.

The flexible cord, Part No. 1948517–1, on the CTT02 is the only replaceable part. CTT02 replacement and company services are available for special maintenance requirements.

Replacement or additional blank cartridges, Part No. 6637531–1, are also available.

Appendix A – Loop Command Controller

NOTE: On new, unconfigured Command Series target units, the user must perform the procedure listed under **User Configuration — NVRAM** prior to starting configuration operations. Proceed to that section in this Instruction Book if your target unit is new.

The information contained in Appendix A applies to the Loop Command Controller, CLC0□. This Appendix is divided into subsections which contain various examples and tables that will prove useful when using the CTT02 for configuration of the Loop Command Controller.

SECTION A1 – EXAMPLE KEYSTROKE PROCEDURE

This subsection of Appendix A provides an operation sequence for the Loop Command Controller and an example keystroke procedure required for the configuration.

EXAMPLE OPERATION SEQUENCE FOR SINGLE ELEMENT CONTROL LOOP

The following is a typical control loop and the operational sequence required to enter the control scheme into a Loop Command Controller. Figure A1 shows a simple loop configuration containing a PID (proportional, integral and derivative) function with a manual/auto station. The keystroke sequence required to enter the configuration from the Configuration and Tuning Terminal to the memory of the Loop Command Controller is defined in the following pages.

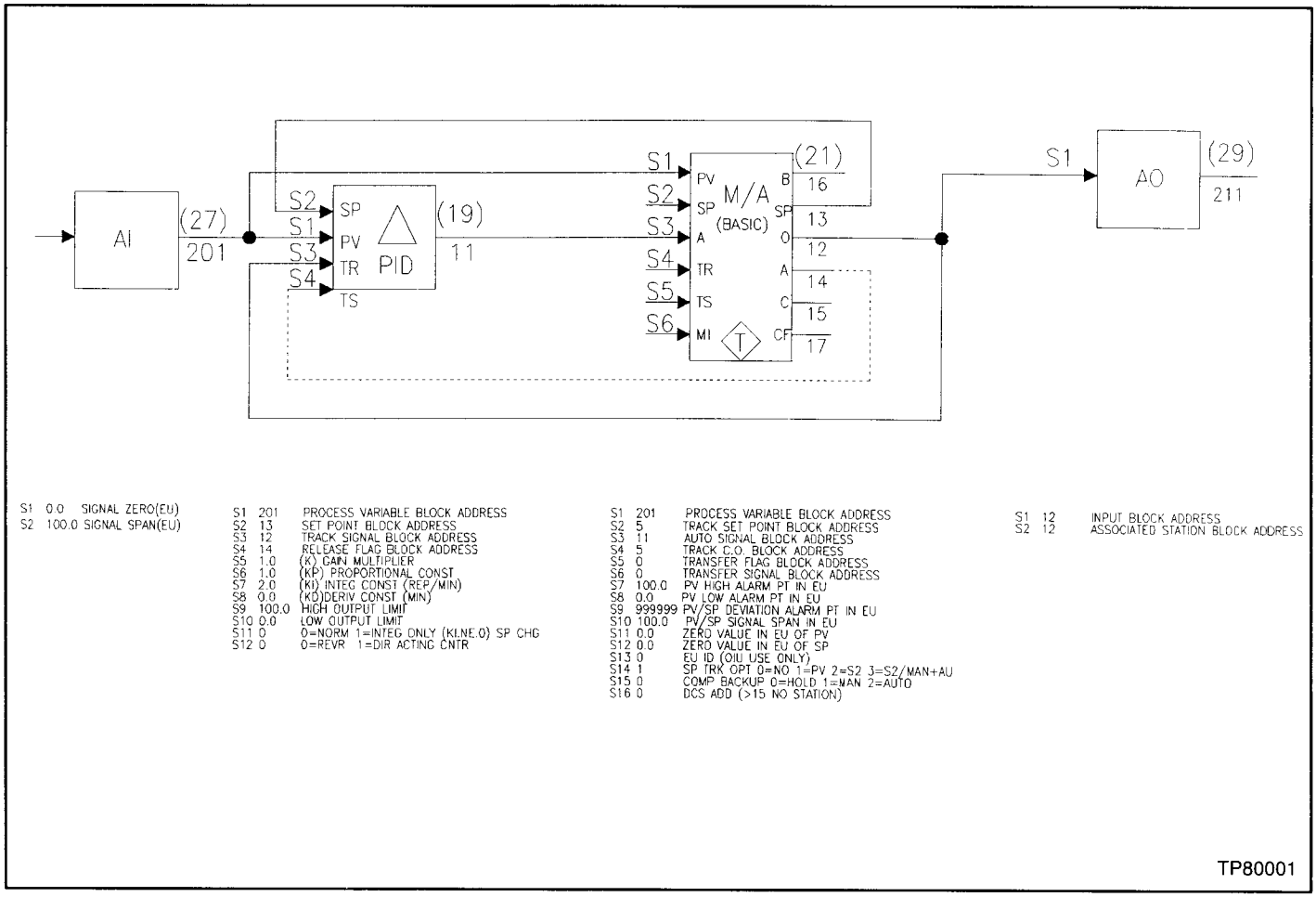


FIGURE A1 – Simple Control Loop (with example values for specs) for Loop Command Controller

Loop Command Controller – KEYSTROKE SEQUENCE

Objective	Keystrokes	Display	Comments
1)Address Target Unit	ADDRESS	ENTER MODULE ADDR >	
	4, ENTER	MODULE – 4 TYPE – LOOP CMD MODE – CONFIGURE F4 – diagnostics	Target unit to be selected. See *Possible Response for this line.
	*Possible Response	MODE – CONFIGURE	The target unit is in the CONFIGURE mode. If true, disregard Objective 2) and proceed to Objective 3).
		MODE – EXECUTE	The target unit is in the EXECUTE mode. A mode change is required before configuration can be started. Proceed to Objective 2).
		MODE – ERROR	The target unit is in the ERROR mode. A mode change is required before configuration can be started. Proceed to Objective 2).
2)Changing Mode of Target Unit to CONFIGURE.	CONFIGURE	MODE CHANGE TO CONFIGURE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODE – CONFIGURE	Verification that the target unit is now in the CONFIGURE mode. Proceed to Objective 3).
		or	
		MODE – EXECUTE	Action depends upon status or error message meaning. Proceed based on these. Refer to Tables 7 and 8.
		or	
		MODE – ERROR	
3)Enter specifica– tions for the analog input. This analog input is a fixed block so it is modified; thus the function code is already specified.	MODIFY	BLK – 10 *MOD* CODE – UNASSIGNED SELECT BLOCK # ENTER – CONTINUE	Selecting MODIFY action.

NOTE: Reference **Function Block Application Manual**, E93–900–20.

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
4)Now the specs for the particular function should be set.	201,ENTER	BLK – 201 *MOD* CODE – 27 AI SPEC # 1 ZERO VALUE: 0.000	Displays initial value and Specification number. S1 is correct, proceed to S2.
	NEXT	BLK – 201 *MOD* CODE – 27 AI SPEC # 2 SPAN VALUE: 0.000	This specification is not correct and should be changed.
	100,ENTER	BLK – 201 *MOD* CODE – 27 AI SPEC # END VALUE:	Enter new value.
5)Check to see if specifications are entered correctly.	NEXT	BLK – 201 *MOD* CODE – 27 AI SPEC # 1 ZERO VALUE: 0.000	
	NEXT	BLK – 201 *MOD* CODE – 27 AI SPEC #2 SPAN VALUE: 100.000	
	NEXT	BLK – 201 *MOD* CODE – 27 AI SPEC # END VALUE:	
6).Send block specification to target unit.	SEND	BLK – 201 *SND* CODE – 27 AI CLEAR – ABORT F2 – SEND BLOCK	
	F2	BLK – 201 *MOD* CODE – 27 AI SELECT BLOCK # *SEND CONFIRMED*	Configuration and Tuning Terminal shows successful modification.
7)Select ADD operation	ADD	BLK – 201 *ADD* CODE – 27 AI SELECT BLOCK # ENTER – CONTINUE	Screen shows ADD environment.

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	11,ENTER	FUNCTION CODE SELECTION BLOCK 11 CODE – 27 >	Block number 11 is unassigned.
Function code required for PID function.	19,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #1 [PV] VALUE: 5	Configuration and Tuning Terminal has received verification of function code. Initial value for the first specification displayed.
Now enter correct specifications.	201,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #2 [SP] VALUE: 5	New value entered for Specification #1. Initial value of Specification #2 displayed.
	13,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #3 [T] VALUE: 5	New value entered.
Press the NEXT key to advance to next specification if initial value is as desired.	12,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #4 [TF] VALUE: 1	
	14,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #5 [K] VALUE: 1.000 T	Block Address (Release Flag). This initial value is good for the application (gain) Multiplier.
	NEXT	BLK –11 *ADD* CODE –19 PID SPEC #6 KP VALUE: 1.000 T	Initial value. K_p (Proportional Constant).
	NEXT	BLK – 11 *ADD* CODE – 19 PID SPEC #7 KI VALUE: 0.000 T	Initial value. K_I (Integral Constant).
Finish entering specifications.	2.0,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #8 KD VALUE 0.000 T	K_D (Derivative Constant).
Press the NEXT key to advance to the next specification if the initial value is as desired.	NEXT	BLK – 11 *ADD* CODE – 19 PID SPEC #9 H VALUE: 105.000 T	Initial value.

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	100,ENTER	BLK – 11 *ADD* TYPE – 19 PID SPEC #10 L VALUE: –5.000 T	
	0.0,ENTER	BLK – 11 *ADD* CODE – 19 PID SPEC #11 MOD VALUE: 0 T	
	NEXT	BLK – 11 *ADD* CODE – 19 PID SPEC #12 DIR VALUE: 0 T	Initial value. Specification correct.
	NEXT	BLK – 11 *ADD* CODE – 19 PID SPEC # END VALUE:	
8)Check the values using the NEXT key.	NEXT	SPEC #1 [PV] VALUE: 201	NOTE: The first two lines on the display will read: BLK – 11 *ADD* CODE – 19 PID during the entire checking procedure.
	NEXT	SPEC #2 [SP] VALUE: 13	
	NEXT	SPEC #3 [T] VALUE: 12	
	NEXT	SPEC #4 [TF] VALUE: 14	
	NEXT	SPEC #5 K VALUE: 1.000 T	
	NEXT	SPEC #6 KP VALUE: 1.000 T	
	NEXT	SPEC #7 KI VALUE: 2.000 T	
	NEXT	SPEC #8 KD VALUE: 0.000 T	
	NEXT	SPEC #9 H VALUE: 100.000 T	

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	NEXT	SPEC #10 L VALUE: 0.000 T	
	NEXT	SPEC #11 MOD VALUE: 0 T	
	NEXT	SPEC #12 DIR VALUE: 0 T	
	NEXT	BLK – 11 *ADD* CODE – 19 PID SPEC # END VALUE:	
	SEND	BLK – 11 *SND* CODE – 19 PID CLEAR – ABORT F2 – SEND BLOCK	
	F2	BLK – 11 *ADD* CODE –19 PID SELECT BLOCK # *SEND CONFIRMED*	
9)The repeated procedure is used in entering the Station Function block.	NEXT	BLK – 12 *ADD* CODE – UNASSIGNED SELECT BLOCK # ENTER – CONTINUE	Add another block.
	ENTER	FUNCTION CODE SELECTION BLOCK – 12 CODE – 19 >	Verify the block is unassigned.
	21,ENTER	BLK – 12 *ADD* CODE – 21 M/A SPEC #1 [PV] VALUE: 5	
	201,ENTER	BLK – 12 *ADD* CODE – 21 M/A SPEC #2 [SPT] VALUE: 5	S2 not used.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #3 [AUTO] VALUE: 5	

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	11,ENTER	BLK – 12 *ADD* CODE – 21 M/A SPEC #4 [TRK] VALUE: 5	S4 not used.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #5 [FLAG] VALUE: 0	S5 not used.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #6 [I–LK] VALUE: 0	S6 not used.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #7 PVH VALUE: 100.000 T	S7 not changed.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #8 PVL VALUE: O.000 T	Initial value is desired value.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #9 PVDEV VALUE: 999999 T	Initial value is desired value.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #10 EUSPAN VALUE: 100.000	Initial value is desired value.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #11 EUPVZ VALUE: 0.000	Initial value is desired value.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #12 EUSPZ VALUE: 0.000	Initial value is desired value.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #13 EUID VALUE: 0	Initial value is desired value.

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #14 TRK SP VALUE: 0 T	
	1,ENTER	BLK – 12 *ADD* CODE – 21 M/A SPEC #15 CMPUTR VALUE: 0	Setpoint will track PV in manual.
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC #16 STA # VALUE: 0	
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC # END VALUE:	
10)Verify entries.	NEXT	SPEC #1 [PV] VALUE: 201	NOTE: The first two lines on the display will read: BLK – 12 *ADD* CODE – 12 M/A
	NEXT	SPEC #2 [SPT] VALUE: 5	during the entire verification. Refer also to Figure A2.
	NEXT	SPEC #3 [AUTO] VALUE: 11	
		↓	Check each specification.
	NEXT	SPEC #16 STA # VALUE: 0	
	NEXT	BLK – 12 *ADD* CODE – 21 M/A SPEC # END VALUE:	
	SEND	BLK – 12 *SND* CODE – 21 M/A CLEAR – ABORT F2 – SEND BLOCK	
	F2	BLK – 12 *ADD* CODE – 21 M/A SELECT BLOCK # *SEND CONFIRMED*	

Loop Command Controller – KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
NOTE: Since the output block is fixed, similar to the input block, it is modified and not added.			
	MODIFY	BLK – 12 *MOD* CODE – 21 M/A SELECT BLOCK # ENTER – CONTINUE	
	211,ENTER	BLK – 211 *MOD* CODE – 29 AO SPEC #1 [X] VALUE: 211	Enter output block number
	12,ENTER	BLK – 211 *MOD* CODE – 29 AO SPEC #2 SA VALUE: 0	
	12,ENTER	BLK – 211 *MOD* CODE – 29 AO SPEC # END VALUE:	
Verify values of SPEC #1 and SPEC #2 using NEXT key.			
	SEND	BLK – 211 *SND* CODE –29 AO CLEAR – ABORT F2 – SEND BLOCK	
	F2	BLK – 211 *SND* CODE – 29 AO SELECT BLOCK # *SEND CONFIRMED*	
11) Place the CLC0 □ back into EXECUTE mode to begin execution of this control strategy.	EXECUTE	MODE CHANGE TO: EXECUTE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODULE – 4 > TYPE – LOOP CMD MODE – EXECUTE F4 – diagnostics	

SECTION A2 – OPERATING STATUS DISPLAYS

Loop Command Controller

Press F3 while in any mode to obtain status byte data in hexadecimal format.

Status bytes #1 and #2 have a common definition regardless of the target unit being used. Refer to DIAGNOSTICS, **Operating Status Display** for a description of Status Bytes #1 and #2. The contents of status bytes #3 through #5 are defined on a target unit basis.

NOTE: For Loop Command Controllers, Status Bytes 1 through 5 displayed in hexadecimal.

Status Bytes #3 – #5.

NOTE: The contents of status bytes 3, 4, and 5 depend on target unit type and unit mode.

Mode	Byte 3	Byte 4	Byte 5	Description
ALL	00	00	00	No specific error status available.
ALL	01	01	—	NVRAM error: Write failure.
EXCT,ERR		02	—	Checksum error
ERR		03	—	Format error (Bad data)
ERR		FA	—	Reset/powerfail during SP write
ERR		FF	—	Reset/powerfail during write
ERR	02	00	04	Analog input overrange or reference error.
		00	05	Analog input overrange or reference error.
	(X) = block number making reference (in hexadecimal format)			(Y) = block number being referenced (in hexadecimal format)
ERR	05	(X)	(Y)	Configuration error – undefined input (X) = block making reference (Y) = block number
ERR	06	(X)	(Y)	Configuration error – data type conflict (X) = block number making reference (Y) = block number
ERR	08	(X)	—	Trip Block Activated (X) = block number of trip block
	09	(X)	(Y)	Function not allowed in segment (X) = segment block number (Y) = block number not allowed
	0A	—	—	Too many segment control blocks
	0B	(X)	(Y)	Segment control block priority violation (X) = block number of first segment in error (Y) = block number of segment in error
	0C	—	—	Configuration Error – sequencing too complex

Appendix B –Sequence Command Controller

The information contained in Appendix B pertains specifically to the Sequence Command Controller, CSC01. This Appendix is divided into subsections which contain various examples and tables that will prove useful when using the CTT02 for configuration of the Sequence Command Controller.

SECTION B1 – EXAMPLE KEYSTROKE PROCEDURE

This subsection of Appendix B provides an example keystroke procedure, control scheme drawings, and sample worksheets using EASY STEP PLUS for configuration of a simplified filter system with backwash application. It will help familiarize you with the steps required to enter a configuration. The I/O count for this example is small enough to fit within a single Sequence Command Controller. EASY STEP PLUS reduces the amount of entries required by the user. The configuration still consists of Bailey Function Codes and can be modified as desired by the user.

Figure B1 is a simplified process diagram of a filter with backwash cycle. The basic operation consists of a material being pumped through one of two filtering stages, while the other filter is being regenerated. The process runs for a fixed time period and is then switched so that the regenerated filter is used and the other filter is regenerated. Figure B2 is a configuration drawing that represents the functions required to complete this operational sequence.

Prior to starting, the user should develop a control scheme drawing and complete the EASY STEP Configuration Worksheets. Blank worksheets are provided in the back of this Instruction Book.

NOTE: On new, unconfigured Command Series target units, the user must perform the procedure listed under **User Configuration — NVRAM** prior to starting configuration operations. Proceed to that section in this Instruction Book if your target unit is new.

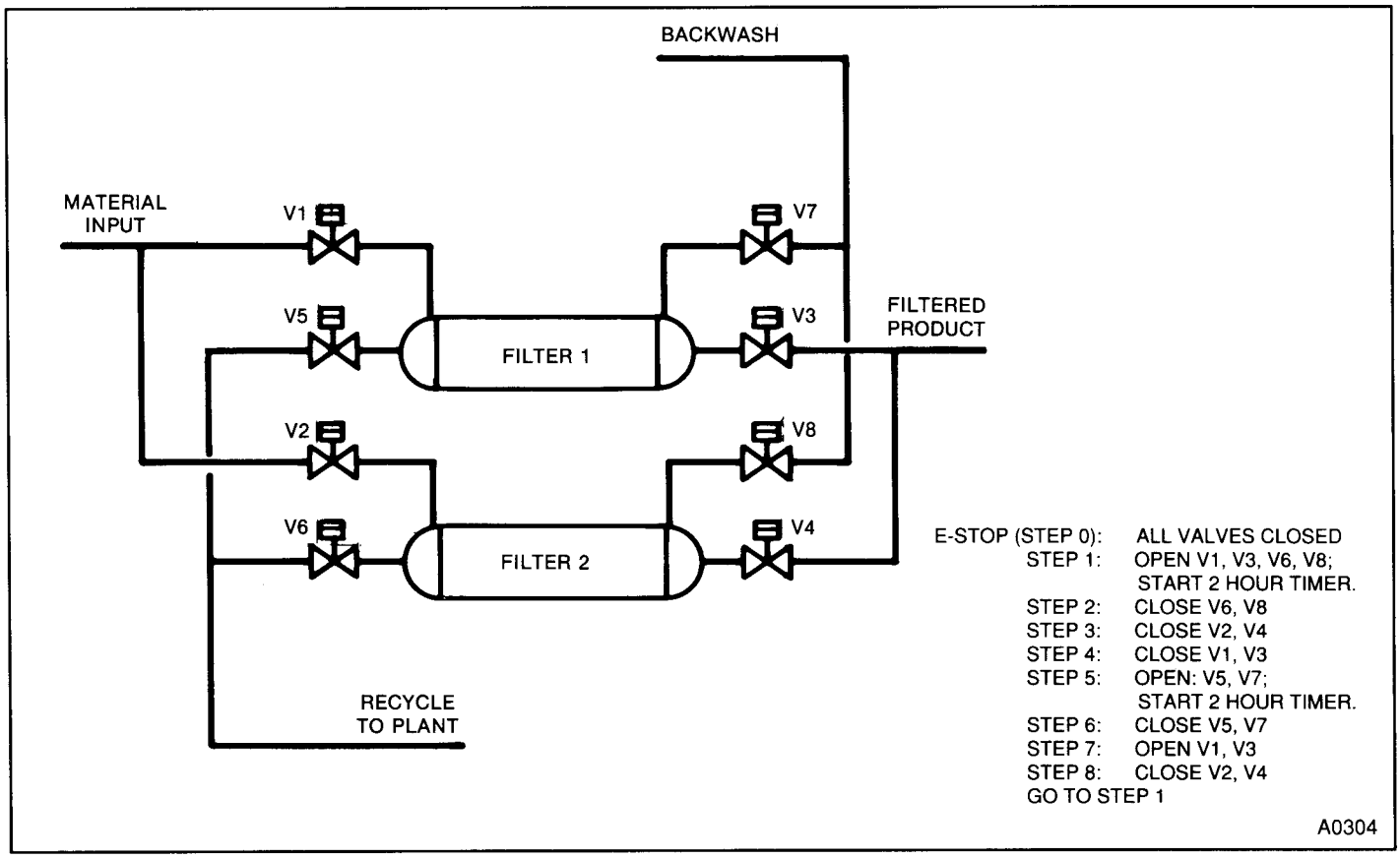
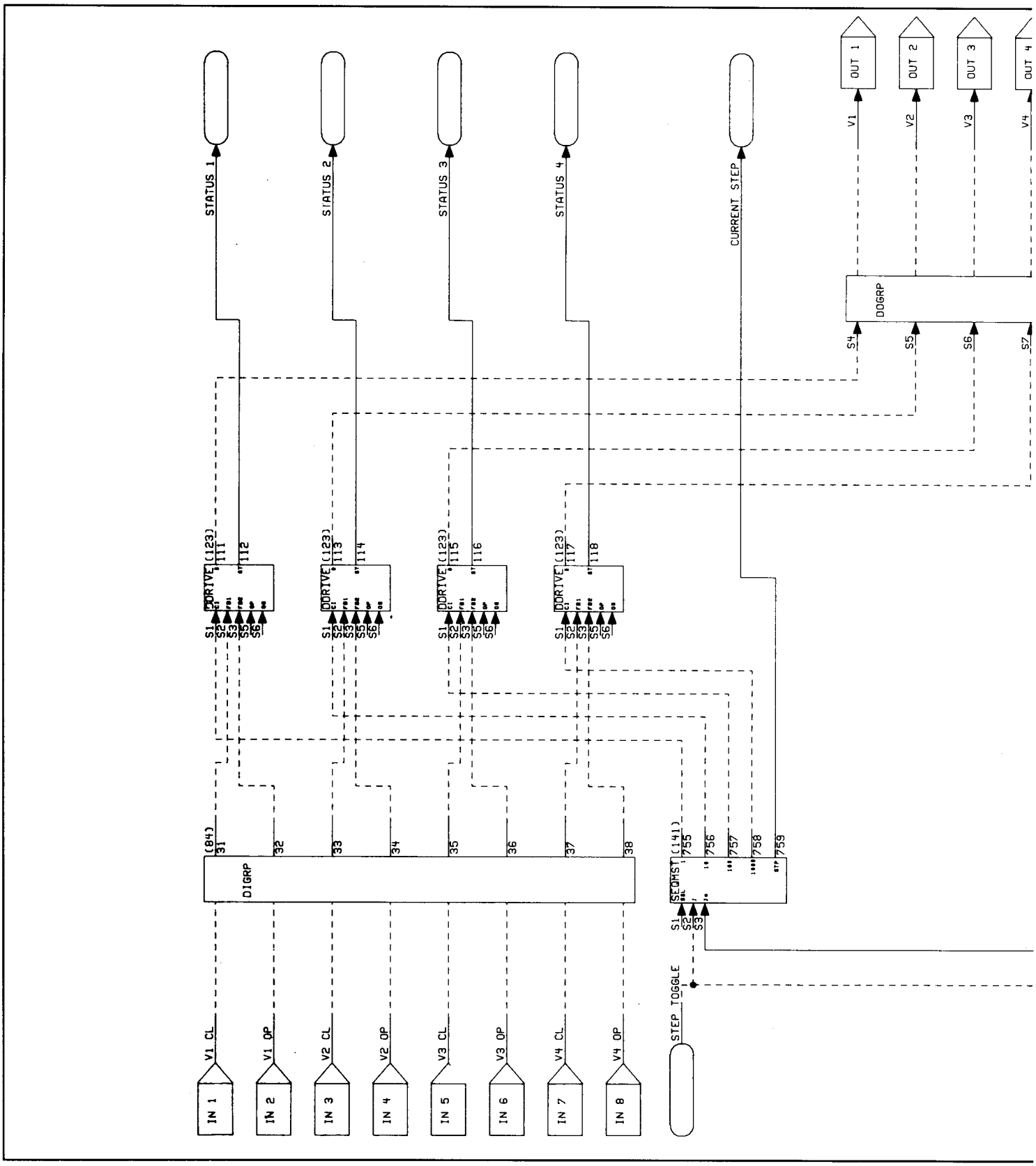


FIGURE B1 – Process Schematic of Filter with Backwash Cycle

Appendix B


STATUS 1
STATUS 2
STATUS 3
STATUS 4
CURRENT STEP
OUT 1
OUT 2
OUT 3
OUT 4
V1
V2
V3
V4
DDGRP
S4
S5
S6
S7
DDRIVE (123)
111
112
113
114
115
116
117
118
S1
S2
S3
S4
S5
S6
DIGRP (84)
31
32
33
34
35
36
37
38
SEQMST (141)
755
756
757
758
759
STEP TOGGLE
V1 CL
V1 OP
V2 CL
V2 OP
V3 CL
V3 OP
V4 CL
V4 OP
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7
IN 8

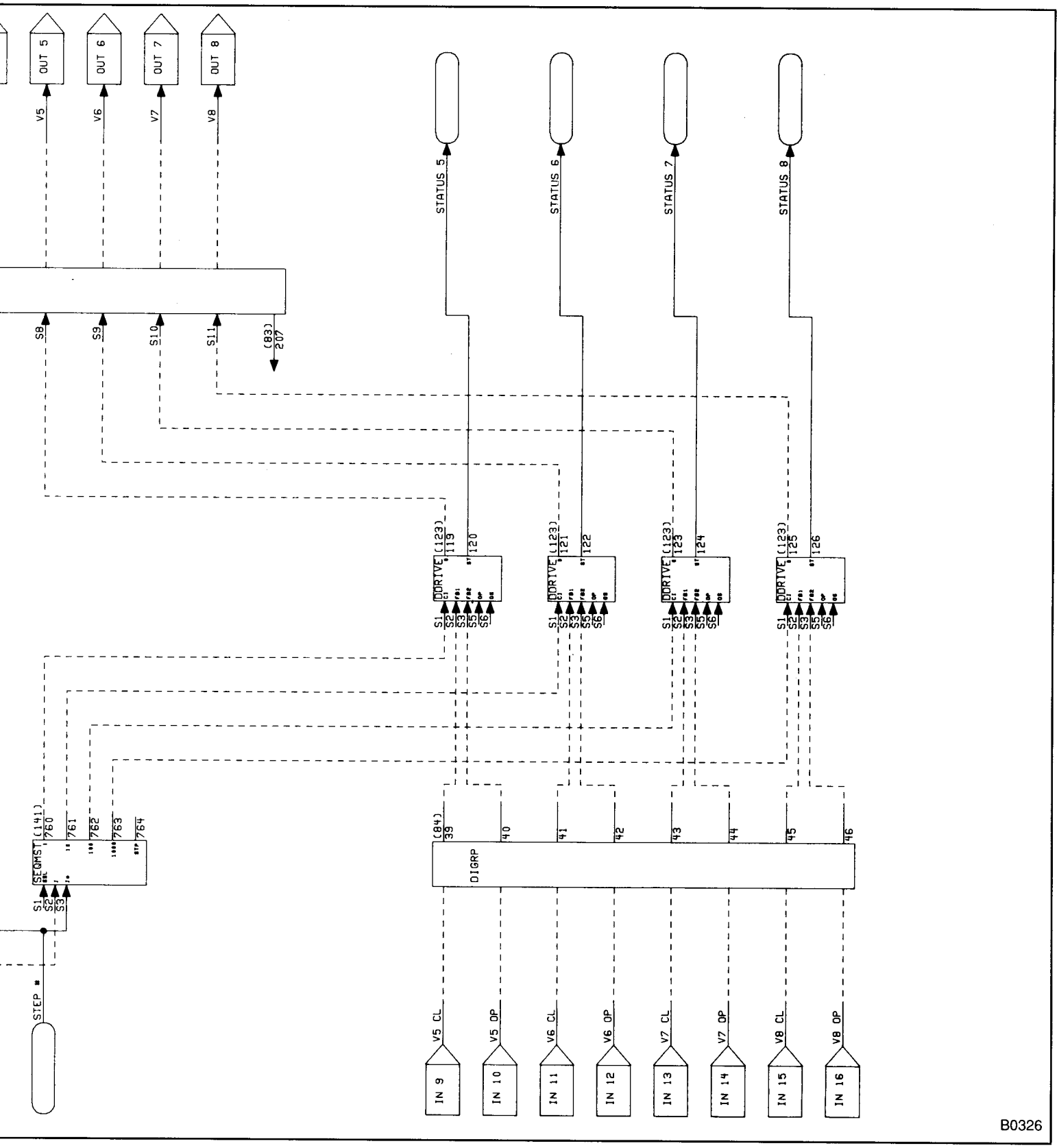
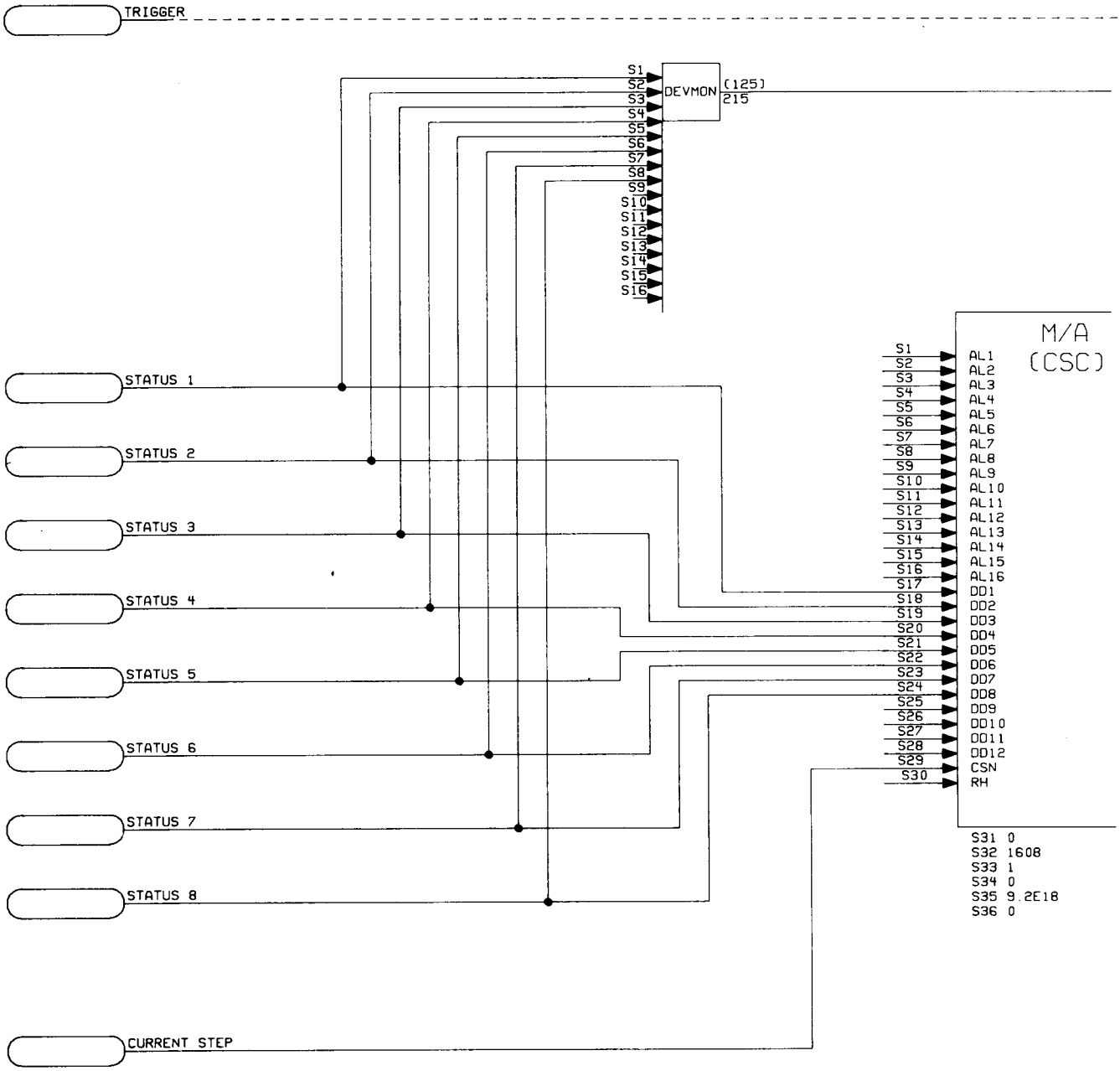


FIGURE B2 – Configuration for Filter with Backwash Cycle


TRIGGER
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
DEVMON
(125)
215
STATUS 1
STATUS 2
STATUS 3
STATUS 4
STATUS 5
STATUS 6
STATUS 7
STATUS 8
M/A
(CSC)
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
S23
S24
S25
S26
S27
S28
S29
S30
AL1
AL2
AL3
AL4
AL5
AL6
AL7
AL8
AL9
AL10
AL11
AL12
AL13
AL14
AL15
AL16
DD1
DD2
DD3
DD4
DD5
DD6
DD7
DD8
DD9
DD10
DD11
DD12
CSN
RH
S31 0
S32 1608
S33 1
S34 0
S35 9.2E18
S36 0
CURRENT STEP

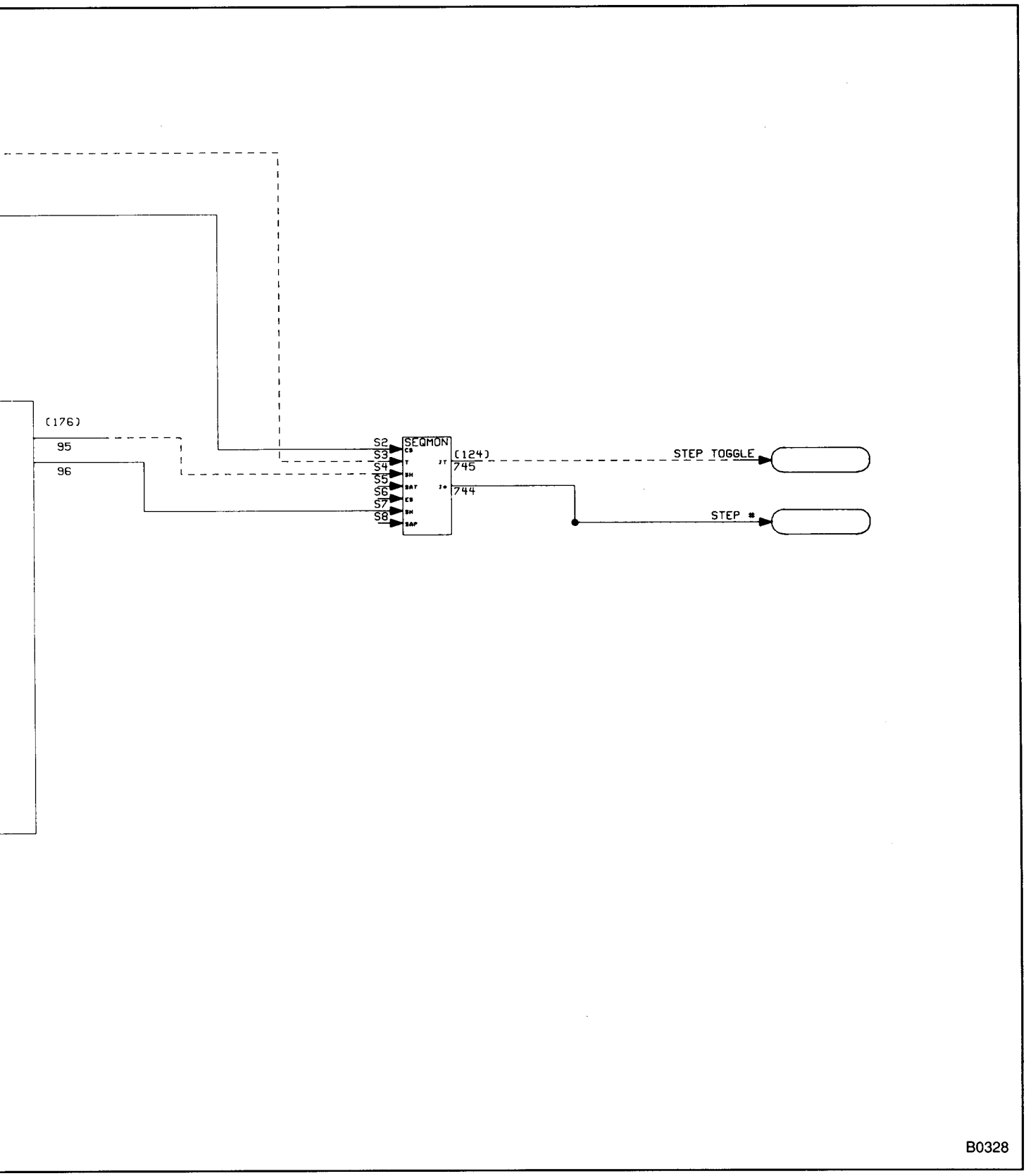
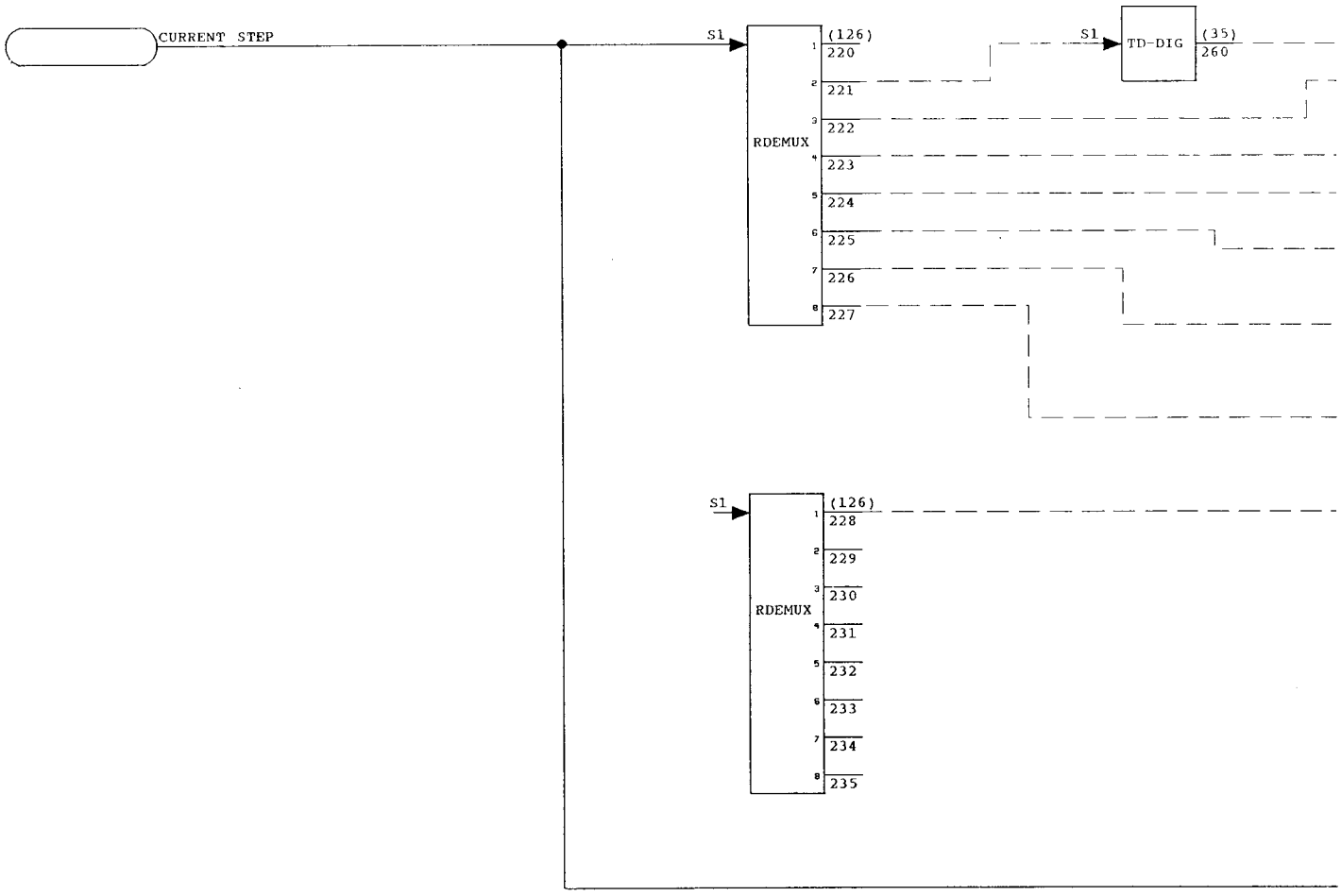


FIGURE B2 – Configuration for Filter with Backwash Cycle (continued)


CURRENT STEP
S1
(126)
220
221
222
223
224
225
226
227
RDEMUX
S1
TD-DIG
(35)
260
S1
(126)
228
229
230
231
232
233
234
235
RDEMUX

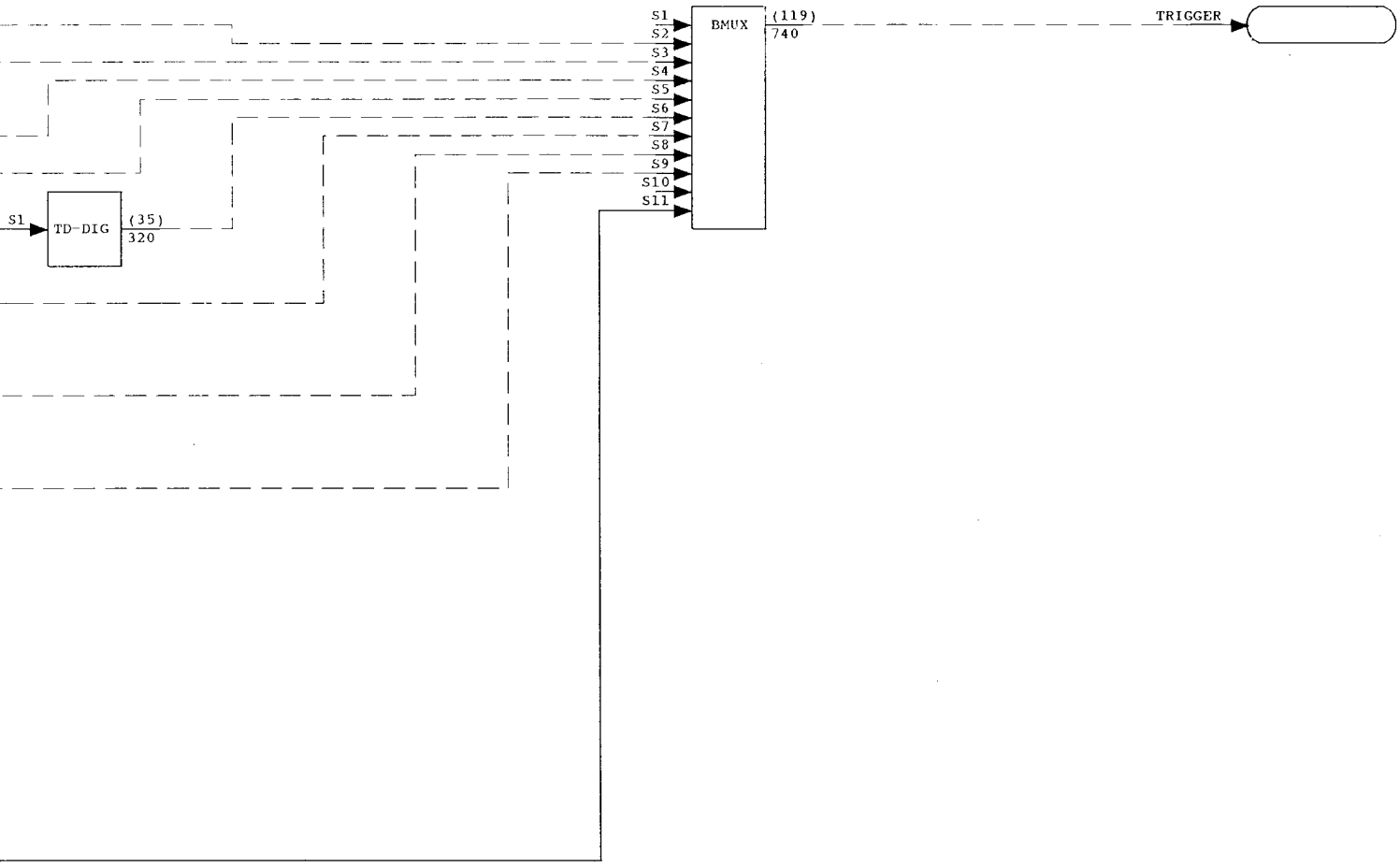


FIGURE B2 – Configuration for Filter with Backwash Cycle (continued)

Worksheet *CSC*

EASY STEP PLUS I/O Data

UNIT'S TAG Filter with Backwash Cycle
MASTER X PRIMARY X
SLAVE _____ BACKUP _____

MODULE ADDRESS 5
STATION ADDRESS 0
INPUT BD. ADDRESS 2 (even)
OUTPUT BD. ADDRESS 3 (odd)

NUMBER OF STEPS 8 (32 MAX.)
NUMBER OF INPUTS 16 (64 MAX.)
NUMBER OF OUTPUTS 8 (48 MAX.)

INPUTS

TAG	VOLTAGE	NO.
V1 CL	120 VAC	1
V1 OP		2
V2 CL		3
V2 OP		4
V3 CL		5
V3 OP		6
V4 CL		7
V4 OP		8
V5 CL		9
V5 OP		10
V6 CL		11
V6 OP		12
V7 CL		13
V7 OP		14
V8 CL		15
V8 OP		16

OUTPUTS

NO.	VOLTAGE	WAIT TIME (SEC)	TAG
1	120 VAC	15	V1
2		15	V2
3		15	V3
4		15	V4
5		30	V5
6		30	V6
7		30	V7
8		30	V8
9			
10			
11			
12			

Bailey Controls

Worksheet — *CBC/CSC*

EASY STEP PLUS – Device Driver Data

DEVICE DRIVER DATA

DEVICE DRIVER # 1 (2 – 4: SIMILAR)

FUNCTION CODE 123 SPEC #	EASY STEP DEFAULT VAUES	USER VALUES	COMMENTS
S1	755 } *		
S2	31 } *		
S3	32 } *		
S4	0		
S5	1		
S6	0		
S7	0	1.0	USE FEEDBACK #1 FOR CLOSED
S8	0	10.0	USE FEEDBACK #2 FOR OPEN
S9	0.0	15.0	WAIT TIME
S10	0		

* Varies with output number.

DEVICE DRIVER # 5 (6 – 8: SIMILAR)

FUNCTION CODE 123 SPEC #	EASY STEP DEFAULT VAUES	USER VALUES	COMMENTS
S1	760 } *		
S2	39 } *		
S3	40 } *		
S4	0		
S5	1		
S6	0		
S7	0	1.0	USE FEEDBACK #1 FOR CLOSED
S8	0	10.0	USE FEEDBACK #2 FOR OPEN
S9	0.0	30.0	WAIT TIME
S10	0		

* Varies with output number.

Bailey Controls

Worksheet — *CSC*

EASY STEP PLUS – Step Mask Data

STEP NAME →	E-STOP	FILTER 1 ON LINE	BACKWASH 2 OFF	FILTER 1 & 2 ON	FILTER 1 OFF	FILTER 2 ON LINE	BACKWASH 1 OFF	FILTER 1 & 2 ON	FILTER 2 OFF
STEP NO. →	0	1	2	3	4	5	6	7	8
TAG	DIGITAL OUTPUTS								
V1	1	0	1	1	1	0	0	0	1	1
V2	2	0	0	0	1	1	1	1	1	0
V3	3	0	1	1	1	0	0	0	1	1
V4	4	0	0	0	1	1	1	1	1	0
V5	5	0	0	0	0	0	1	0	0	0
V6	6	0	1	0	0	0	0	0	0	0
V7	7	0	0	0	0	0	1	0	0	0
V8	8	0	1	0	0	0	0	0	0	0
	9									
	10									
	11									
	12									

TAG	DIGITAL OUTPUTS
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12

Bailey Controls

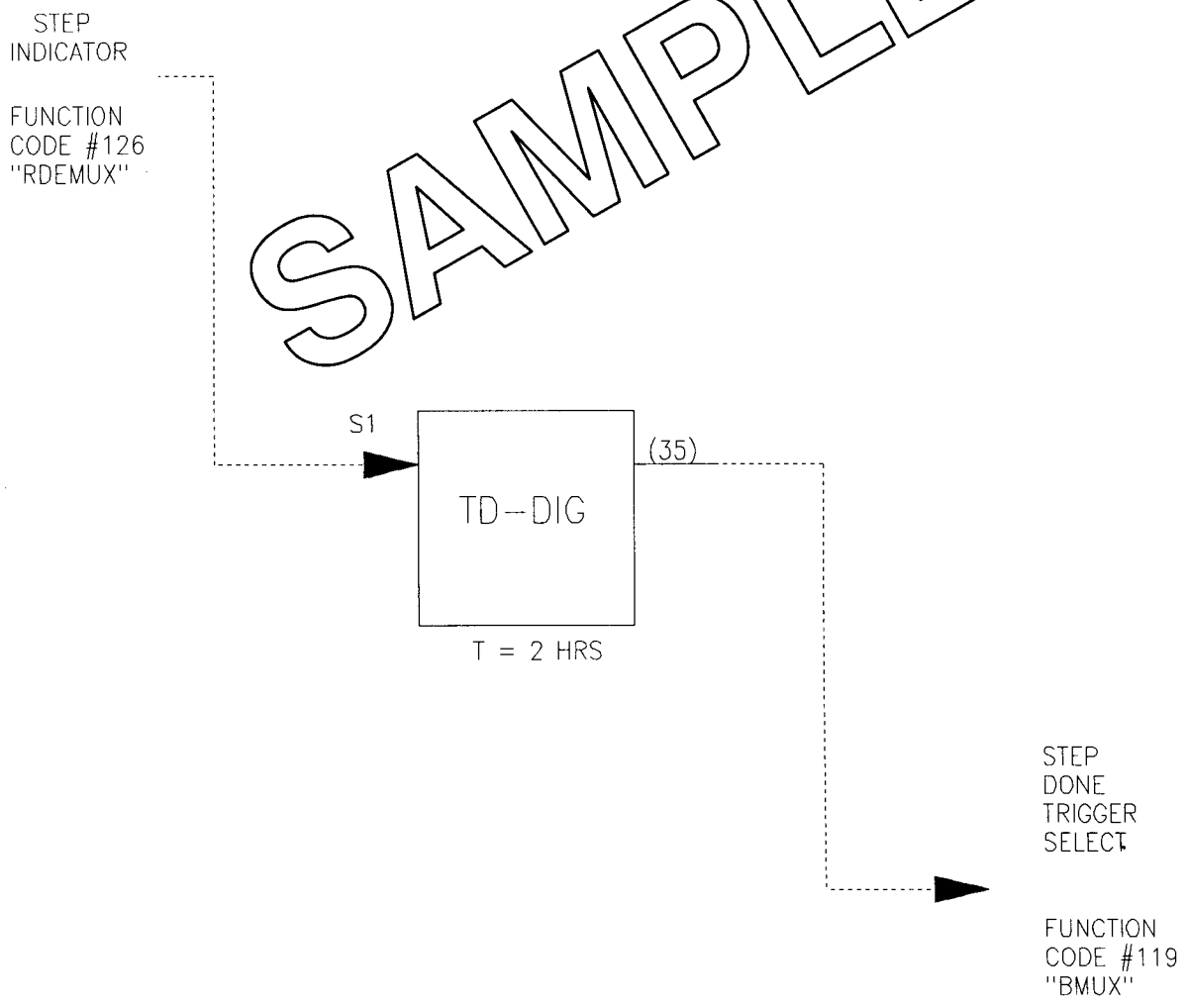
Worksheet — *CBC/CSC*

Step Logic Definition

STEP #____1____ STEP NAME____Filter 1 On Line__

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ____221____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (Batch)
= 220 + STEP # (Sequence)



Description: Wait for 2 hours.

Bailey Controls

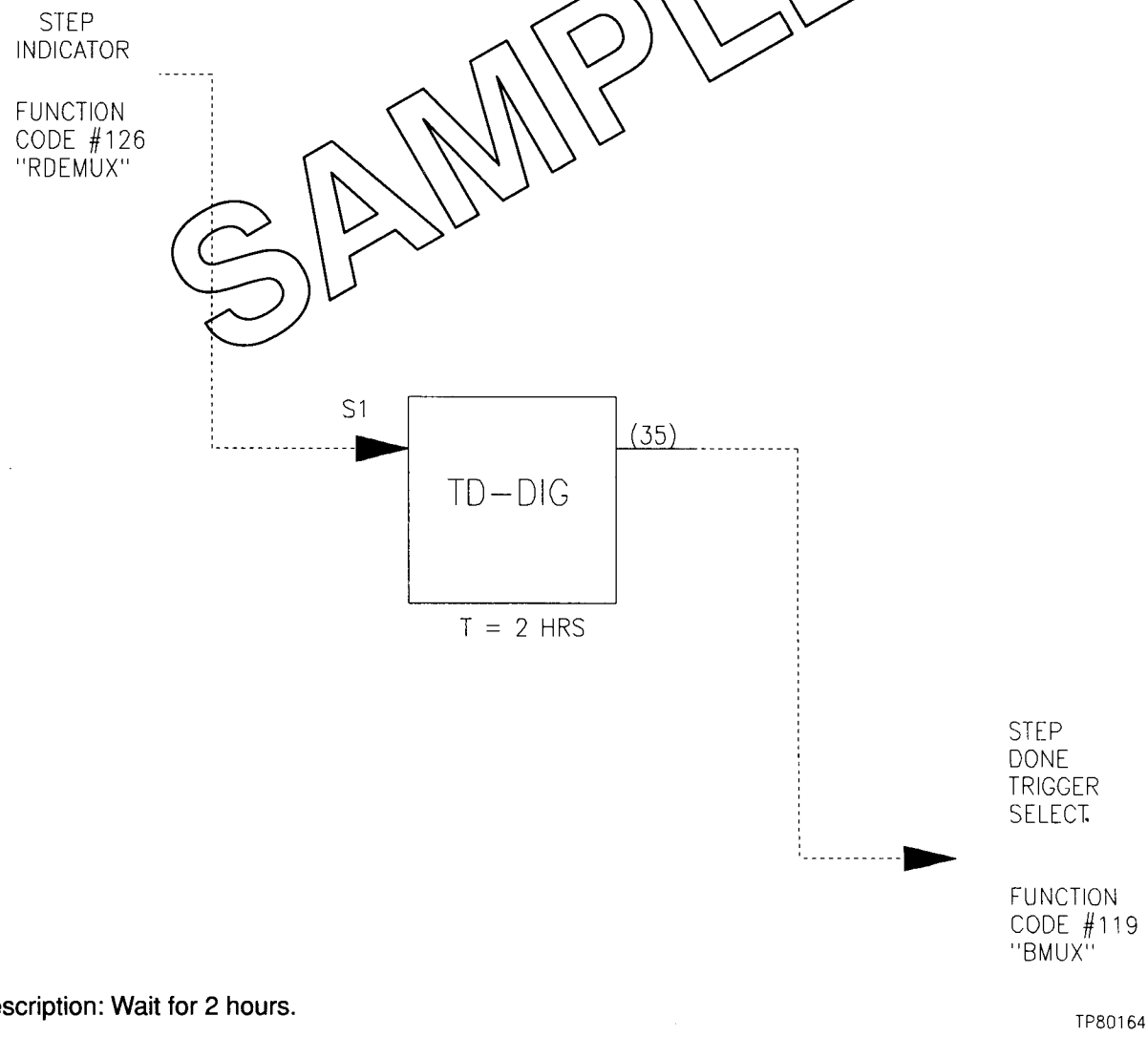
Worksheet *CBC/CSC*

Step Logic Definition

STEP # 5 STEP NAME Filter 2 on Line

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 225

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (Batch)
= 220 + STEP # (Sequence)



Description: Wait for 2 hours.

TP80164

Bailey Controls

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE

Objective	Keystrokes	Display	Comments
1) Address target unit	ADDRESS	ENTER MODULE ADDR>	
	5, ENTER	MODULE – 5> TYPE – SEQ CMD MODE – CONFIGURE F4 – diagnostics	Target unit to be selected. See *Possible Response for this line.
	*Possible Response	MODE – CONFIGURE	The target unit is already in the CONFIGURE mode. If true, disregard Objective 2) and proceed to Objective 3).
		OR	
		MODE – EXECUTE	The target unit is in the EXECUTE mode. A mode change is required before configuration can be started. Proceed to Objective 2).
		OR	
		MODE – ERROR	The target unit is in the ERROR mode. A mode change is required before configuration can be started. Proceed to Objective 2).
2) Changing Mode of Target Unit to CONFIGURE	CONFIGURE	MODE CHANGE TO CONFIGURE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODE – CONFIGURE	Verification that the target unit is now in the CONFIGURE mode.
3) Selecting EASY STEP PLUS	SPECIAL FEATURE	F1 – UP/DOWN LOAD F2 – EASY STEP PLUS F3 – SET TIME F4 – CONFG DUMP	
	F2	*** WARNING *** THE EXISTING TARGET CONFIG. WILL BE LOST	
		PROCEED? F1 – YES F2 – NO	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	F1	EASY STEP MODE ENTER # OF STEPS (1–32):	
	8, ENTER	EASY STEP MODE # OF STEPS = 8 ENTER # OF INPUTS (1–64):	Enter number of process steps.
	16, ENTER	EASY STEP MODE # OF INPUTS = 16 ENTER # OF OUTPUTS (1–48):	Enter number of inputs from process.
	8, ENTER	AUTOMATIC RESTORE OPTION? F1 – YES F2 – NO	Enter number of outputs to process.
	F2	**STANDBY** □□□□□□□□ PROCESSING EASYSTEP DATA	
		F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
4) Setting Step Mask Inputs	F1	STEP MASK INPUT ENTER STEP #: (OR F1 TO END)	
	1, ENTER	MASK STEP #1 1 0 <— 2 0 3 0	
	1	MASK STEP #1 1 1 2 0 <— 3 0	
	0	MASK STEP #1 1 1 2 0 3 0 <—	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
Setting Step Mask Inputs (cont'd)	1	MASK STEP #1 2 0 3 1 4 0 <—	
	0	MASK STEP #1 3 1 4 0 5 0 <—	
	0	MASK STEP #1 4 0 5 0 6 0 <—	
	1	MASK STEP #1 5 0 6 1 7 0 <—	
	0	MASK STEP #1 6 1 7 0 8 0 <—	
	1	MASK STEP #1 6 1 7 0 8 1 <—	
	ENTER	**STANDBY** □□□□□□□□ PROCESSING EASYSTEP DATA	
		STEP MASK INPUT ENTER STEP #: (OR F1 TO END)	
	2, ENTER	MASK STEP #2 1 0 <— 2 0 3 0	
	1	MASK STEP #2 1 1 2 0 <— 3 0	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
Setting Step Mask Inputs (cont'd)	0	MASK STEP #2 1 1 2 0 3 0<—	
	1	MASK STEP #2 2 0 3 1 4 0<—	
	0	MASK STEP #2 3 1 4 0 5 0<—	
	0	MASK STEP #2 4 0 5 0 6 0<—	
	0	MASK STEP #2 5 0 6 0 7 0<—	
	0	MASK STEP #2 6 0 7 0 8 0<—	
	ENTER	**STANDBY** □□□□□□□□ PROCESSING EASYSTEP DATA	
		STEP MASK INPUT ENTER STEP #: (OR F1 TO END)	Enter Step Mask Inputs for Steps 3 through 8 and Step 0 as described above.
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
5) Setting the Step Logic Inputs	F2	STEP LOGIC INPUT ENTER STEP #: (OR F1 TO END)	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	1, ENTER	STEP 1 LOGIC STEP INDICATOR AT BLOCK # 221 ENTER FCODE:	
Function code required for Timer	35, ENTER	BLK – 260 *ADD* CODE – 35 TD–DIG SPEC #1 [X] VALUE: 0	
Now enter correct specifications	221, ENTER	BLK – 260 *ADD* CODE – 35 TD–DIG SPEC #2 TYPE VALUE: 0	Setting S2=1 makes the TD–DIG block a delay timer.
	1, ENTER	BLK – 260 *ADD* CODE – 35 TD–DIG SPEC #3 SEC VALUE: 0.000 T	Setting S3=7200 makes the time delay 7200 seconds.
	7200, ENTER	BLK – 260 *ADD* CODE – 35 TD–DIG SPEC # END VALUE:	
	SEND	BLK – 260 *SND* CODE – 35 TD–DIG CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 1 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	F1	STEP LOGIC INPUT ENTER STEP # (OR F1 TO END)	
	5, ENTER	STEP 5 LOGIC STEP INDICATOR AT BLOCK #225 ENTER FCODE:	
	35, ENTER	BLK – 320 *ADD* CODE – 35 TD–DIG SPEC #1 [X] VALUE: 0	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	225, ENTER	BLK – 320 *ADD* CODE – 35 TD–DIG SPEC #2 TYPE VALUE: 0	
	1, ENTER	BLK – 320 *ADD* CODE – 35 TD–DIG SPEC #3 SEC VALUE: 0.000 T	
	7200, ENTER	BLK – 320 *ADD* CODE – 35 TD–DIG SPEC # END VALUE:	
	SEND	BLK – 320 *SND* CODE – 35 TD–DIG CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 5 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	F1	STEP LOGIC INPUT ENTER STEP #: (OR F1 TO END)	
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
	F3	DEVICE DRIVER SET–UP CSC OUTPUT # (OR F1 TO END)	
6) Function code required for Device Driver Block	1, ENTER	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #1 C1 VALUE: 755	Output #1 Device Driver. Sequence Master output block address for Output #1 (already provided by EASY STEP).
Now enter correct specifications	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #2 FEED1 VALUE: 31	Block address of feedback signal already provided by EASY STEP.

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
EASY STEP PLUS has filled in values for its default configuration. The specs may be changed to suit specific needs.	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #3 FEED2 VALUE: 32	Block address of feedback signal already provided by EASY STEP.
	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #4 COSOV VALUE: 0 T	COSOV = Control Output Status Override. When set = 1, no interlocking for sequencing on this unit.
Press the NEXT key to advance to the next specification if initial value is desired value.	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #5 OOPER VALUE: 1	OOPER = Output Override Permission. If equal to 1, operator can put Controller in MANUAL from faceplate. If equal to 0, then Controller locked into AUTO.
	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #6 OVOUT VALUE: 0	
	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #7 FDMSK0 VALUE: 0 T	Logic level of feedback signal indicating an output 0 condition.
	1,ENTER	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #8 FDMSK1 VALUE: 0 T	Logic level of feedback signal indicating an output 1 condition.
	10, ENTER	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #9 FDWAIT VALUE: 0.000 T	
	15, ENTER	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC #10 DISPLY VALUE: 0	Enter feedback waiting time in seconds.
	NEXT	BLK – 111 *MOD* CODE – 123 DDRIVE SPEC # END VALUE:	

Sequence Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	SEND	BLK – 111 *SND* CODE – 123 DDRIVE CLEAR – ABORT F2 – SEND BLOCK	
	F2	DEVICE DRIVER SET–UP CSC OUTPUT # (OR F1 TO END)	Enter the feedback indicators and wait time for Device Drivers 2 – 8 as described above.
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
	F4	MODULE – 5> TYPE – SEQ CMD MODE – CONFIGURE F4 – diagnostics	
	EXECUTE	MODE CHANGE TO: EXECUTE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODULE – 5> TYPE SEQ CMD MODE – EXECUTE F4 – diagnostics	

SECTION B2 – SEQUENCE COMMAND EASY STEP PLUS BLOCK ADDRESS MAP

BLOCK ADDRESS		CONTROL FUNCTION	FUNC-CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
0	29	RESERVED					
30	30	UNUSED					
31	38	DI GROUP INPUTS: 1 – 8	84	16	114	MASTER	DIGITAL INPUT GROUPS
39	46	DI GROUP INPUTS: 9 – 16	84	16	114	MASTER	ARE THE INTERFACE
47	54	DI GROUP INPUTS 17 – 24	84	16	114	SLAVE 1	TO THE HARDWARE INPUTS
55	62	DI GROUP INPUTS 25 – 32	84	16	114	SLAVE 1	
63	70	DI GROUP INPUTS 33 – 40	84	16	114	SLAVE 2	
71	78	DI GROUP INPUTS 41 – 48	84	16	114	SLAVE 2	
79	86	DI GROUP INPUTS 49 – 56	84	16	114	SLAVE 3	
87	94	DI GROUP INPUTS 57 – 64	84	16	114	SLAVE 3	
95	96	CSC STATION MASTER	176	80	304		SEQUENCE STATION
97	98	CSC STATION SLAVE 1	176	80	304		BLOCKS ARE THE INTERFACE
99	100	CSC STATION SLAVE 2	176	80	304		TO THE FACEPLATE
101	102	CSC STATION SLAVE 3	176	80	304		
103	110	UNUSED					
111	112	DEVICE DRIVER OUTPUT: 1	123	30	100	MASTER	FEEDBACK INPUTS = 1,2
113	114	DEVICE DRIVER OUTPUT: 2	123	30	100	MASTER	FEEDBACK INPUTS = 3,4
115	116	DEVICE DRIVER OUTPUT: 3	123	30	100	MASTER	FEEDBACK INPUTS = 5,6
117	118	DEVICE DRIVER OUTPUT: 4	123	30	100	MASTER	FEEDBACK INPUTS = 7,8
119	120	DEVICE DRIVER OUTPUT: 5	123	30	100	MASTER	FEEDBACK INPUTS = 9,10
121	122	DEIVCE DRIVER OUTPUT: 6	123	30	100	MASTER	FEEDBACK INPUTS = 11,12
123	124	DEVICE DRIVER OUTPUT: 7	123	30	100	MASTER	FEEDBACK INPUTS = 13,14
125	126	DEVICE DRIVER OUTPUT: 8	123	30	100	MASTER	FEEDBACK INPUTS = 15,16
127	128	DEVICE DRIVER OUTPUT: 9	123	30	100	MASTER	NO INPUTS
129	130	DEVICE DRIVER OUTPUT: 10	123	30	100	MASTER	NO INPUTS
131	132	DEVICE DRIVER OUTPUT: 11	123	30	100	MASTER	NO INPUTS
133	134	DEVICE DRIVER OUTPUT: 12	123	30	100	MASTER	NO INPUTS
135	136	DEVICE DRIVER OUTPUT: 13	123	30	100	SLAVE 1	FEEDBACK INPUTS = 17,18
137	138	DEVICE DRIVER OUTPUT: 14	123	30	100	SLAVE 1	FEEDBACK INPUTS = 19,20
139	140	DEVICE DRIVER OUTPUT: 15	123	30	100	SLAVE 1	FEEDBACK INPUTS = 21,22
141	142	DEVICE DRIVER OUTPUT: 16	123	30	100	SLAVE 1	FEEDBACK INPUTS = 23,24
143	144	DEVICE DRIVER OUTPUT: 17	123	30	100	SLAVE 1	FEEDBACK INPUTS = 25,26
145	146	DEVICE DRIVER OUTPUT: 18	123	30	100	SLAVE 1	FEEDBACK INPUTS = 27,28
147	148	DEVICE DRIVER OUTPUT: 19	123	30	100	SLAVE 1	FEEDBACK INPUTS = 29,30
149	150	DEVICE DRIVER OUTPUT: 20	123	30	100	SLAVE 1	FEEDBACK INPUTS = 31,32
151	152	DEVICE DRIVER OUTPUT: 21	123	30	100	SLAVE 1	NO INPUTS
153	154	DEVICE DRIVER OUTPUT: 22	123	30	100	SLAVE 1	NO INPUTS

SECTION B2 – SEQUENCE COMMAND EASY STEP PLUS BLOCK ADDRESS MAP (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNC-CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
155	156	DEVICE DRIVER OUTPUT: 23	123	30	100	SLAVE 1	NO INPUTS
157	158	DEVICE DRIVER OUTPUT: 24	123	30	100	SLAVE 1	NO INPUTS
159	160	DEVICE DRIVER OUTPUT: 25	123	30	100	SLAVE 2	FEEDBACK INPUTS = 33,34
161	162	DEVICE DRIVER OUTPUT: 26	123	30	100	SLAVE 2	FEEDBACK INPUTS = 35,36
163	164	DEVICE DRIVER OUTPUT: 27	123	30	100	SLAVE 2	FEEDBACK INPUTS = 37,38
165	166	DEVICE DRIVER OUTPUT: 28	123	30	100	SLAVE 2	FEEDBACK INPUTS = 39,40
167	168	DEVICE DRIVER OUTPUT: 29	123	30	100	SLAVE 2	FEEDBACK INPUTS = 41,42
169	170	DEVICE DRIVER OUTPUT: 30	123	30	100	SLAVE 2	FEEDBACK INPUTS = 43,44
171	172	DEVICE DRIVER OUTPUT: 31	123	30	100	SLAVE 2	FEEDBACK INPUTS = 45,46
173	174	DEVICE DRIVER OUTPUT: 32	123	30	100	SLAVE 2	FEEDBACK INPUTS = 47,48
175	176	DEVICE DRIVER OUTPUT: 33	123	30	100	SLAVE 2	NO INPUTS
177	178	DEVICE DRIVER OUTPUT: 34	123	30	100	SLAVE 2	NO INPUTS
179	180	DEVICE DRIVER OUTPUT: 35	123	30	100	SLAVE 2	NO INPUTS
181	182	DEVICE DRIVER OUTPUT: 36	123	30	100	SLAVE 2	NO INPUTS
183	184	DEVICE DRIVER OUTPUT: 37	123	30	100	SLAVE 3	FEEDBACK INPUTS = 49,50
185	186	DEVICE DRIVER OUTPUT: 38	123	30	100	SLAVE 3	FEEDBACK INPUTS = 51,52
187	188	DEVICE DRIVER OUTPUT: 39	123	30	100	SLAVE 3	FEEDBACK INPUTS = 53,54
189	190	DEVICE DRIVER OUTPUT: 40	123	30	100	SLAVE 3	FEEDBACK INPUTS = 55,56
191	192	DEVICE DRIVER OUTPUT: 41	123	30	100	SLAVE 3	FEEDBACK INPUTS = 57,58
193	194	DEVICE DRIVER OUTPUT: 42	123	30	100	SLAVE 3	FEEDBACK INPUTS = 59,60
195	196	DEVICE DRIVER OUTPUT: 43	123	30	100	SLAVE 3	FEEDBACK INPUTS = 61,62
197	198	DEVICE DRIVER OUTPUT: 44	123	30	100	SLAVE 3	FEEDBACK INPUTS = 63,64
199	200	DEVICE DRIVER OUTPUT: 45	123	30	100	SLAVE 3	NO INPUTS
201	202	DEVICE DRIVER OUTPUT: 46	123	30	100	SLAVE 3	NO INPUTS
203	204	DEVICE DRIVER OUTPUT: 47	123	30	100	SLAVE 3	NO INPUTS
205	206	DEVICE DRIVER OUTPUT: 48	123	30	100	SLAVE 3	NO INPUTS
207	207	DO GROUP OUTPUTS: 1 – 8	83	32	90	MASTER	
208	208	DO GROUP OUTPUTS: 9 – 12	83	32	90	MASTER	Digital Output Groups
209	209	DO GROUP OUTPUTS: 13 – 20	83	32	90	SLAVE 1	are the interface
210	210	DO GROUP OUTPUTS: 21 – 24	83	32	90	SLAVE 1	to the hardware outputs
211	211	DO GROUP OUTPUTS: 25 – 32	83	32	90	SLAVE 2	
212	212	DO GROUP OUTPUTS: 33 – 36	83	32	90	SLAVE 2	
213	213	DO GROUP OUTPUTS: 37 – 44	83	32	90	SLAVE 3	
214	214	DO GROUP OUTPUTS: 45 – 48	83	32	90	SLAVE 3	
215	215	DEVICE MONITOR OUTPUTS: 1 – 12	125	40	102		

SECTION B2 – SEQUENCE COMMAND EASY STEP PLUS BLOCK ADDRESS MAP (continued)

BLOCK ADDRESS				MEMORY USAGE			
START	END	CONTROL FUNCTION	FUNC-CODE	NVRAM	RAM	I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
216	216	DEVICE MONITOR OUTPUTS: 13 – 24	125	40	102		Device Monitors logically OR the control status of all the Device Driver Blocks
217	217	DEVICE MONITOR OUTPUTS: 25 – 36	125	40	102		
218	218	DEVICE MONITOR OUTPUTS: 37 – 48	125	40	102		
219	219	UNUSED					
220	227	RDEMUX STEPS: 0 – 7	126	12	92		Outputs of the
228	235	RDEMUX STEPS: 8 – 15	126	12	92		Real Demultiplexer
236	243	RDEMUX STEPS: 16 – 23	126	12	92		blocks are the
244	251	RDEMUX STEPS: 24 – 31	126	12	92		step indicators
252	259	RDEMUX STEPS: 32 – 39	126	12	92		
260	274	STEP 1 LOGIC					STEP INDICATOR = 221
275	289	STEP 2 LOGIC					STEP INDICATOR = 222
290	304	STEP 3 LOGIC					STEP INDICATOR = 223
305	319	STEP 4 LOGIC					STEP INDICATOR = 224
320	334	STEP 5 LOGIC					STEP INDICATOR = 225
335	349	STEP 6 LOGIC					STEP INDICATOR = 226
350	364	STEP 7 LOGIC					STEP INDICATOR = 227
365	379	STEP 8 LOGIC					STEP INDICATOR = 228
380	394	STEP 9 LOGIC					STEP INDICATOR = 229
395	409	STEP 10 LOGIC					STEP INDICATOR = 230
410	424	STEP 11 LOGIC					STEP INDICATOR = 231
425	439	STEP 12 LOGIC					STEP INDICATOR = 232
440	454	STEP 13 LOGIC					STEP INDICATOR = 233
455	469	STEP 14 LOGIC					STEP INDICATOR = 234
470	484	STEP 15 LOGIC					STEP INDICATOR = 235
485	499	STEP 16 LOGIC					STEP INDICATOR = 236
500	514	STEP 17 LOGIC					STEP INDICATOR = 237
515	529	STEP 18 LOGIC					STEP INDICATOR = 238
530	544	STEP 19 LOGIC					STEP INDICATOR = 239
545	559	STEP 20 LOGIC					STEP INDICATOR = 240
560	574	STEP 21 LOGIC					STEP INDICATOR = 241
575	589	STEP 22 LOGIC					STEP INDICATOR = 242
590	604	STEP 23 LOGIC					STEP INDICATOR = 243
605	619	STEP 24 LOGIC					STEP INDICATOR = 244
620	634	STEP 25 LOGIC					STEP INDICATOR = 245
635	649	STEP 26 LOGIC					STEP INDICATOR = 246

SECTION B2 – SEQUENCE COMMAND EASY STEP PLUS BLOCK ADDRESS MAP (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNC-CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
650	664	STEP 27 LOGIC					STEP INDICATOR = 247
665	679	STEP 28 LOGIC					STEP INDICATOR = 248
680	694	STEP 29 LOGIC					STEP INDICATOR = 249
695	709	STEP 30 LOGIC					STEP INDICATOR = 250
710	724	STEP 31 LOGIC					STEP INDICATOR = 251
725	739	STEP 32 LOGIC					STEP INDICATOR = 252
740	740	BMUX STEPS: 0 – 9	119	32	86		STEP TRIGGERS 1 – 9
741	741	BMUX STEPS: 10 – 19	119	32	86		STEP TRIGGERS 10 – 19
742	742	BMUX STEPS: 20 – 29	119	32	86		STEP TRIGGERS 20 – 29
743	743	BMUX STEPS: 30 – 39	119	32	86		STEP TRIGGERS 30 – 32
744	745	SEQ MONITOR STEPS: 1 – 8	124	80	162		Next and fault steps
746	747	SEQ MONITOR STEPS: 9 – 16	124	80	162		for each step are
748	749	SEQ MONITOR STEPS: 17 – 24	124	80	162		configured in the
750	751	SEQ MONITOR STEPS: 25 – 32	124	80	162		Sequence Monitors
752	754	UNUSED					
755	759	SEQUENCE MASTER OUTPUTS: 1 – 4	141	80	142	MASTER	Step masks are configured in the
760	764	SEQUENCE MASTER OUTPUTS: 5 – 8	141	80	142	MASTER	Sequence Master function blocks
765	769	SEQUENCE MASTER OUTPUTS: 9 – 12	141	80	142	MASTER	
770	774	SEQUENCE MASTER OUTPUTS: 13 – 16	141	80	142	SLAVE 1	
775	779	SEQUENCE MASTER OUTPUTS: 17 – 20	141	80	142	SLAVE 1	
780	784	SEQUENCE MASTER OUTPUTS: 21 – 24	141	80	142	SLAVE 1	
785	789	SEQUENCE MASTER OUTPUTS: 25 – 28	141	80	142	SLAVE 2	
790	794	SEQUENCE MASTER OUTPUTS: 29 – 32	141	80	142	SLAVE 2	
795	799	SEQUENCE MASTER OUTPUTS: 33 – 36	141	80	142	SLAVE 2	
800	804	SEQUENCE MASTER OUTPUTS: 37 – 40	141	80	142	SLAVE 3	
805	809	SEQUENCE MASTER OUTPUTS: 41 – 44	141	80	142	SLAVE 3	
810	814	SEQUENCE MASTER OUTPUTS: 45 – 48	141	80	142	SLAVE 3	
815	1394	RESERVED FOR AUTOMATIC RESTORE					
1395	2046	FREE USER AREA					For user defined blocks

Sequence Command Controller Easy Step Plus Block Structure For Automatic Restore Option

BLOCK ADDRESS		FUNCTIONS TO BE RESTORED	FUNC CODE	MEMORY USAGE		RAM
START	END			EXTRA NVRAM	TOTAL NVRAM	
815	822	DI GROUPS	84	34	640	704
823	826	CSC STATIONS	176	70	464	352
827	874	DEVICE DRIVERS	123	20	3168	4224
875	882	DO GROUPS	83	2	384	704
883	886	DEVICE MONITORS	125	4	200	352
887	891	RDEMUX	126	16	310	440
892	895	BMUX	119	2	196	352
896	899	SEQUENCE MONITORS	124	12	232	352
900	911	SEQUENCE MASTERS	141	16	744	1056
913	913	SEGMENT CONTROL	82	20	66	88
914	914	EXTENDED EXECUTIVE	90	52	98	88
915	1394	STEP LOGIC		*	*	*

* Varies with type and amount of Function Codes added by the user.

SECTION B3 – OPERATING STATUS DISPLAYS

Sequence Command Controller

Press F3 while in any mode to obtain status byte information.

Status bytes #1 and #2 have a common definition regardless of the target unit being used. Refer to DIAGNOSTICS, **Operating Status Display** for information on Status Bytes #1 and #2. The contents of status bytes #3 through #5 are defined on a target unit basis.

NOTE: For Sequence Command Controllers, status byte #1, #2 and #3 data displayed on CTT02 in hexadecimal format. All status byte #4 and #5 data displayed in binary coded decimal (BCD) format.

Status Bytes #3 – #5

Mode	Byte 3	Byte 4	Byte 5	Description
ERR	05	(1)	(2)	Configuration error – undefined block (1), (2) = Block* making reference.
ERR	06	(1)	(2)	Configuration error – input data type is incorrect. (1), (2) = Block* making reference.
ERR	08	(1)	(2)	Trip block activated (1), (2) = Block* making reference
	09	(1)	(2)	Too many segment control blocks. (1), (2) = Block* making reference.
	0F	—	—	Primary failed and configuration not current
	10	—	—	Primary failed and checkpoint data not available.

*All block numbers are encoded in BCD (Binary Coded Decimal) with (1) = MSB (most significant byte) and 2 = LSB (least significant byte).
Example: Block number 1024: (1) = 10; (2) = 24.

Appendix C – Batch Command Controller

NOTE: On new, unconfigured Command Series target units, the user must perform the procedure listed under **User Configuration — NVRAM** prior to starting configuration operations. Proceed to that section in this Instruction Book if your target unit is new.

The information contained in Appendix C applies to the Batch Command Controller, CBC01. This appendix is divided into subsections which contain various examples and tables that will prove useful when using the CTT02 for configuration of the Batch Command Controller.

SECTION C1 – EXAMPLE KEYSTROKE PROCEDURE

This subsection of Appendix C provides control scheme drawings and sample worksheets using EASY STEP PLUS for configuration of a Batch Command Controller as the master controller for a small batch reactor installation. A Sequence Command Controller (CSC01) is used as a slave to the Batch Command Controller to provide the additional digital I/O needed. EASY STEP PLUS reduces the amount of entries required by the user. The configuration still consists of Bailey Function Codes and can be modified as desired by the user. An example keystroke procedure is included for this particular example.

Figure C1 is a simplified process diagram. Up to three materials can be mixed in the reactor and heated. There is a solvent input to allow the reactor to be flushed and cleaned. Metering is provided on the product output to measure the amount of product produced. Figure C2 is a set of configuration drawings that represent the functions required to complete this operational sequence.

Prior to starting, the user should develop a control scheme drawing and complete the EASY STEP PLUS Configuration Worksheets. Blank worksheets are provided in the back of this Instruction Book.

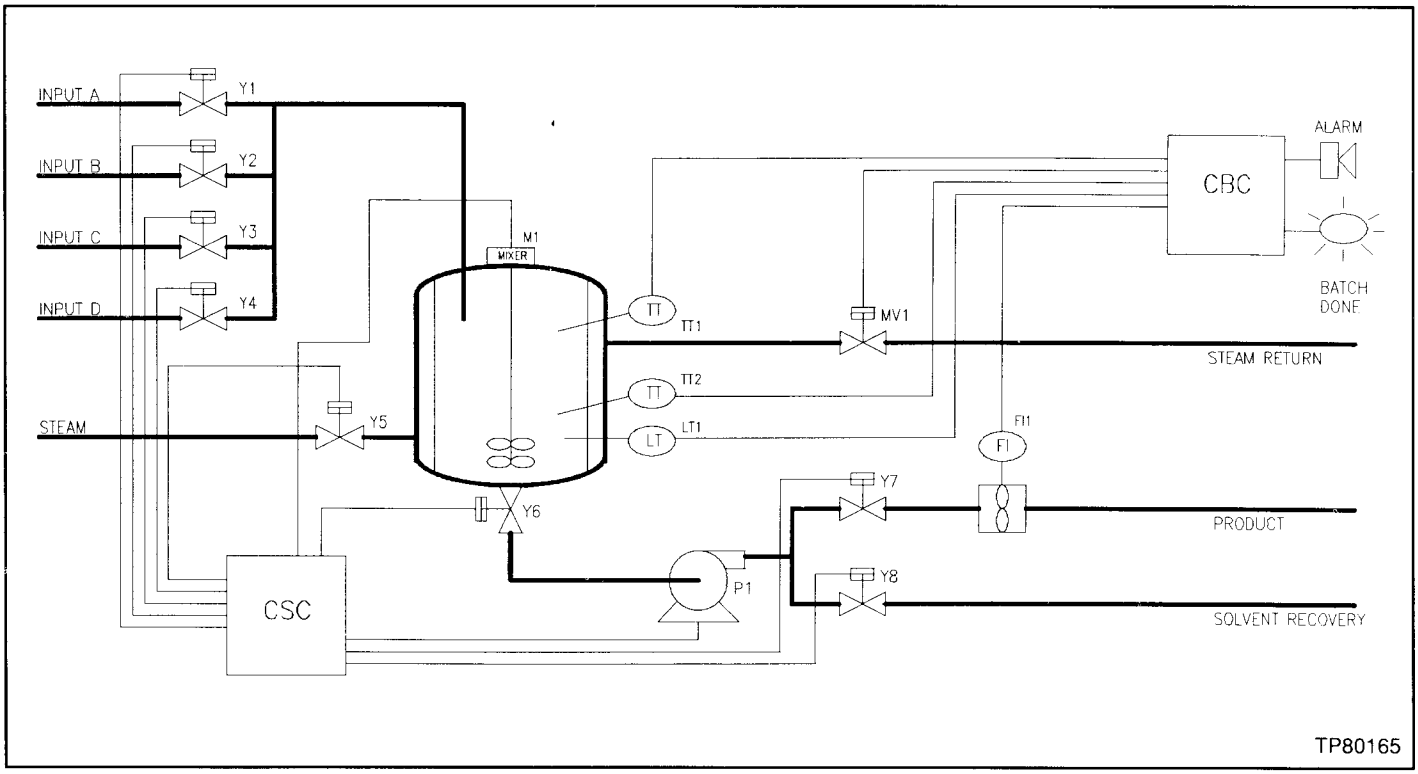
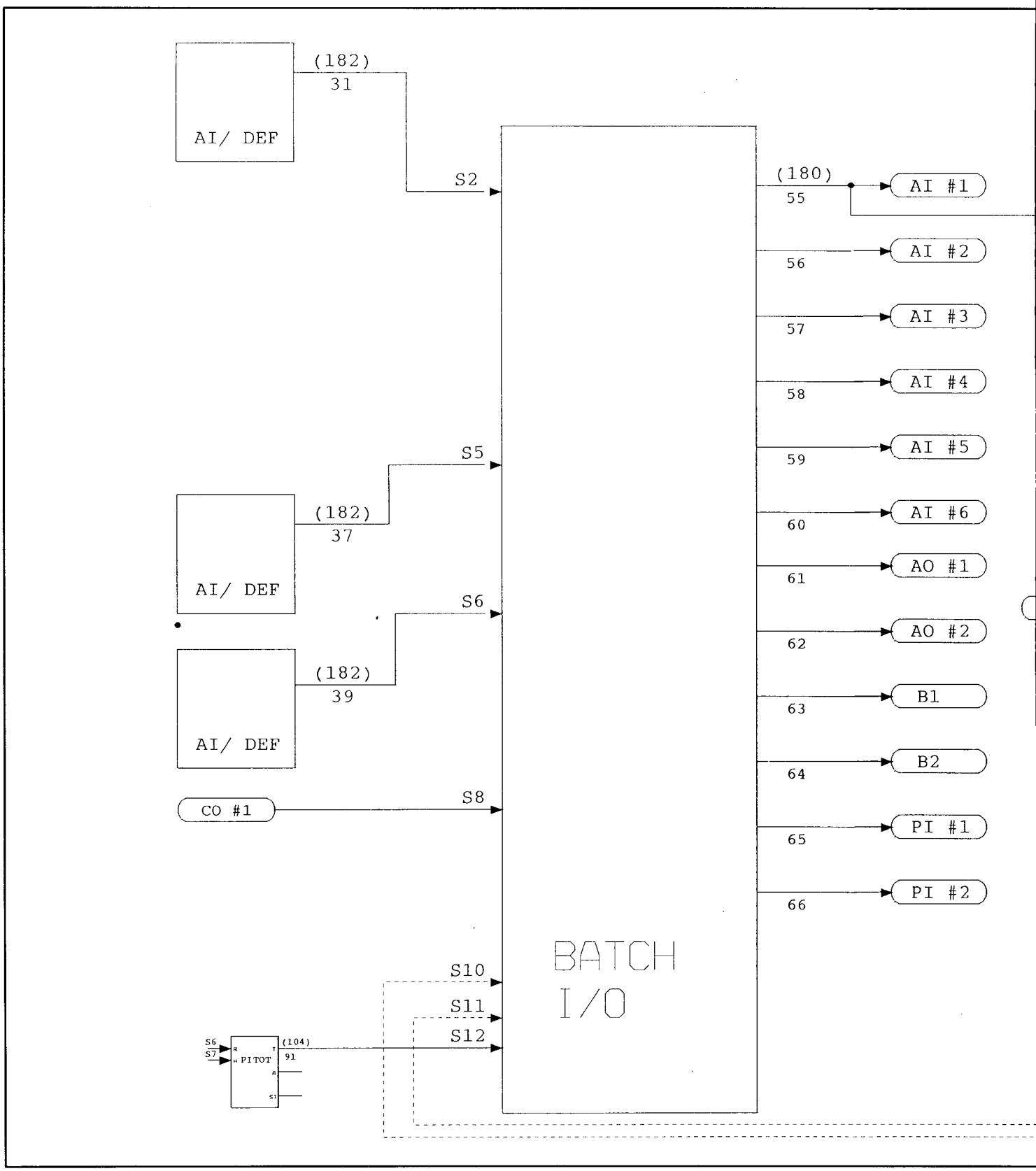


FIGURE C1 – Simplified Process Schematic, Batch Reactor

Appendix C


AI/ DEF
(182)
31
S2
AI/ DEF
(182)
37
S5
AI/ DEF
(182)
39
S6
CO #1
S8
S10
S11
S12
S6
S7
PITOT
(104)
91
BATCH
I/O
(180)
55
AI #1
56
AI #2
57
AI #3
58
AI #4
59
AI #5
60
AI #6
61
AO #1
62
AO #2
63
B1
64
B2
65
PI #1
66
PI #2

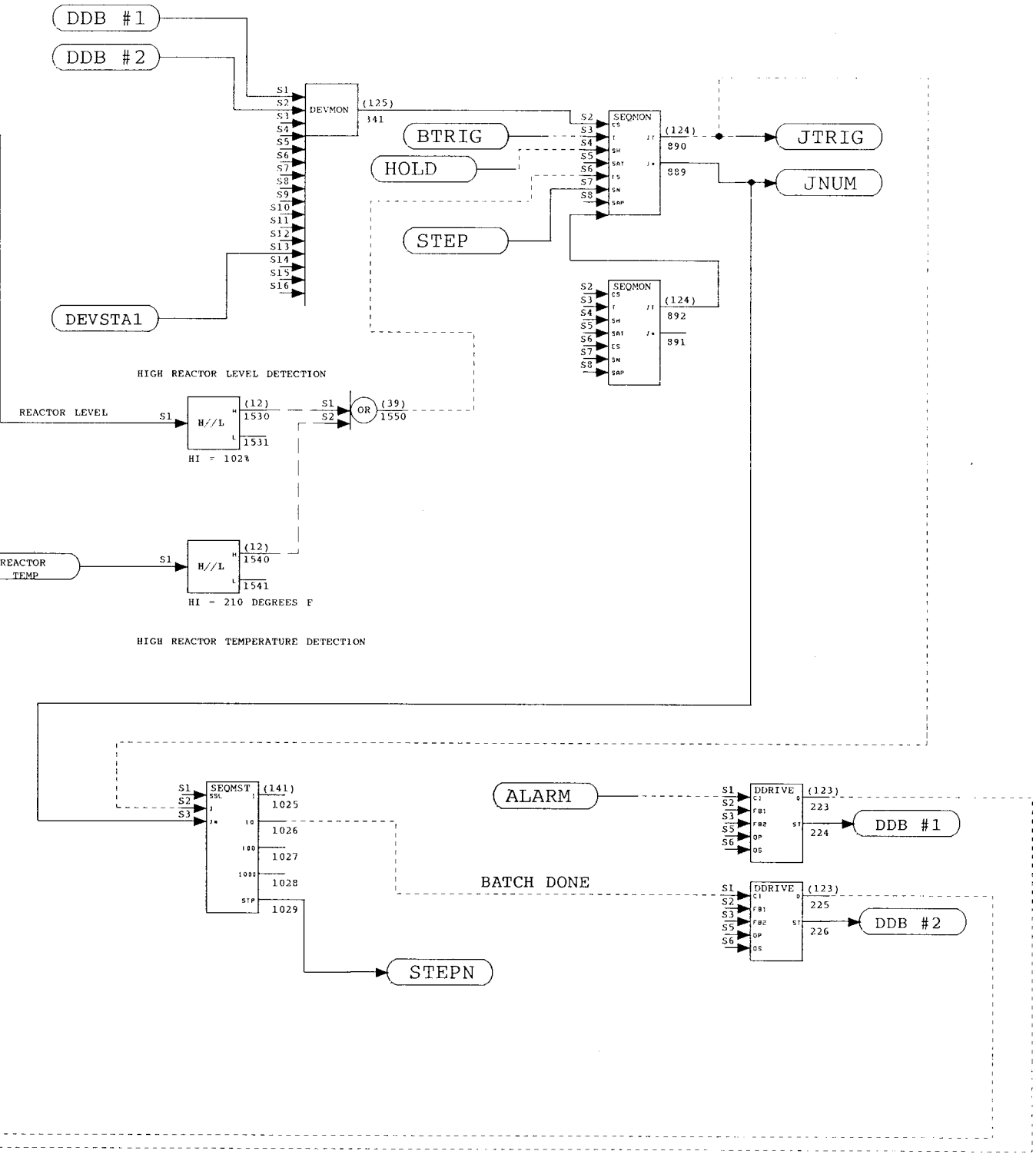


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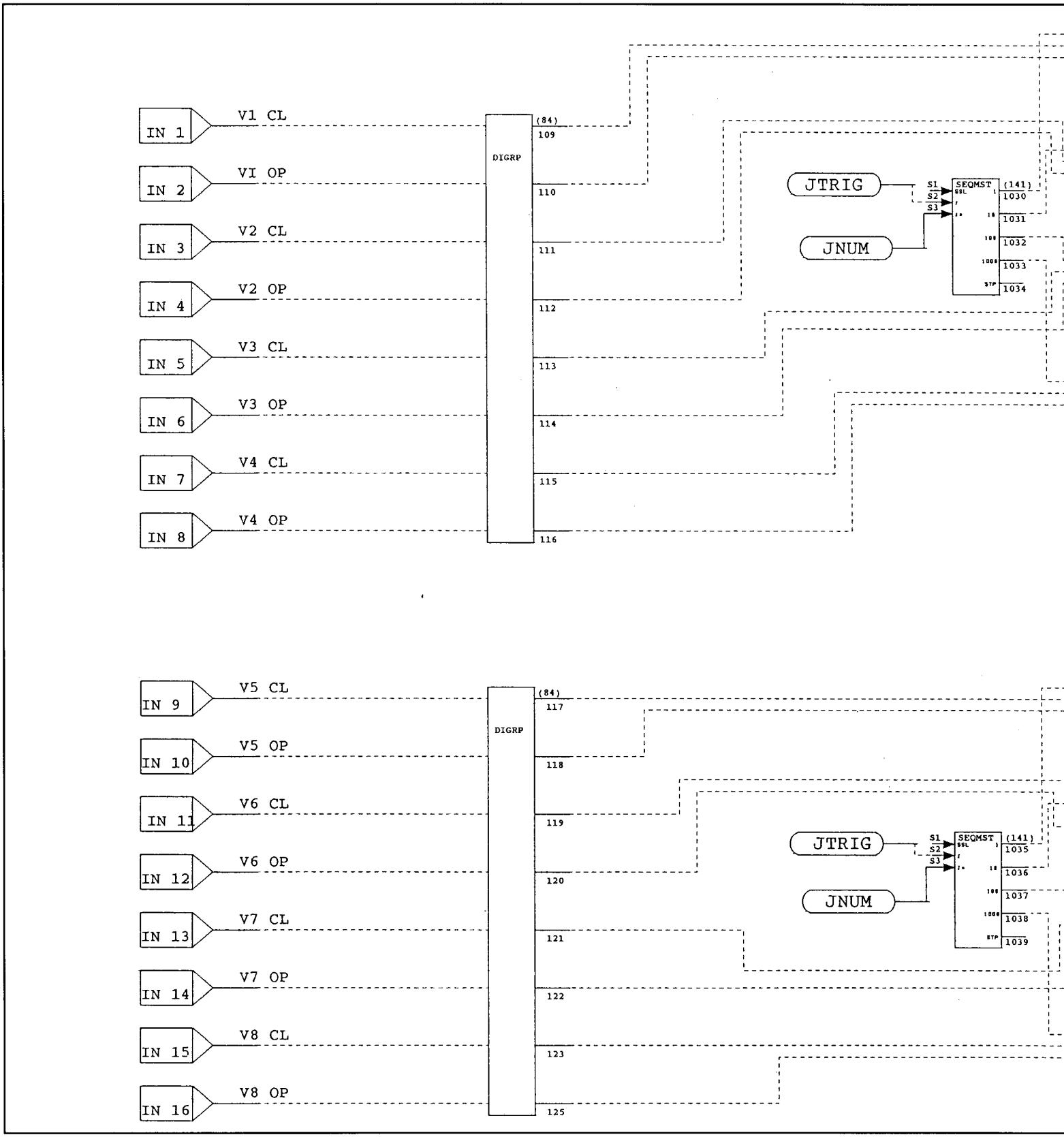
FIGURE C2 – Configuration Diagram, Batch Reactor


IN 1
V1 CL
IN 2
VI OP
IN 3
V2 CL
IN 4
V2 OP
IN 5
V3 CL
IN 6
V3 OP
IN 7
V4 CL
IN 8
V4 OP
DIGRP
(84)
109
110
111
112
113
114
115
116
JTRIG
JNUM
S1
S2
S3
SEQMST
(141)
1030
1031
1032
1033
1034
IN 9
V5 CL
IN 10
V5 OP
IN 11
V6 CL
IN 12
V6 OP
IN 13
V7 CL
IN 14
V7 OP
IN 15
V8 CL
IN 16
V8 OP
DIGRP
(84)
117
118
119
120
121
122
123
125
JTRIG
JNUM
S1
S2
S3
SEQMST
(141)
1035
1036
1037
1038
1039

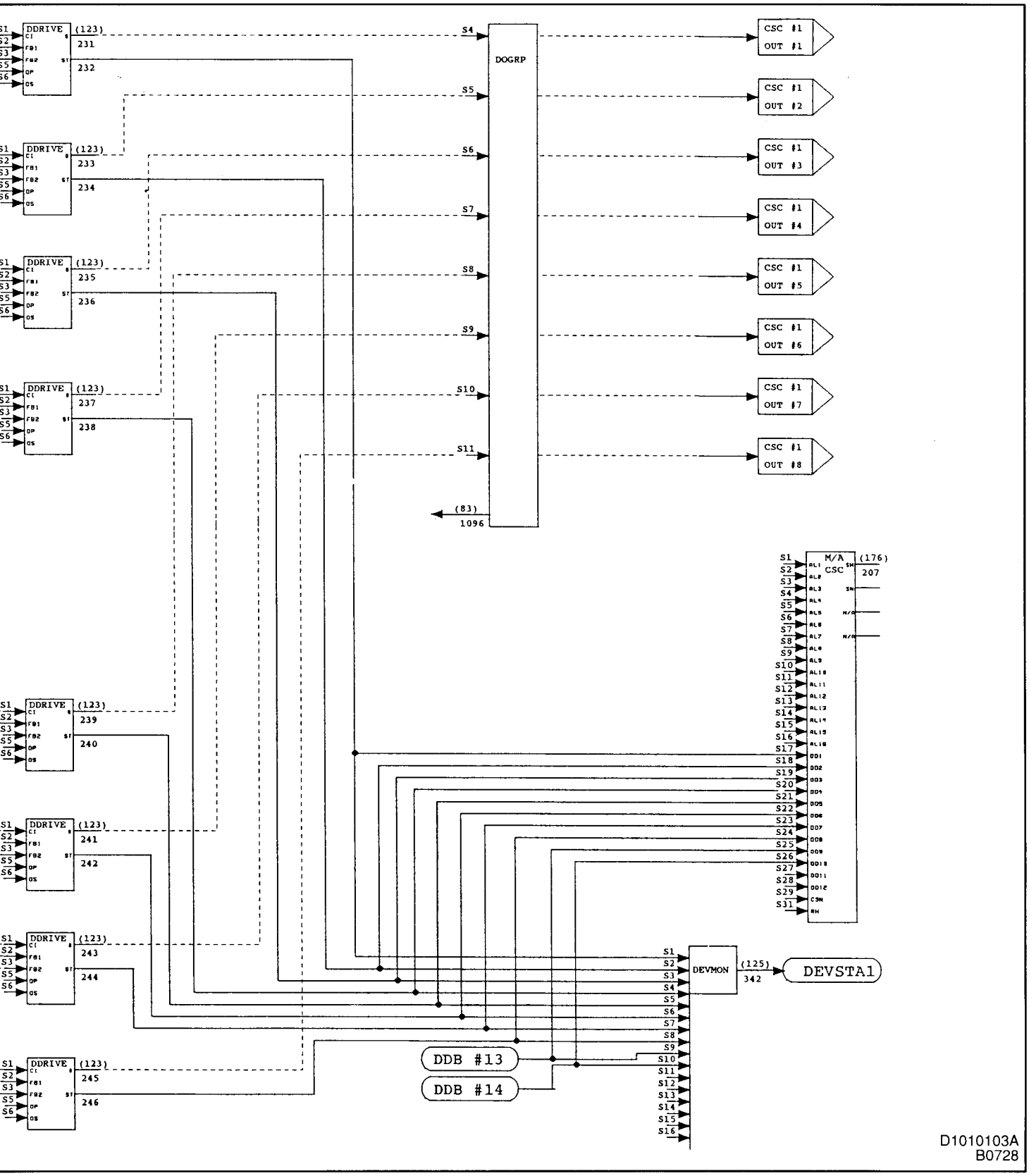
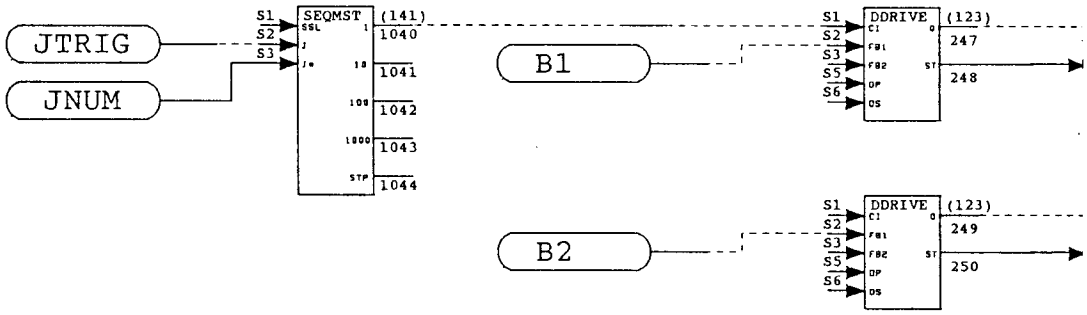


FIGURE C2 – Configuration Diagram, Batch Reactor (continued)


JTRIG
JNUM
S1
S2
S3
SEQMST
SSL
(141)
1040
1041
1042
1043
1044
B1
B2
DDRIVE
C1
FB1
FB2
OP
OS
ST
S5
S6
(123)
247
248
249
250

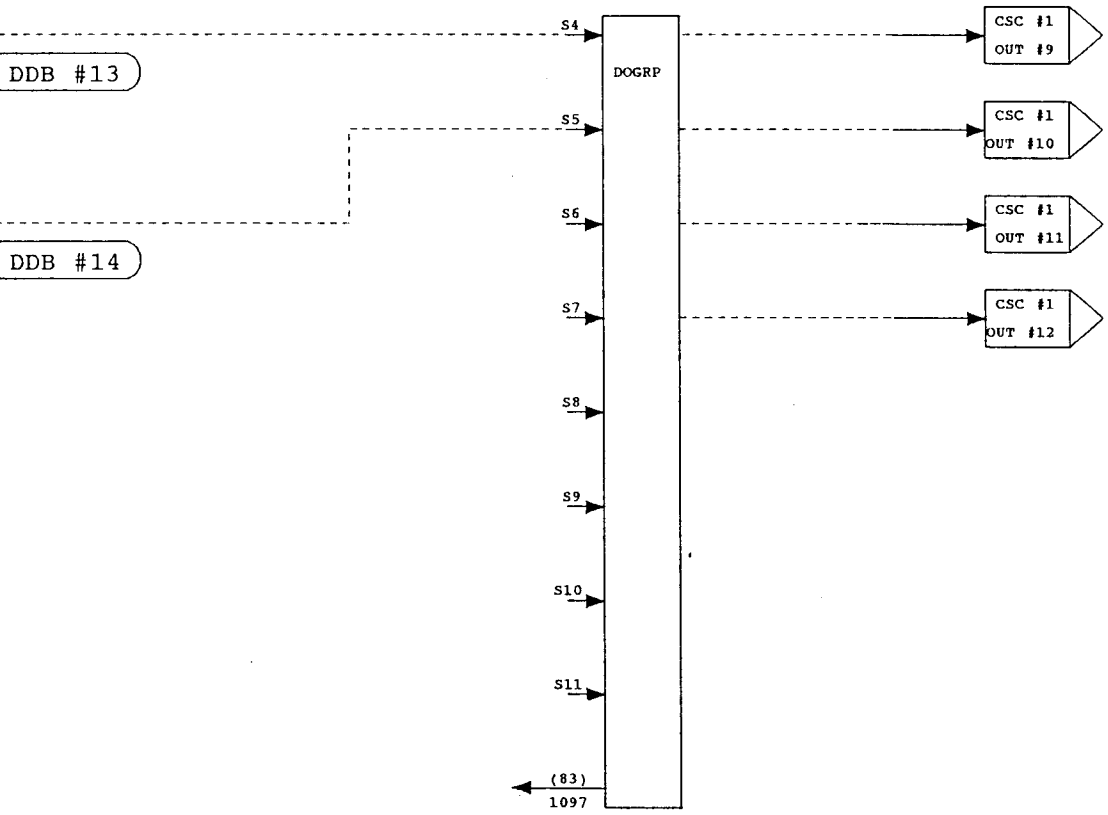


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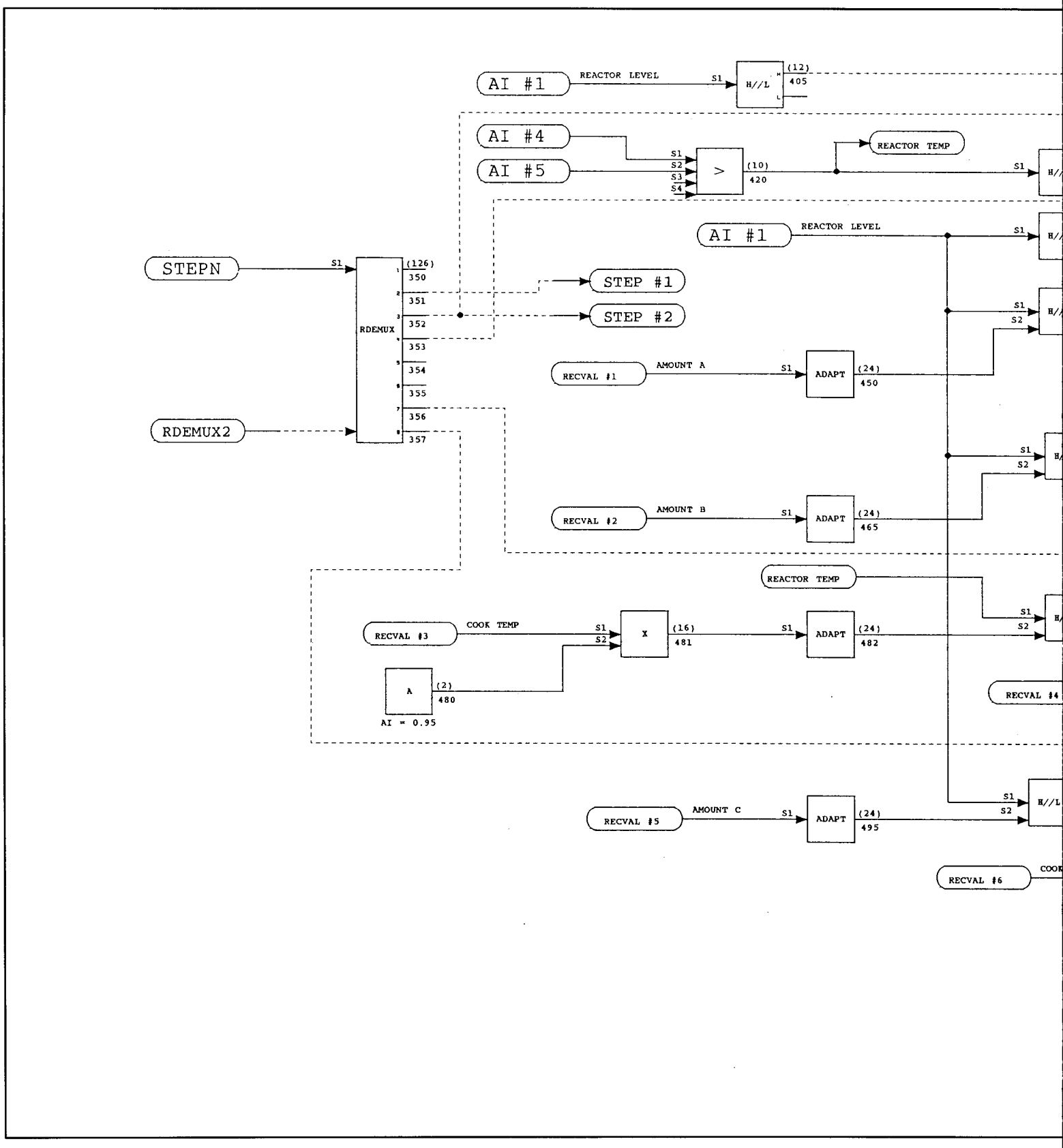
FIGURE C2 – Configuration Diagram, Batch Reactor (continued)

Appendix C


AI #1
REACTOR LEVEL
S1
H//L
(12)
405
AI #4
AI #5
S1
S2
S3
S4
>
(10)
420
REACTOR TEMP
S1
AI #1
REACTOR LEVEL
S1
STEPN
S1
(126)
350
351
352
353
354
355
356
357
RDEMUX
RDEMUX2
STEP #1
STEP #2
S1
S2
RECVAL #1
AMOUNT A
S1
ADAPT
(24)
450
S1
S2
RECVAL #2
AMOUNT B
S1
ADAPT
(24)
465
REACTOR TEMP
S1
S2
RECVAL #3
COOK TEMP
S1
S2
X
(16)
481
S1
ADAPT
(24)
482
A
(2)
480
AI = 0.95
RECVAL #4
S1
S2
RECVAL #5
AMOUNT C
S1
ADAPT
(24)
495
H//L
RECVAL #6

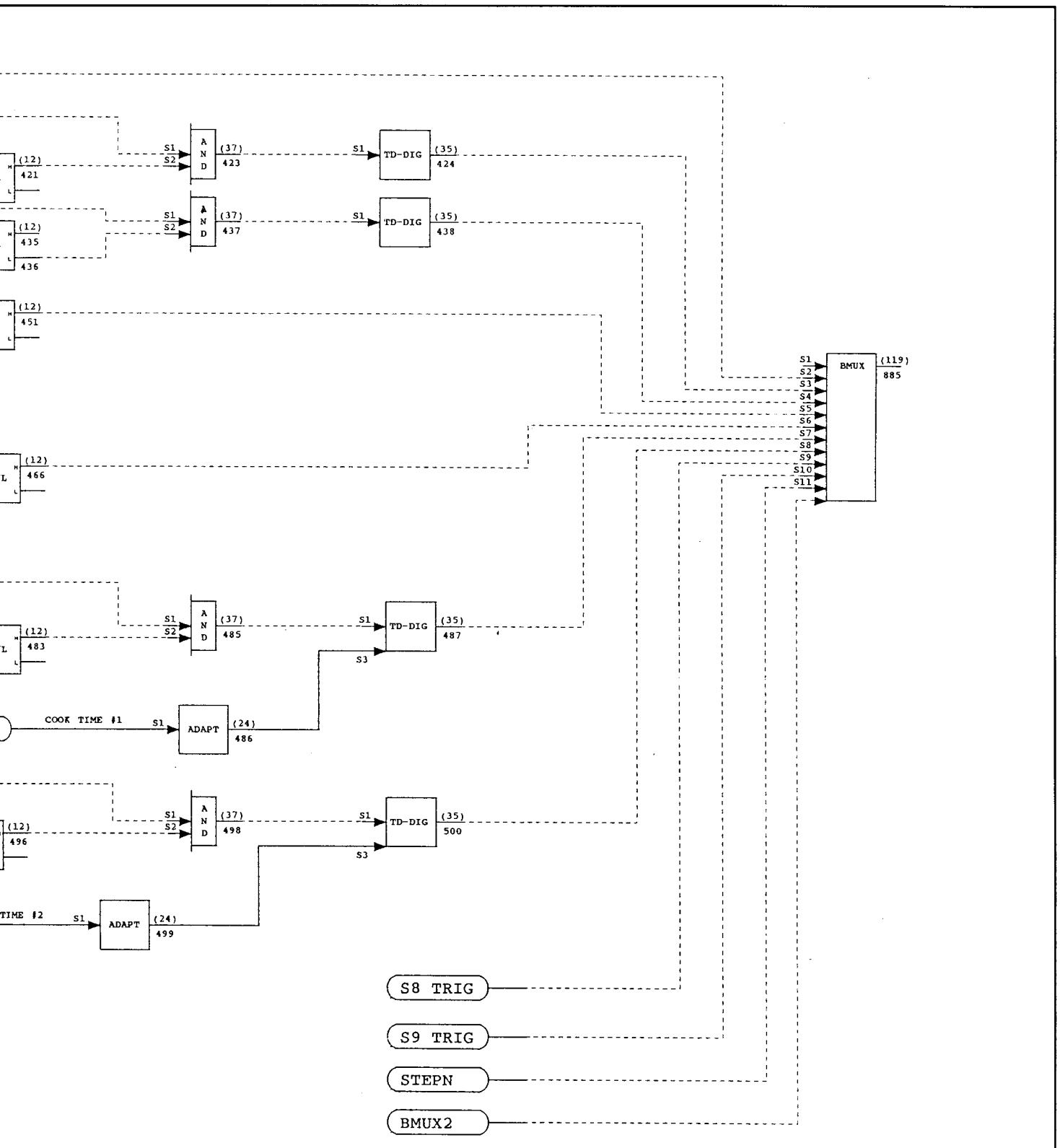
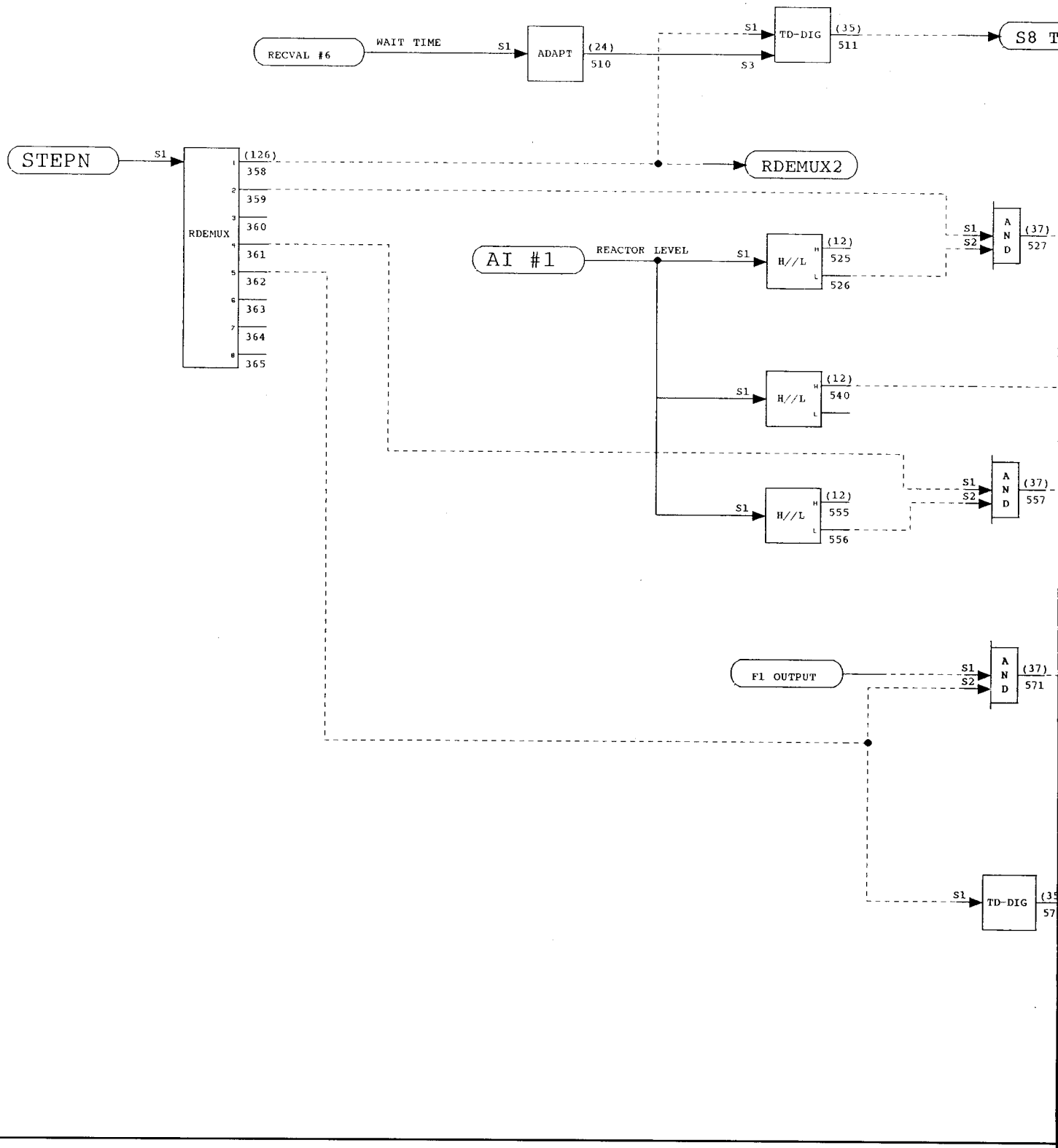


FIGURE C2 – Configuration Diagram, Batch Reactor (continued)


RECVAL #6
WAIT TIME
S1
ADAPT
(24)
510
S1
S3
TD-DIG
(35)
511
S8 T
STEPN
S1
RDEMUX
(126)
358
359
360
361
362
363
364
365
RDEMUX2
AI #1
REACTOR LEVEL
S1
H//L
(12)
525
526
S1
S2
AND
(37)
527
S1
H//L
(12)
540
S1
H//L
(12)
555
556
S1
S2
AND
(37)
557
F1 OUTPUT
S1
S2
AND
(37)
571
S1
TD-DIG

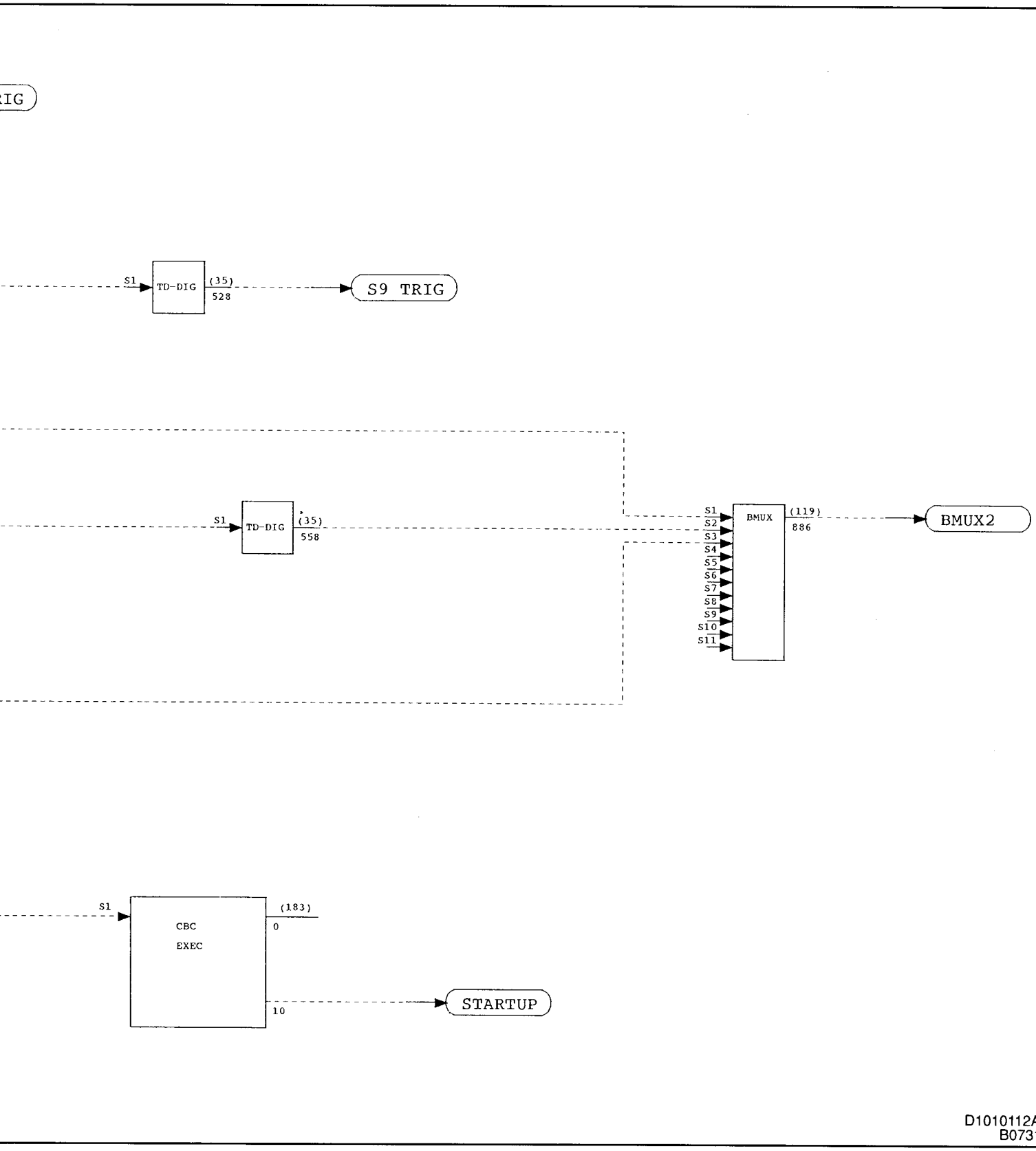
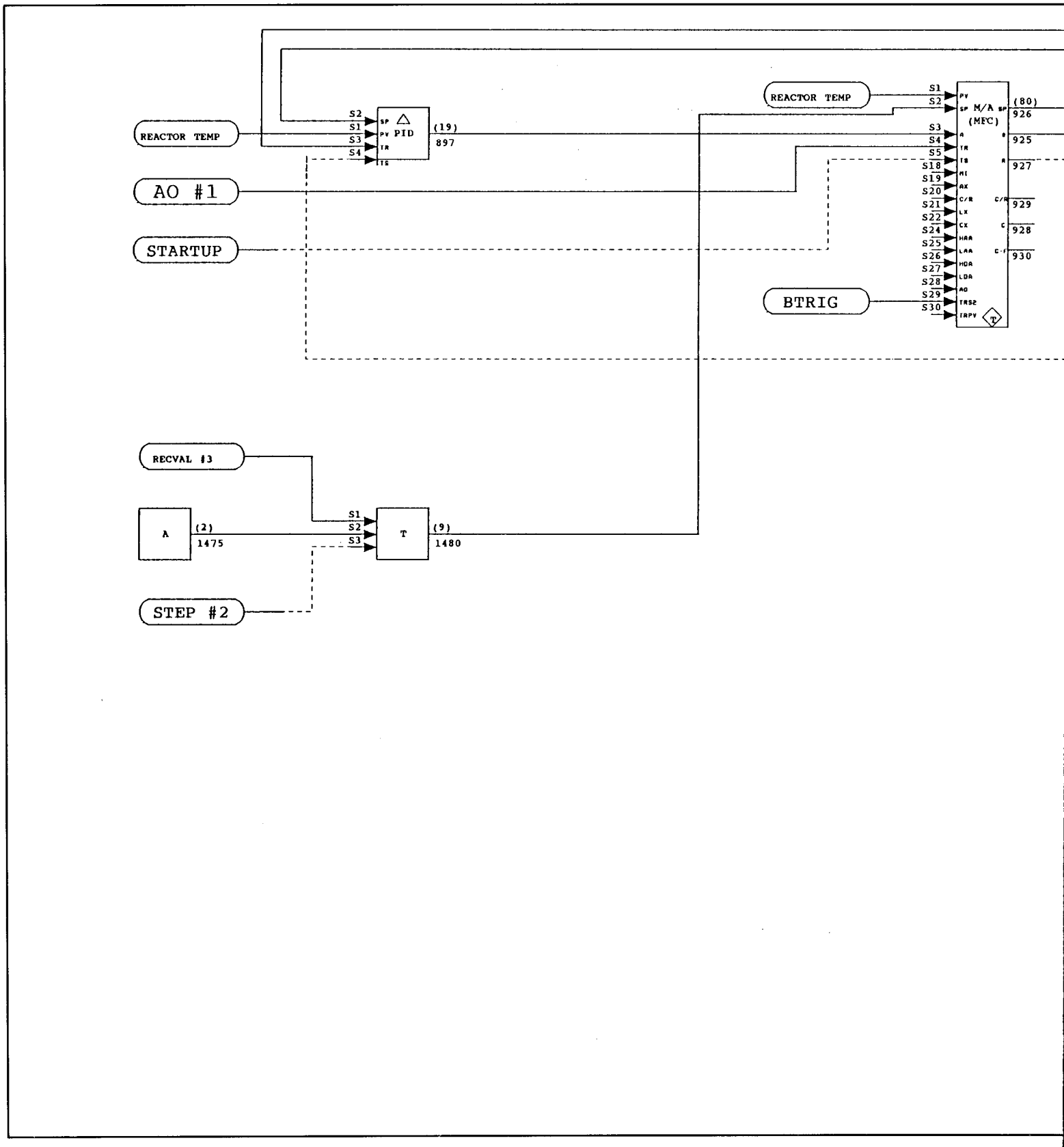


FIGURE C2 – Configuration Diagram, Batch Reactor (continued)

Appendix C


REACTOR TEMP
S2
S1
S3
S4
SP
PV
TR
TS
PID
(19)
897
AO #1
STARTUP
REACTOR TEMP
S1
S2
PV
SP
M/A
(MFC)
(80)
926
S3
S4
S5
S18
S19
S20
S21
S22
S24
S25
S26
S27
S28
S29
S30
A
TR
TS
MI
AX
C/R
LX
CX
HAA
LAA
HOA
LOA
AO
TRS2
TRPV
925
927
929
928
930
BTRIG
RECVAL #3
A
(2)
1475
S1
S2
S3
T
(9)
1480
STEP #2

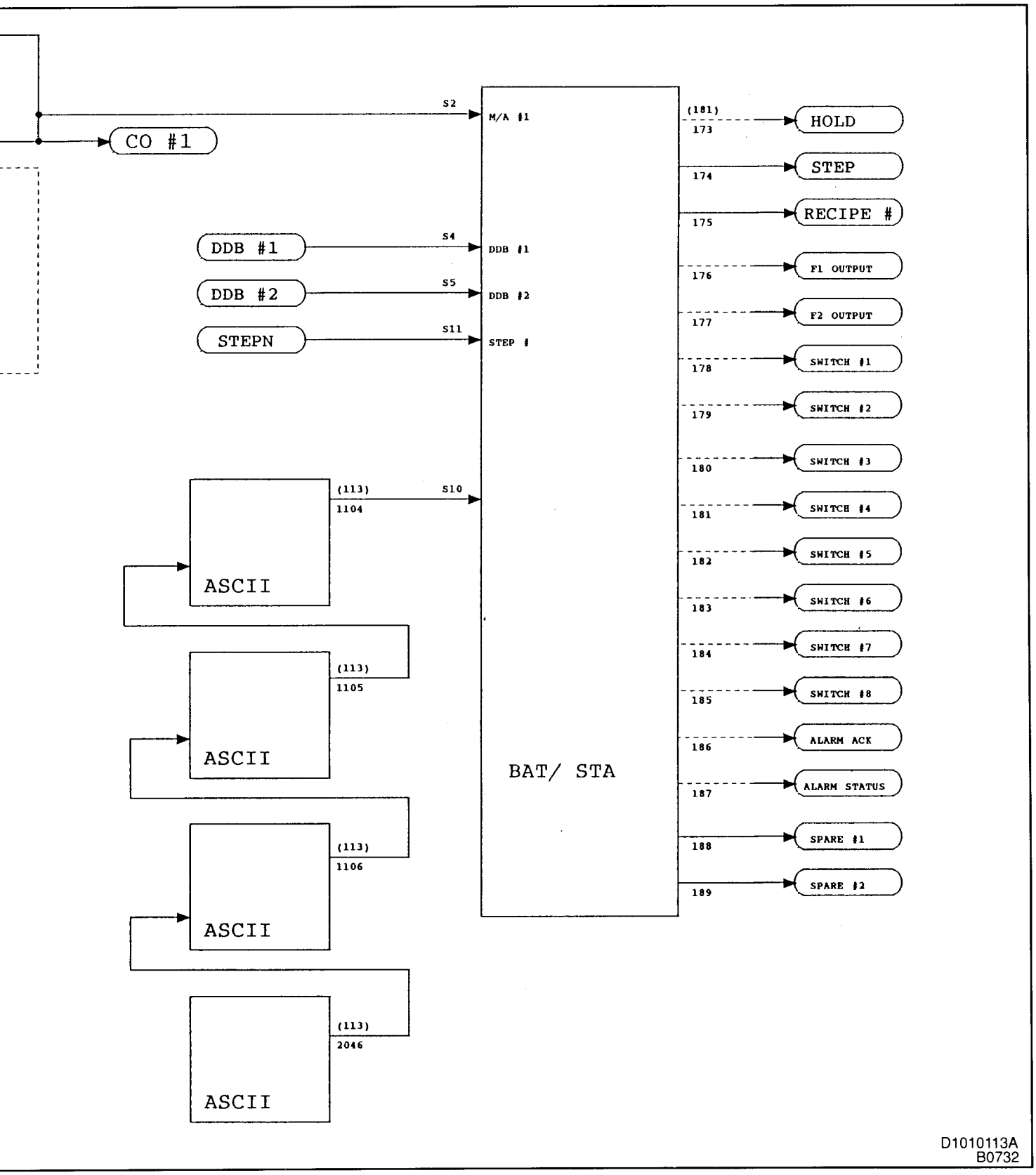
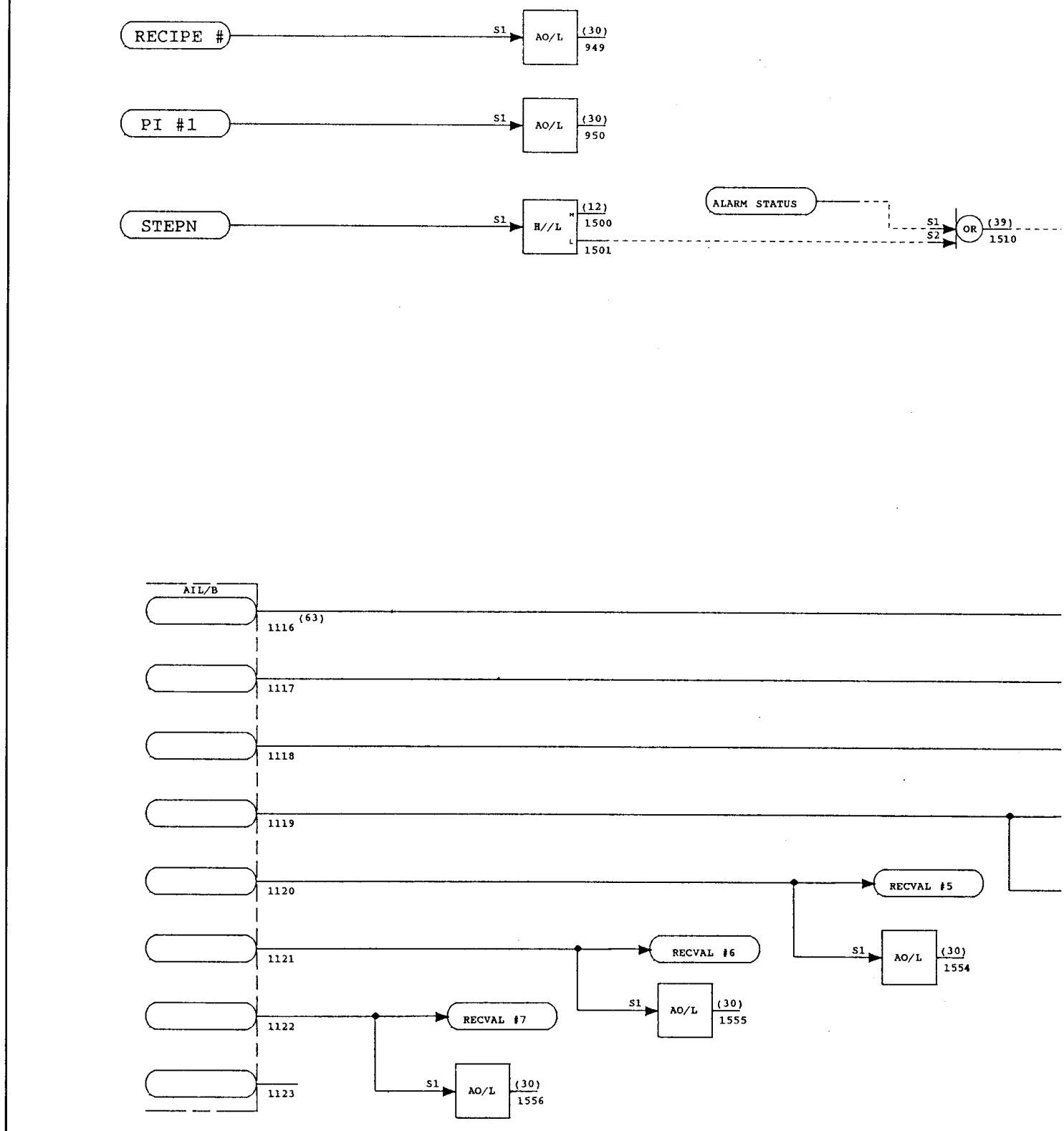
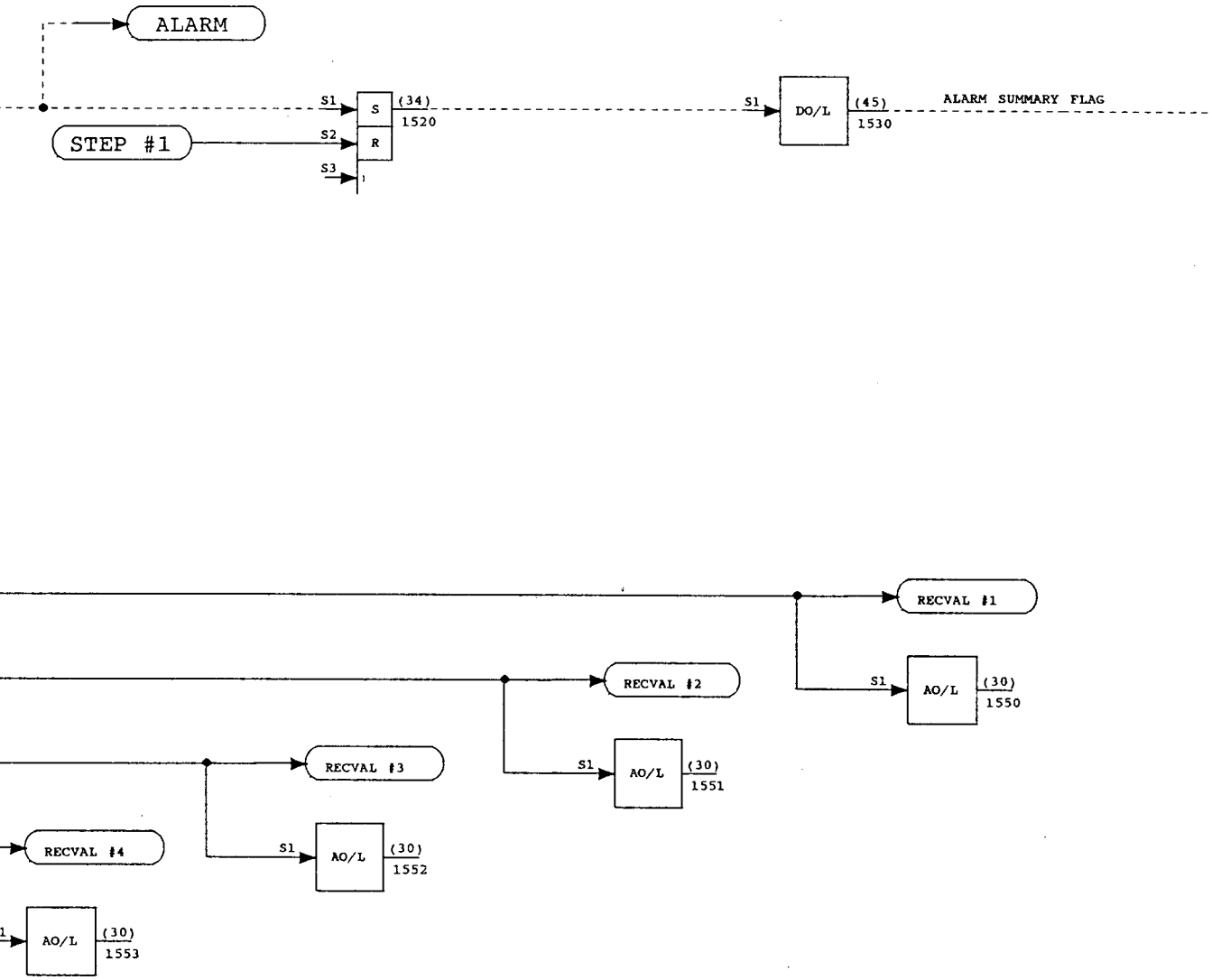


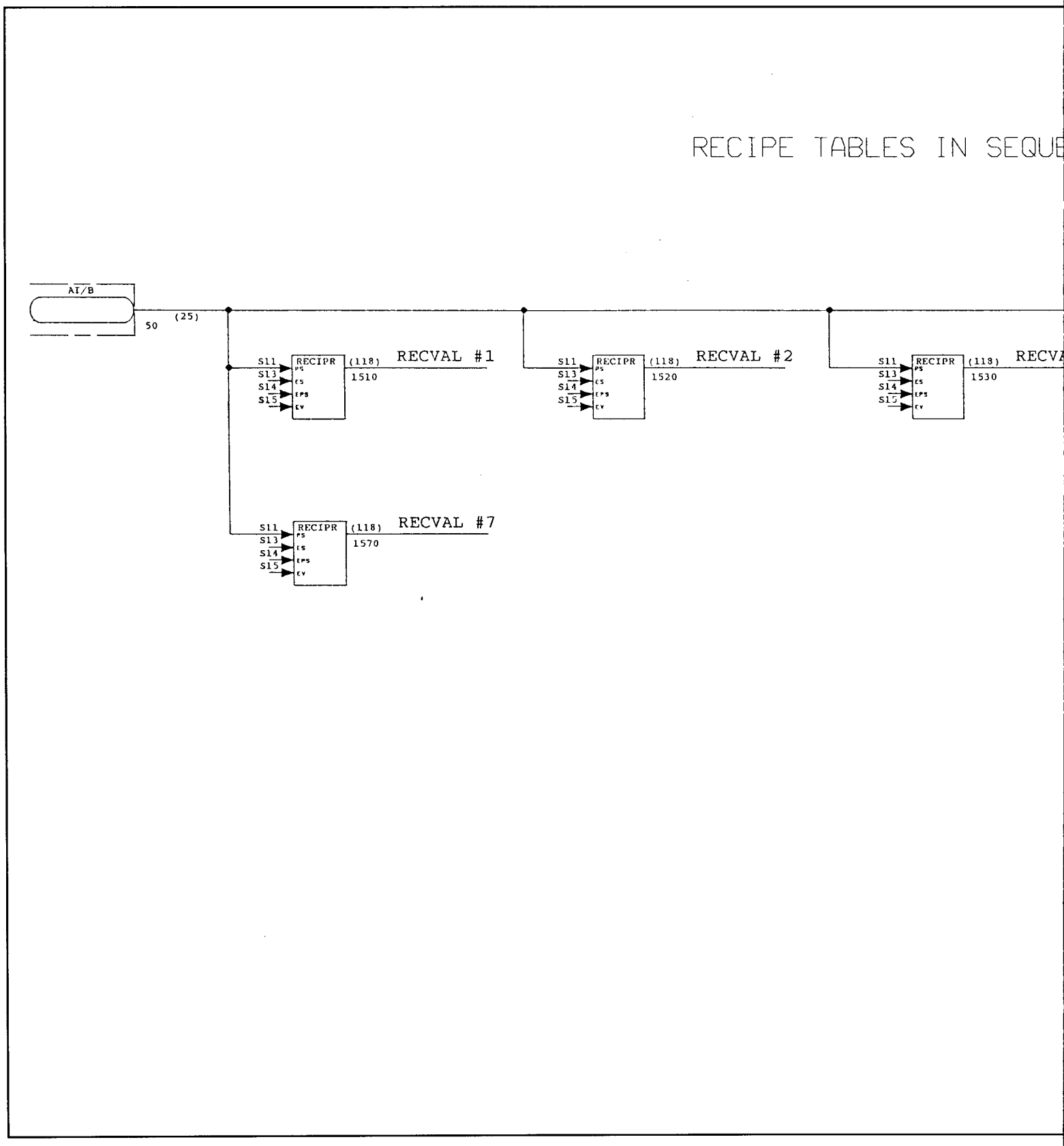
FIGURE C2 – Configuration Diagram, Batch Reactor (continued)


RECIPE #
S1
AO/L
(30)
949
PI #1
S1
AO/L
(30)
950
STEPN
S1
H//L
H
L
(12)
1500
1501
ALARM STATUS
S1
S2
OR
(39)
1510
AIL/B
1116
(63)
1117
1118
1119
1120
1121
1122
1123
RECVAL #5
RECVAL #6
RECVAL #7
S1
AO/L
(30)
1554
S1
AO/L
(30)
1555
S1
AO/L
(30)
1556



D1010116A
B0733

FIGURE C2 – Configuration Diagram, Batch Reactor (continued)


RECIPE TABLES IN SEQUE
AI/B
50
(25)
S11
S13
S14
S15
RECIPR
PS
ES
EPS
EV
(118)
1510
RECVAL #1
1520
RECVAL #2
1530
RECVA
1570
RECVAL #7

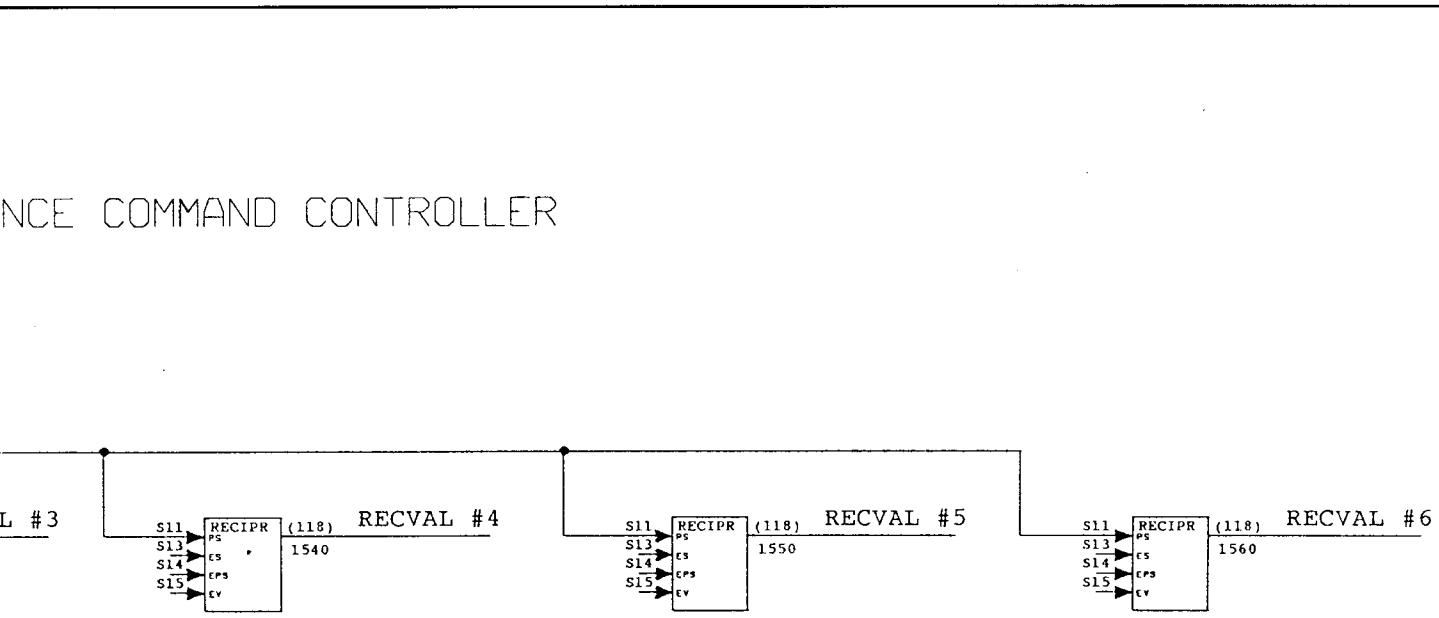


FIGURE C2 – Configuration Diagram, Batch Reactor (continued)

The step definitions for this particular example are as follows:

Step No.	Step Name	Action
Step 1:	CLEAN 1	Fill reactor to 95% with solvent and turn on mixer.
Step 2:	CLEAN 2	Heat to 200°F for 10 minutes.
Step 3:	CLEAN 3	Drain solvent.
Step 4:	ADD A	Fill reactor to Recipe Parameter 1 level.
Step 5:	ADD B	Fill reactor to Recipe Parameter 2 level.
Step 6:	COOK	Heat to Recipe Parameter 3 temperature for Recipe Parameter 4 duration.
Step 7:	ADD C	Fill reactor to Recipe Parameter 5 level.
Step 8:	WAIT	Shut off steam supply to reactor and wait for Recipe Parameter 6 duration.
Step 9:	DUMP	Remove finished product from reactor.
Step 10:	FLUSH 1	Fill reactor to 90% with solvent.
Step 11:	FLUSH 2	Remove solvent from reactor.
Step 12:	HOLD	Shut down process, print batch report, wait for operator acknowledge (using F1 key) before restarting.

Recipe Parameter #	Name	Description
1	Amount A	Amount of material A for batch.
2	Amount B	Amount of material B for batch.
3	Cook Temp	Cooking temperature.
4	Cook Time 1	Cooking duration for material A/B mix.
5	Amount C	Amount of material C for batch.
6	Wait Time	Amount of time to let product set.

The following Configuration Worksheets are samples on how the worksheets would be filled in for this example.

Worksheet — *CBC*

Configuration Parameters and Digital I/O Data

UNIT TAG REACTOR K101

☐ MASTER
☐ SLAVE

☒ PRIMARY
☐ BACKUP

MODULE ADDRESS 4 (0–31)
STATION ADDRESS 0 (0–7)
I/O ADDRESS 1 (1–15)

FOR MASTER UNIT ONLY:

NUMBER OF PROCESS STEPS	12
NUMBER OF CBC01 DIGITAL INPUTS	2
NUMBER OF CSC01 DIGITAL INPUTS	16
NUMBER OF CBC01 DIGITAL OUTPUTS	2
NUMBER OF CSC01 DIGITAL OUTPUTS	10
NUMBER OF HIGH LEVEL (1–5V/4–20mA) ANALOG INPUTS	1
NUMBER OF LOW LEVEL (T/C, RTD, mV) ANALOG INPUTS	2
NUMBER OF PULSE INPUTS	1
NUMBER OF ANALOG LOOPS	1
NUMBER OF RECIPES	2
NUMBER OF RECIPE PARAMETERS	6

DIGITAL INPUTS

INPUT #1

TAG M1 FB
VOLTAGE: ☐ 24 V DC ☒ 120 V AC

INPUT #2

TAG P1 FB
VOLTAGE: ☐ 24 V DC ☒ 120 V AC

DIGITAL OUTPUTS

OUTPUT #1

TAG ALARM
VOLTAGE: ☐ 24 V DC ☒ 120 V AC
WAIT TIME: N/A (SEC)

OUTPUT #2

TAG BATCH DONE
VOLTAGE: ☐ 24 V DC ☒ 120 V AC
WAIT TIME: N/A (SEC)

Bailey Controls

Worksheet — *CBC*

Analog I/O Definition

UNIT TAG **REACTOR K101**
MODULE BUS ADDRESS **4**
I/O ADDRESS **1**

ANALOG INPUT #1 I/O CHANNEL #1 TAG LT1
[X] 4 – 20 mA ZERO **0** SPAN 100
[ ] 1 – 5 V

ANALOG INPUT #2 I/O CHANNEL #2 TAG
[ ] 4 – 20 mA ZERO SPAN
[ ] 1 – 5 V

ANALOG INPUT #3 I/O CHANNEL #3 TAG
[ ] 4 – 20 mA ZERO SPAN
[ ] 1 – 5 V

ANALOG INPUT #4 I/O CHANNEL #4 TAG TT1
[ ] 4 – 20 mA ZERO SPAN
[ ] 1 – 5 V
[ ] MILLIVOLT (–20 to +80 mV)
[ ] THERMOCOUPLE: TYPE
[X] RTD (100 OHM): TYPE **U.S. INDUSTRY** 2–WIRE [X] 3–WIRE [ ]
LEAD WIRE RESISTANCE **3 OHMS**

ANALOG INPUT #5 I/O CHANNEL #5 TAG TT2
[ ] 4 – 20 mA ZERO SPAN
[ ] 1 – 5 V
[ ] MILLIVOLT (–20 TO +80 mV)
[ ] THERMOCOUPLE: TYPE
[X] RTD (100 OHM): TYPE **U.S. INDUSTRY** 2–WIRE [X] 3–WIRE [ ]
LEAD WIRE RESISTANCE **3 OHMS**

ANALOG INPUT #6 I/O CHANNEL #6 TAG
[ ] 4 – 20 mA ZERO SPAN
[ ] 1 – 5 V
[ ] MILLIVOLT (–20 to +80 mV)
[ ] THERMOCOUPLE: TYPE
[ ] RTD (100 OHM): TYPE 2–WIRE [ ] 3–WIRE [ ]
LEAD WIRE RESISTANCE

ANALOG OUTPUT #1 TAG **MV1**
[X] 4 – 20 mA
[ ] 1 – 5 V

ANALOG OUTPUT #2 TAG
[ ] 4 – 20 mA
[ ] 1 – 5 V

Bailey Controls

Worksheet — *CBC*

Pulse Input Definition

I/O ADDRESS **1** UNIT TAG **REACTOR K101**

INPUT # 1 TAG **FT1**

CHANNEL #1

VOLTAGE LEVEL:
- ☐ LOW 3.5 – 8 V
- ☒ HIGH 14 – 30 V

INPUT TYPE:

☐ PERIOD	☐ FREQUENCY	☒ TOTALIZATION
FUNCTION CODE #102	FUNCTION CODE #103	FUNCTION CODE #104
RANGE	RANGE	STARTING VALUE 0
GAIN	GAIN	

INPUT # 2 TAG

CHANNEL #2

VOLTAGE LEVEL:
- ☐ LOW 3.5 – 8 V
- ☐ HIGH 14 – 30 V

INPUT TYPE:

☐ PERIOD	☐ FREQUENCY	☐ TOTALIZATION
FUNCTION CODE #102	FUNCTION CODE #103	FUNCTION CODE #104
RANGE	RANGE	STARTING VALUE
GAIN	GAIN	

Bailey Controls

Worksheet — *CSC*

EASY STEP PLUS I/O Data

UNIT'S TAG REACTOR K101
MASTER _____ PRIMARY _____
SLAVE X BACKUP _____

MODULE ADDRESS 3 NUMBER OF STEPS _____ (32 MAX.)
STATION ADDRESS 1 NUMBER OF INPUTS _____ (64 MAX.)
INPUT BD. ADDRESS 2 NUMBER OF OUTPUTS _____ (48 MAX.)
OUTPUT BD. ADDRESS 3

INPUTS

TAG	VOLTAGE	NO.
V1 CLOSED	120 V AC	1
V1 OPEN		2
V2 CLOSED		3
V2 OPEN		4
V3 CLOSED		5
V3 OPEN		6
V4 CLOSED		7
V4 OPEN		8
V5 CLOSED		9
V5 OPEN		10
V6 CLOSED		11
V6 OPEN		12
V7 CLOSED		13
V7 OPEN		14
V8 CLOSED		15
V8 OPEN		16

OUTPUTS

NO.	VOLTAGE	WAIT TIME (SEC)	TAG
1	120 V AC	5	V1
2		5	V2
		5	V3
3		5	V4
		10	V5
4		5	V6
		5	V7
5		5	V8
		10	M1
6		10	P1
7			
8			
9			
10			
11			
12			

Bailey Controls

Worksheet — *CBC*

I/0 Summary

BLOCK OUTPUT	BLOCK ADDRESS		TAG NAME	SIGNAL NAME
	CBC MASTER	CBC SLAVE		
ANALOG INPUT #1	55	70	LT1	REACTOR LEVEL
ANALOG INPUT #2	56	71		
ANALOG INPUT #3	57	72		
ANALOG INPUT #4	58	73	TT1	REACTOR TEMP 1
ANALOG INPUT #5	59	74	TT2	REACTOR TEMP 2
ANALOG INPUT #6	60	75		
ANALOG OUTPUT #1	61	76	MV 1	STEAM VALVE
ANALOG OUTPUT #2	62	77		
DIGITAL INPUT #1	63	78	M1 FB	MIXER RUNNING
DIGITAL INPUT #2	64	79	P1 FB	PUMP RUNNING
PULSE INPUT #1	65	80	FT 1	PRODUCT FLOW TOTALIZER
PULSE INPUT #2	66	81		
I/O STATUS SUMMARY	67	82		
UNUSED	68	83		
UNUSED	69	84		
DIGITAL OUTPUT #1	N/A	N/A	ALARM	ALARM
DIGITAL OUTPUT #2	N/A	N/A	BATCH DONE	BATCH DONE

Bailey Controls

EASY STEP PLUS – Device Driver Data

DEVICE DRIVER # B1 **TAG** ALARM

FUNCTION CODE 123 SPEC #	EASY STEP PLUS-DEFAULT VALUES	USER VALUES	COMMENTS
S1	(1) 1025	1510	NO FEEDBACK REQUIRED
S2	0	0	
S3	0	0	
S4	0		
S5	1	0	NO MANUAL CONTROL PERMITTED
S6	0		
S7	0		
S8	0		
S9	0.000		
S10	0		

DEVICE DRIVER # B2 **TAG** BATCH DONE

FUNCTION CODE 123 SPEC #	EASY STEP PLUS-DEFAULT VALUES	USER VALUES	COMMENTS
S1	(1) 1026	1026	NO FEEDBACK REQUIRED
S2	0	0	
S3	0	0	
S4	0		
S5	1	0	NO MANUAL CONTROL PERMITTED
S6	0		
S7	0		
S8	0		
S9	0.000		
S10	0		

NOTES: (1) SEQUENCE MASTER OUTPUT BLOCK ADDRESS FOR OUTPUT #_____

Worksheet — *CBC/CSC*

EASY STEP PLUS – Device Driver Data

DEVICE DRIVER # S1 **TAG V1**

FUNCTION CODE 123 SPEC #	EASY STEP PLUS-DEFAULT VALUES	USER VALUES	COMMENTS
S1	(1) 1030	1030	
S2	(2) 0	109	V1 CLOSED FB
S3	(3) 0	110	V1 OPEN FB
S4	0		
S5	1		
S6	0		
S7	0	1	V1 CLOSED MASK
S8	0	10	V1 OPEN MASK
S9	0.000	5	WAIT TIME
S10	0		

DEVICE DRIVER # S2 **TAG V2**

FUNCTION CODE 123 SPEC #	EASY STEP PLUS-DEFAULT VALUES	USER VALUES	COMMENTS
S1	(1) 1031	1031	
S2	(2) 0	111	V2 CLOSED FB
S3	(3) 0	112	V2 OPEN FB
S4	0		
S5	1		
S6	0		
S7	0	1	V2 CLOSED MASK
S8	0	10	V2 OPEN MASK
S9	0.000	5	WAIT TIME
S10	0		

NOTES: (1) SEQUENCE MASTER OUTPUT BLOCK ADDRESS FOR OUTPUT # _____

(2) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 0

(3) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 1

Bailey® Controls

Worksheet — *CBC*

Recipe Data

RECIPE NAME: STANDARD / DELUXE

RECIPE PARAMETER				RECIPE DATA							
NO.	NAME	EASY STEP PLUS BLOCK OUTPUT ADDRESS		1	2	3	4	5	6	7	8
		AIL/B*	RRT*								
1	AMOUNT A	1116	1510	15%	30%						
2	AMOUNT B	1117	1520	30%	60%						
3	COOK TEMP	1118	1530	180°F	160°F						
4	COOK TIME 1	1119	1540	40 min.	90 min.						
5	AMOUNT C	1120	1550	80%	80%						
6	WAIT TIME	1121	1560	30 min.	15 min.						
7		1122	1570								
8		1123	1580								
9		1124	1590								
10		1125	1600								

* The AIL/B (Function Code 63) is used if the recipe parameters are not stored in the Batch Command Controller. The RRT addresses (Function Code 118) are what should be used if the parameters are stored in the Batch Command Controller.

Bailey Controls

Worksheet — *CBC/CSC*

EASY STEP PLUS – Step Mask Data

STEP NAME →

STEP NO. →	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TAG	**DIGITAL OUTPUTS***	E-STOP	CLEAN 1	CLEAN 2	CLEAN 3	ADD A	ADD B	COOK	ADD C	WAIT	DUMP	FLUSH 1	FLUSH 2	HOLD																				
ALARM	B1	1	0	0	0	0	0	0	0	0	0	0	0	0																			
BATCH DONE	B2	0	0	0	0	0	0	0	0	0	0	0	0	1																			
	B3																																
	B4																																
V1	S1	0	0	0	0	1	0	0	0	0	0	0	0	0																			
V2	S2	0	0	0	0	0	1	0	0	0	0	0	0	0																			
V3	S3	0	0	0	0	0	0	0	1	0	0	0	0	0																			
V4	S4	0	1	0	0	0	0	0	0	0	0	1	0	0																			
V5	S5	0	0	1	0	0	0	1	1	0	0	0	0	0																			
V6	S6	0	0	0	1	0	0	0	0	0	1	0	1	1																			
V7	S7	0	0	0	0	0	0	0	0	0	1	0	0	0																			
V8	S8	0	0	0	1	0	0	0	0	0	0	0	1	1																			
M1	S9	0	1	1	1	1	1	1	1	1	1	1	1	0																			
P1	S10	0	0	0	1	0	0	0	0	0	1	0	1	0																			
	S11																																
	S12																																

TAG	DIGITAL OUTPUTS*
	S1
	S2
	S3
	S4
	S5
	S6
	S7
	S8
	S9
	S10
	S11
	S12

* B PREFIX — BATCH COMMAND CONTROLLER DIGITAL OUTPUTS
S PREFIX — SEQUENCE COMMAND CONTROLLER DIGITAL OUTPUTS

Bailey® Controls

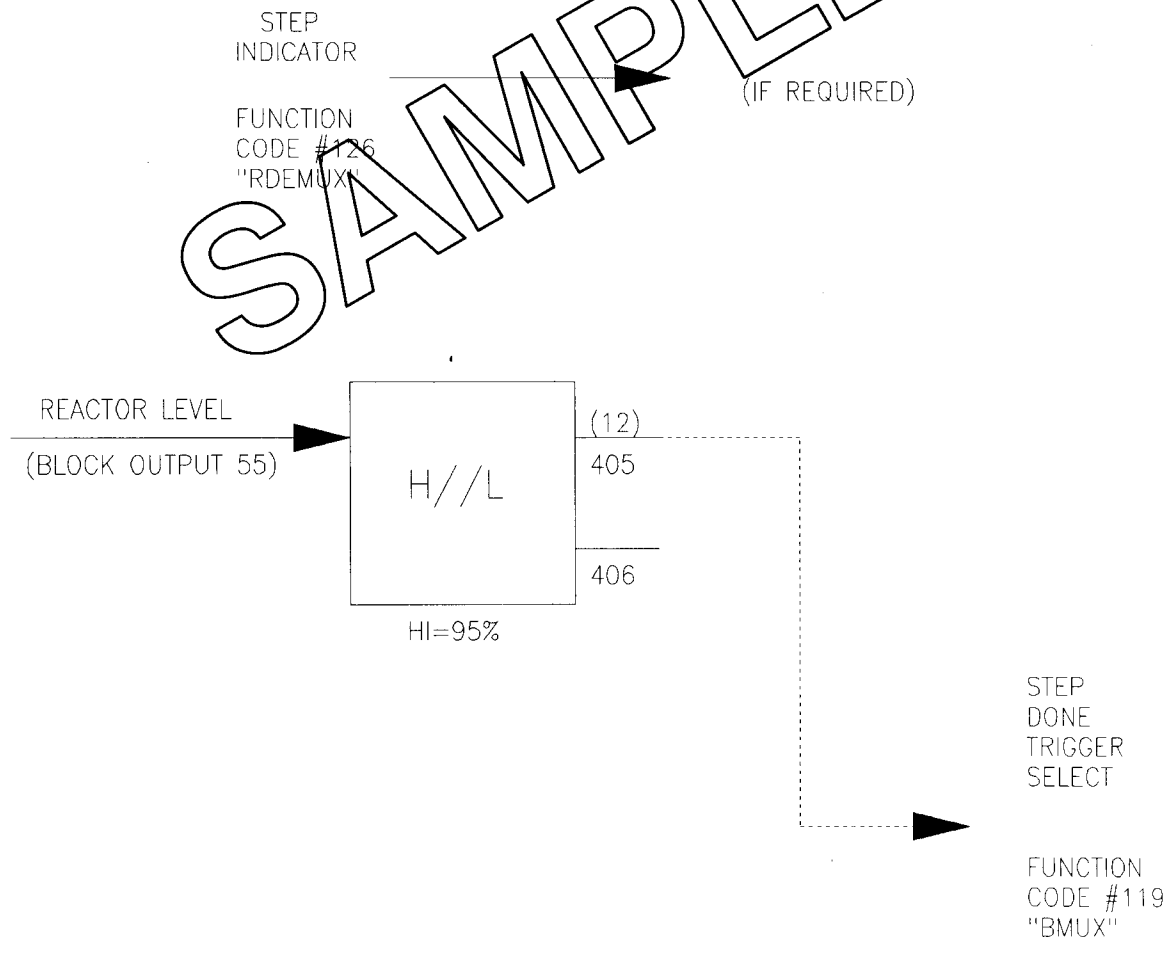
Worksheet — *CBC/CSC*

Step Logic Definition

STEP #____1____ STEP NAME ___**CLEAN 1**____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # __**351**____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Wait until reactor reaches 95%

TP80146

Bailey Controls

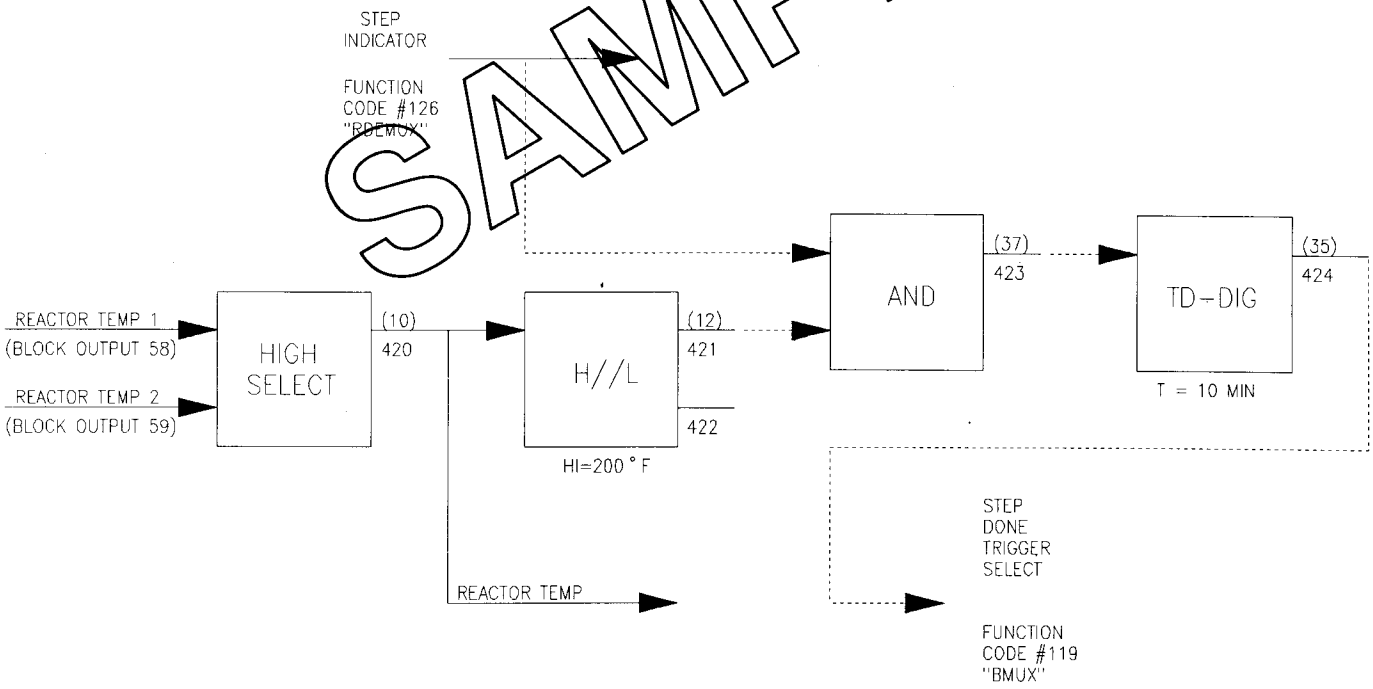
Worksheet *CBC/CSC*

Step Logic Definition

STEP #____2____ STEP NAME ____CLEAN 2____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ___352____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Wait for 10 minutes after highest of the two reactor temperatures reaches 200ºF.

Bailey Controls

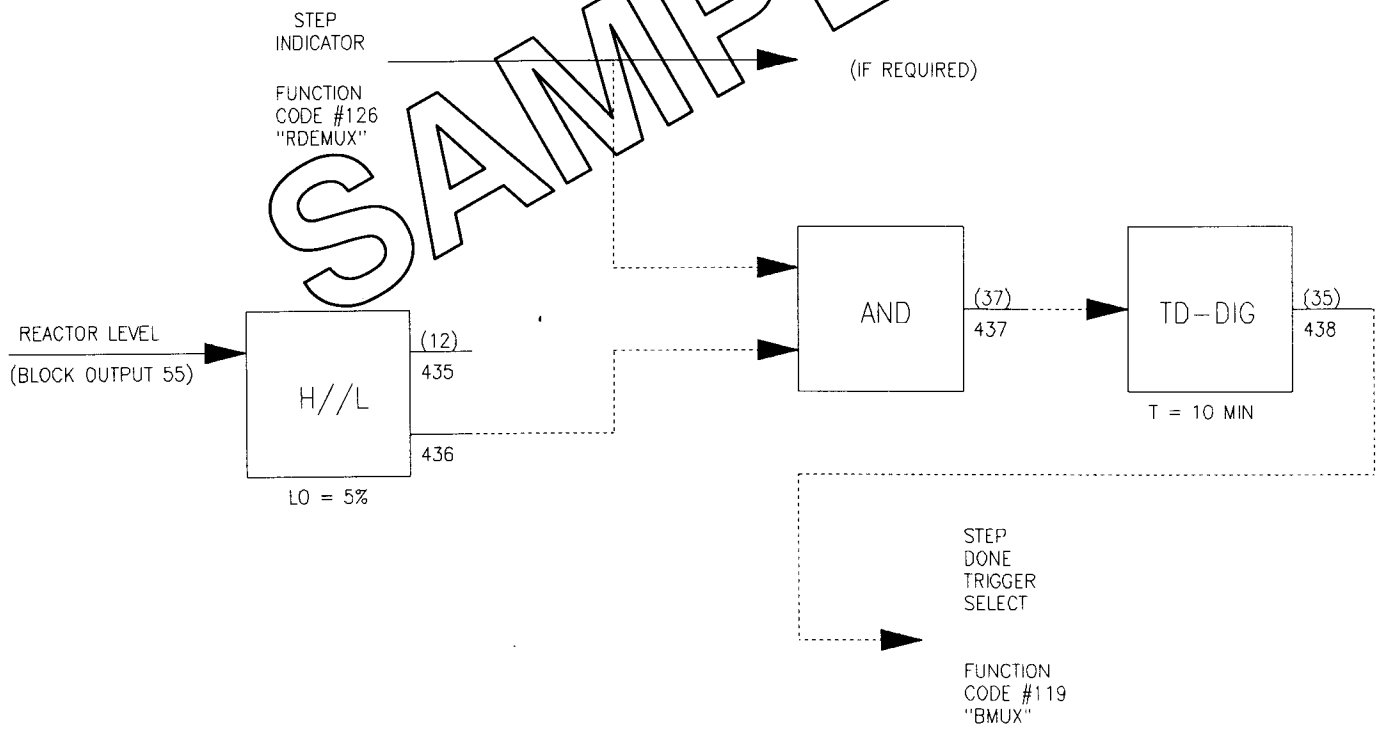
Worksheet — *CBC/CSC*

Step Logic Definition

STEP # 3 STEP NAME CLEAN 3

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 353

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Allow reactor to drain for 10 minutes after level drops below 5%.

Bailey Controls

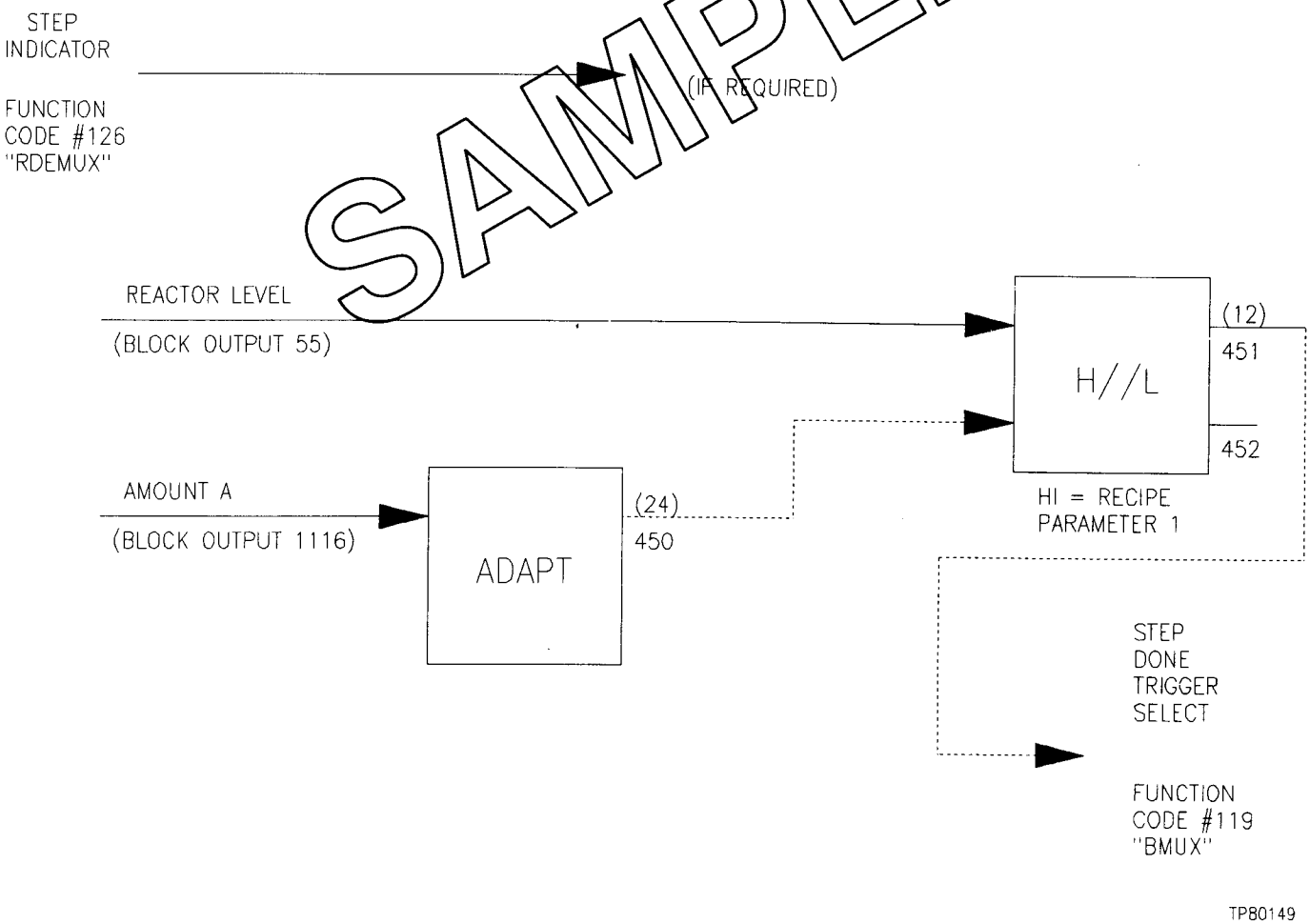
Worksheet *CBC/CSC*

Step Logic Definition

STEP #____4_____ STEP NAME_____ADD A_____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ____384_____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Add material A until reactor level reaches recipe parameter 1 value (AMOUNT A).

Bailey Controls

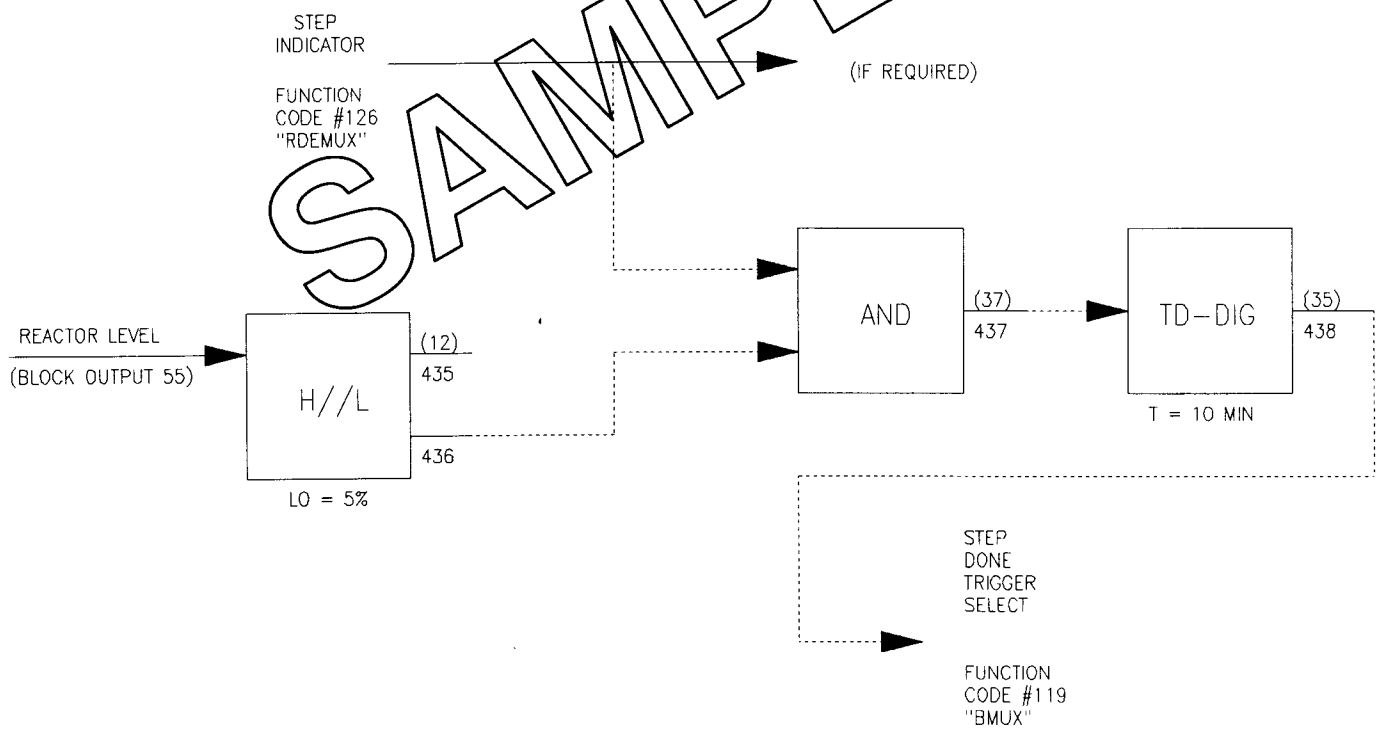
Worksheet *CBC/CSC*

Step Logic Definition

STEP #__3__ STEP NAME __CLEAN 3__

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT #__353__

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Allow reactor to drain for 10 minutes after level drops below 5%.

Bailey Controls

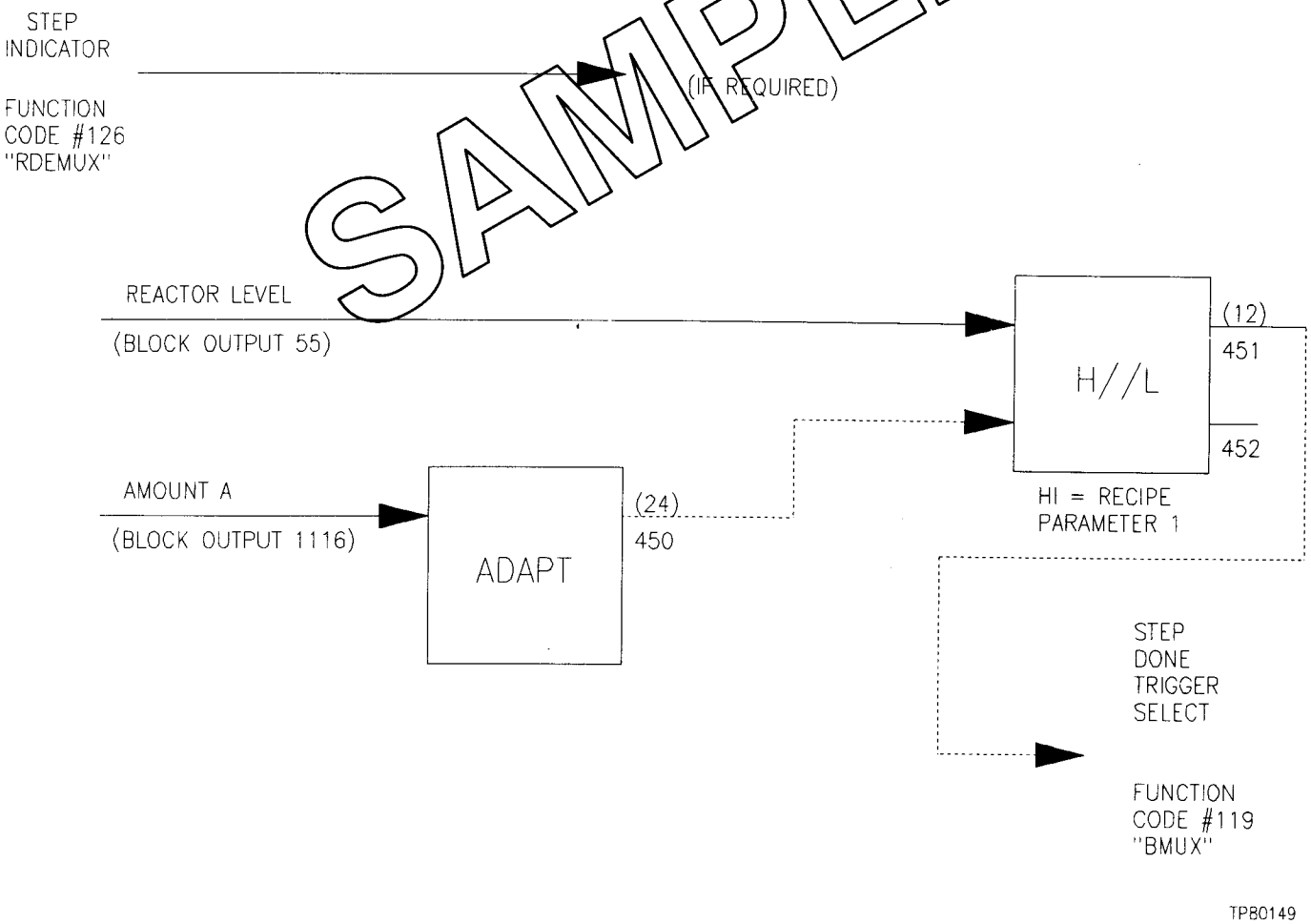
Worksheet *CBC/CSC*

Step Logic Definition

STEP #____4_____ STEP NAME_____ADD A_____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ____354_____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Add material A until reactor level reaches recipe parameter 1 value (AMOUNT A).

Bailey Controls

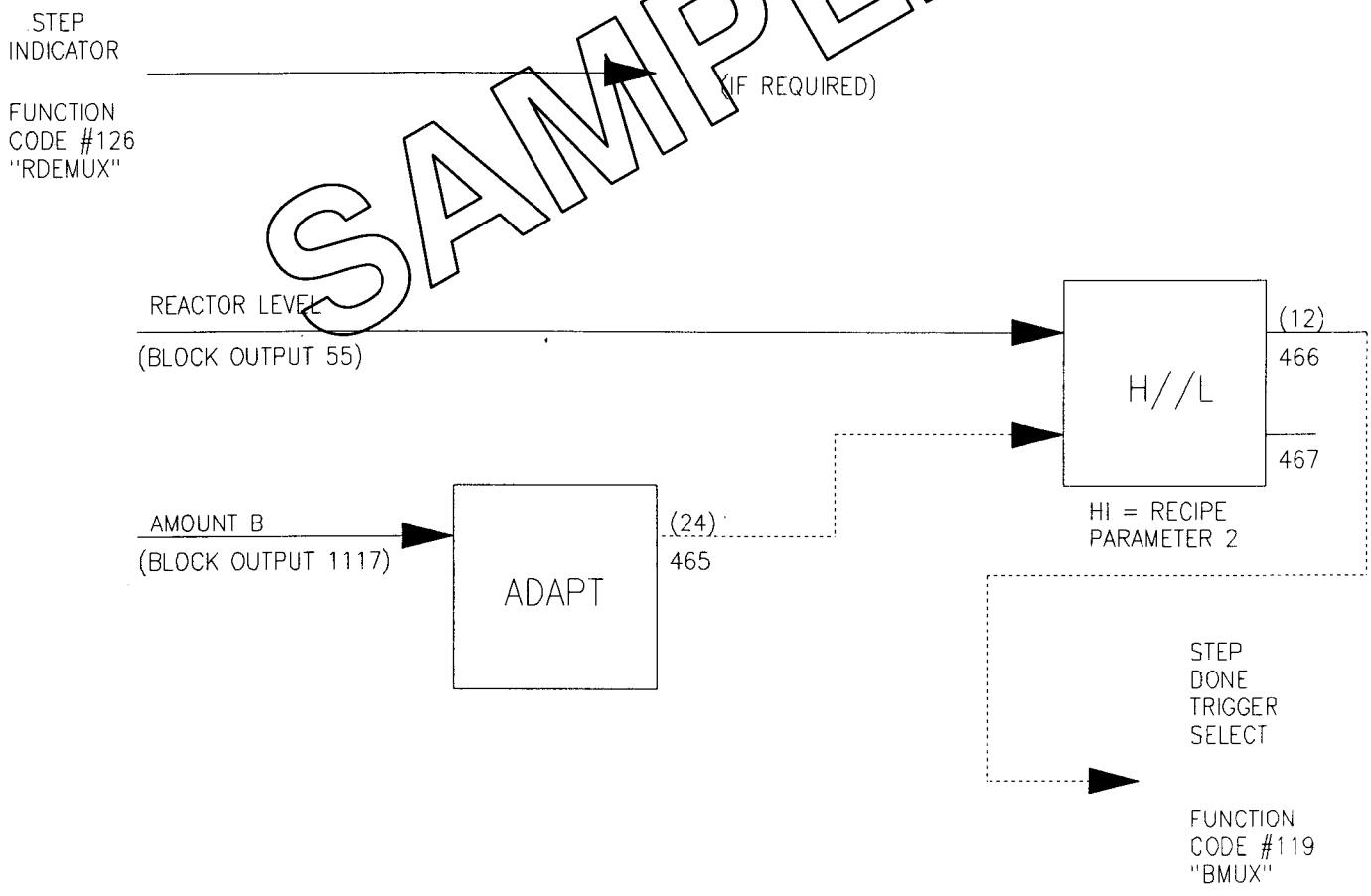
Worksheet *CBC/CSC*

Step Logic Definition

STEP # 5 STEP NAME ADD B

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 355

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Add material B until reactor level reaches recipe parameter 2 value (AMOUNT B).

Bailey Controls

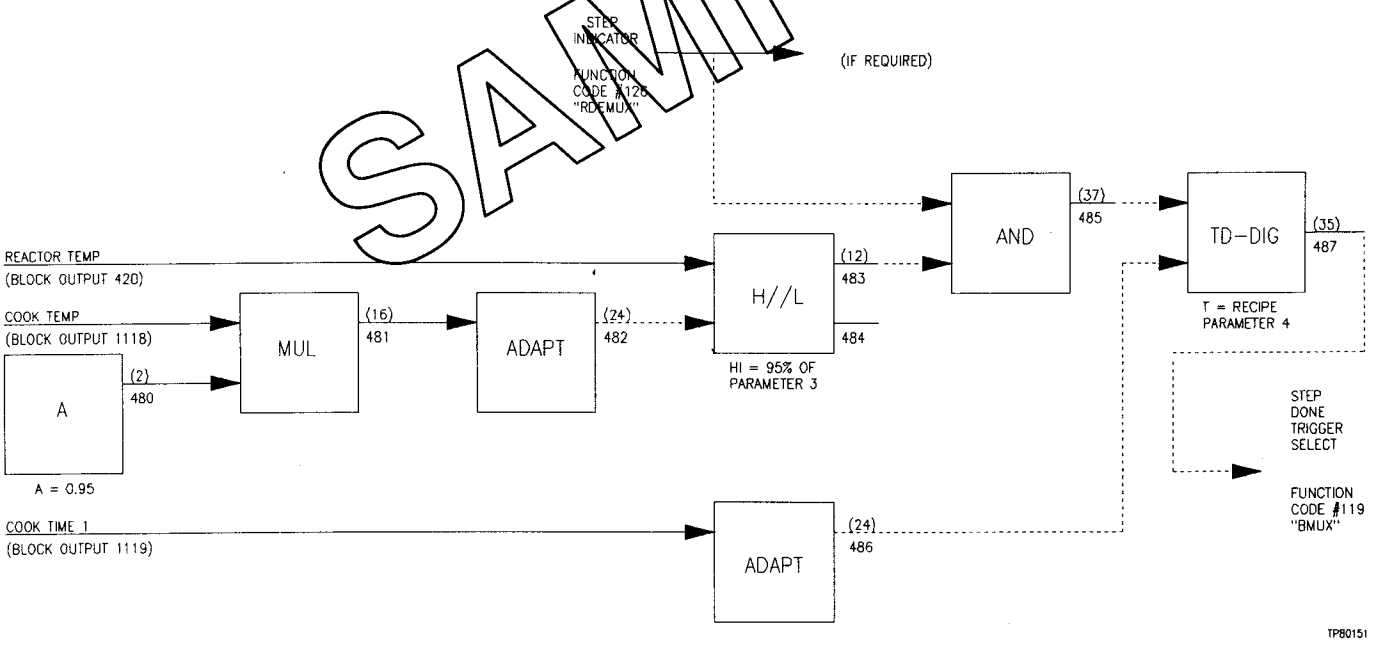
Worksheet — *CBC/CSC*

Step Logic Definition

STEP # 6 STEP NAME COOK

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 356

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Cook ingredients for time indicated by recipe parameter 4 (Cook Time 1) after reactor temperature has reached 95% of the temperature indicated by recipe parameter 3 (COOK TEMP).

Bailey Controls

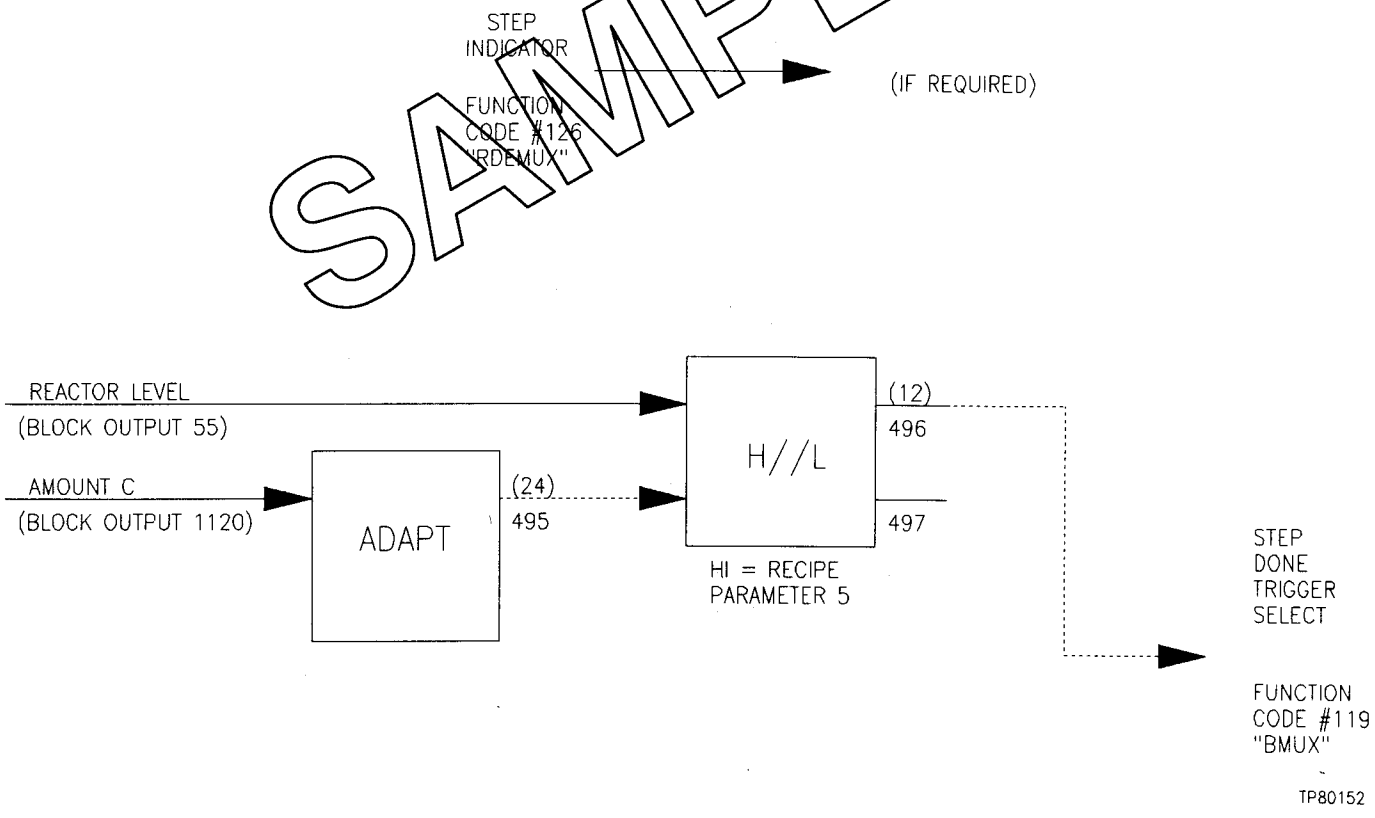
Worksheet *CBC/CSC*

Step Logic Definition

STEP # 7 STEP NAME ADD C

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 357

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Add material C until reactor level reaches recipe parameter 5 (AMOUNT C).

Bailey Controls

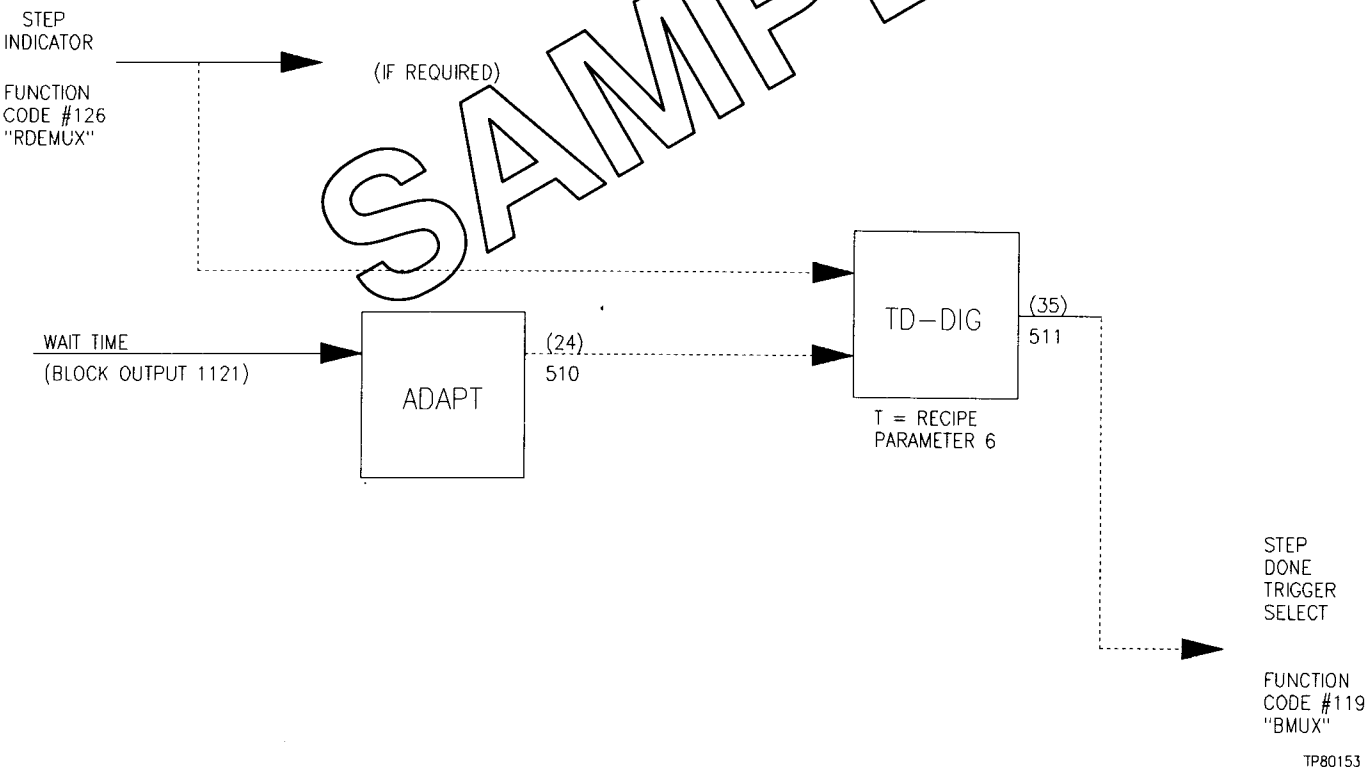
Worksheet *CBC/CSC*

Step Logic Definition

STEP # 8 STEP NAME WAIT

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 358

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Wait for the period of time indicated by recipe parameter 6 (WAIT TIME).

Bailey Controls

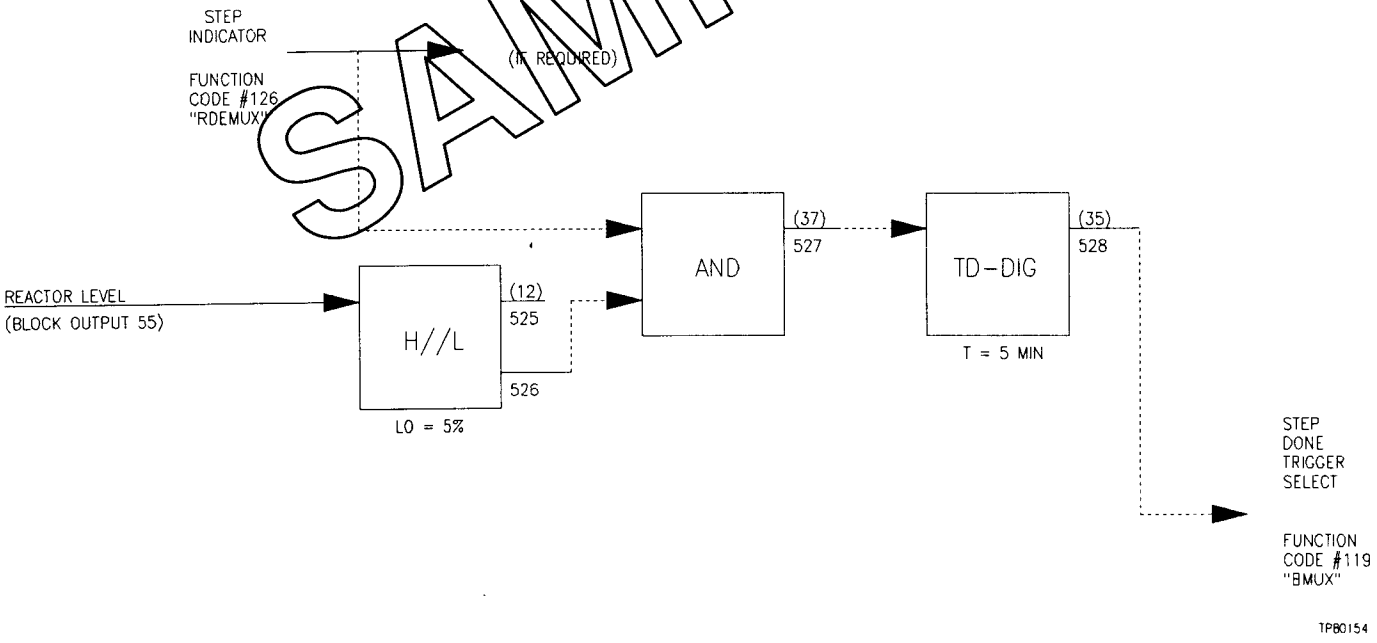
Worksheet — *CBC/CSC*

Step Logic Definition

STEP #____9____ STEP NAME____DUMP____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ____359____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Allow reactor to drain for 5 minutes after level drops below 5%.

Bailey Controls

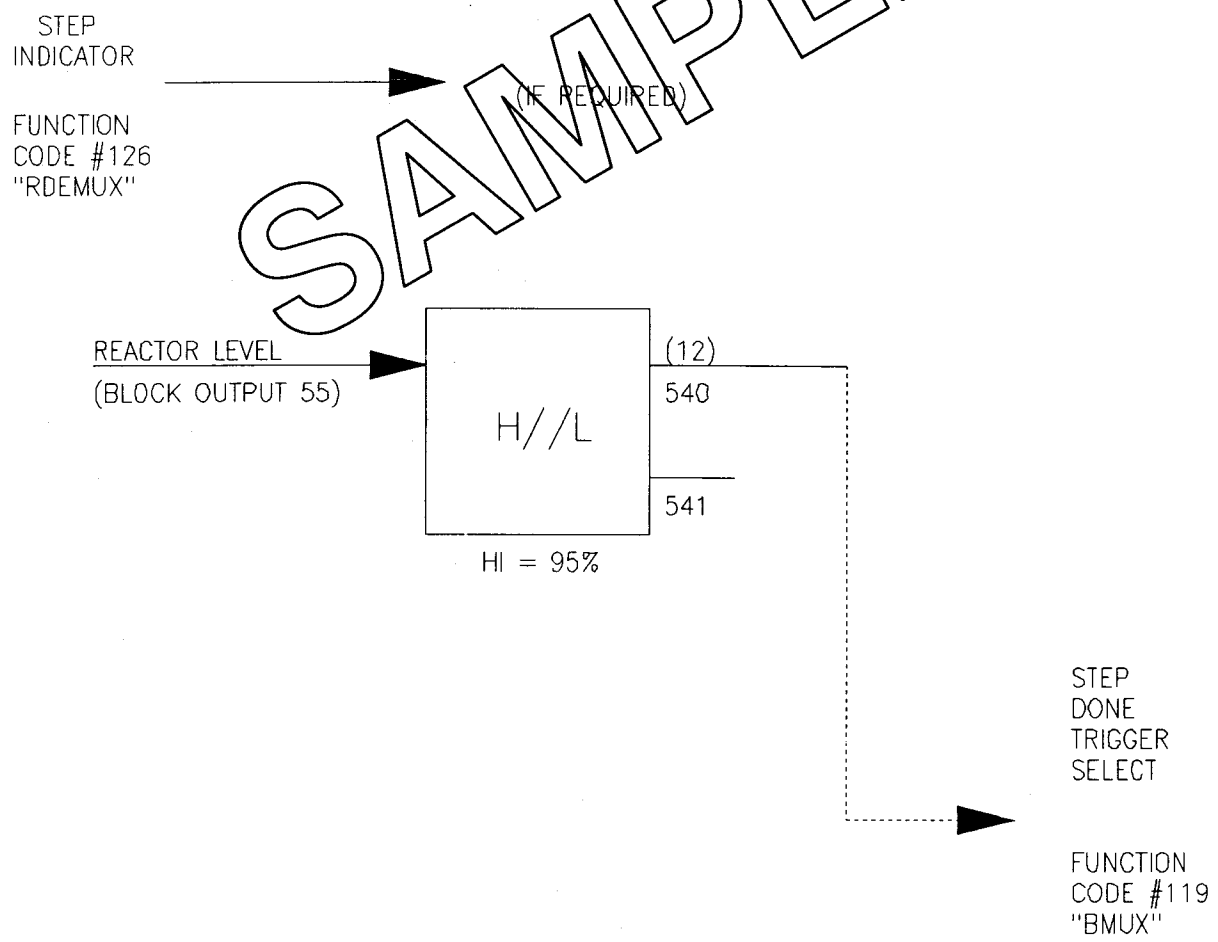
Worksheet *CBC/CSC*

Step Logic Definition

STEP # 10 STEP NAME FLUSH 1

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 360

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Wait for reactor level to reach 95%.

Bailey Controls

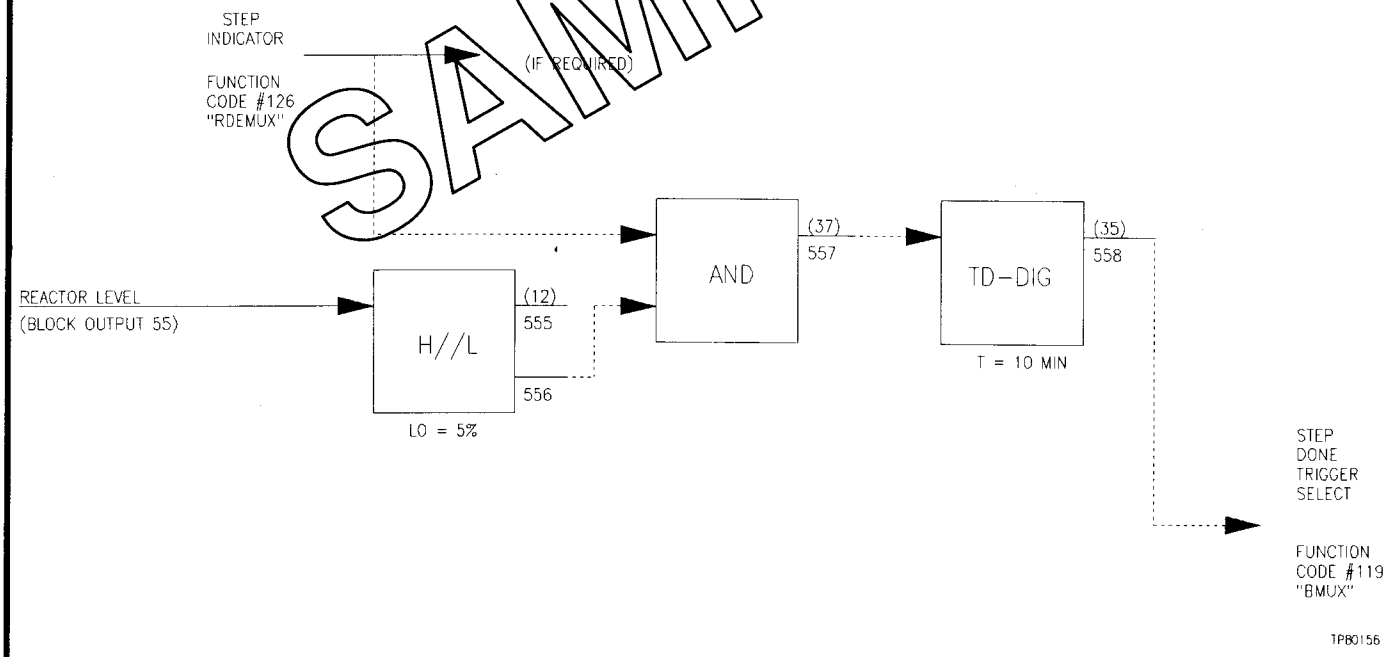
Worksheet — *CBC/CSC*

Step Logic Definition

STEP #____11_____ STEP NAME _____FLUSH 2_____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # ____361_____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)



DESCRIPTION: Allow reactor to drain for 10 minutes after level drops below 5%.

Bailey Controls

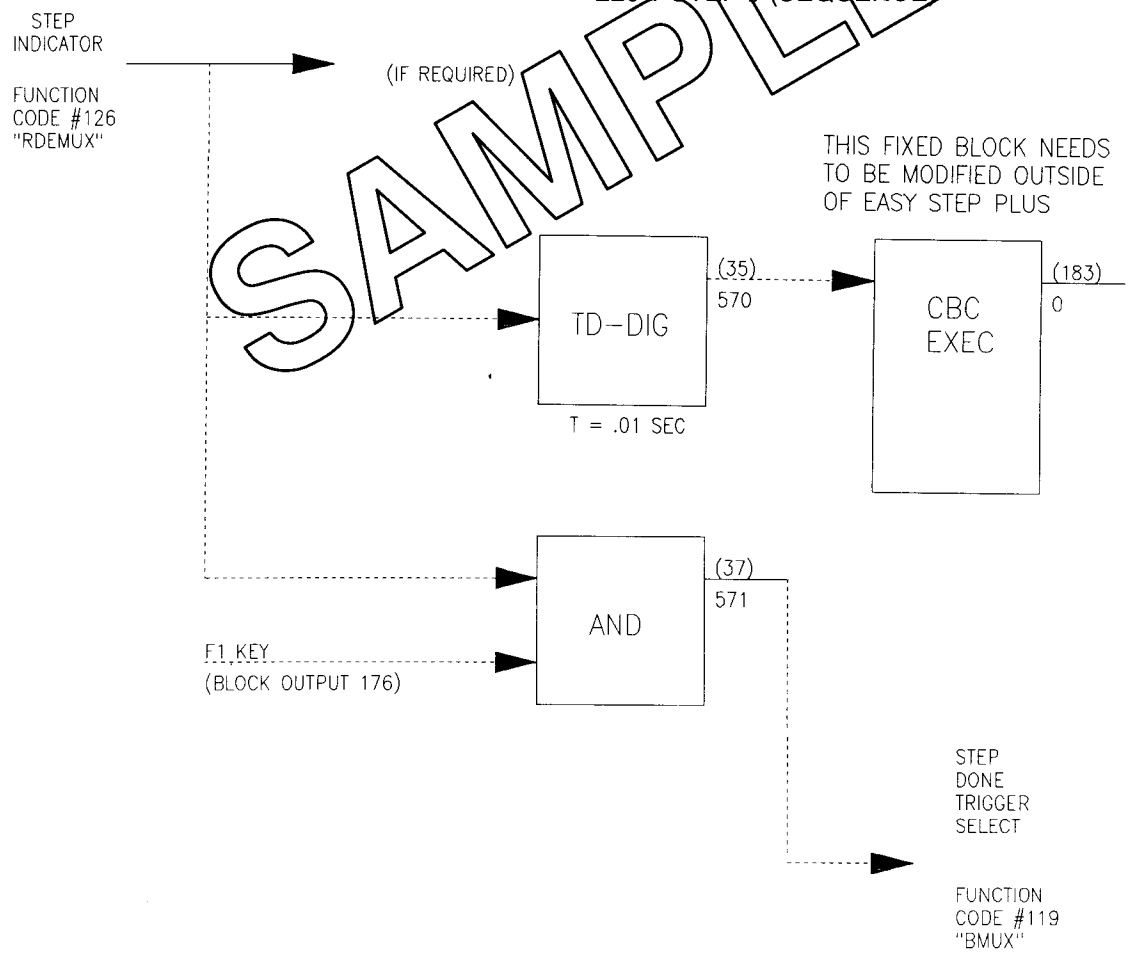
Worksheet — *CBC/CSC*

Step Logic Definition

STEP # 12 STEP NAME HOLD

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT # 362

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)

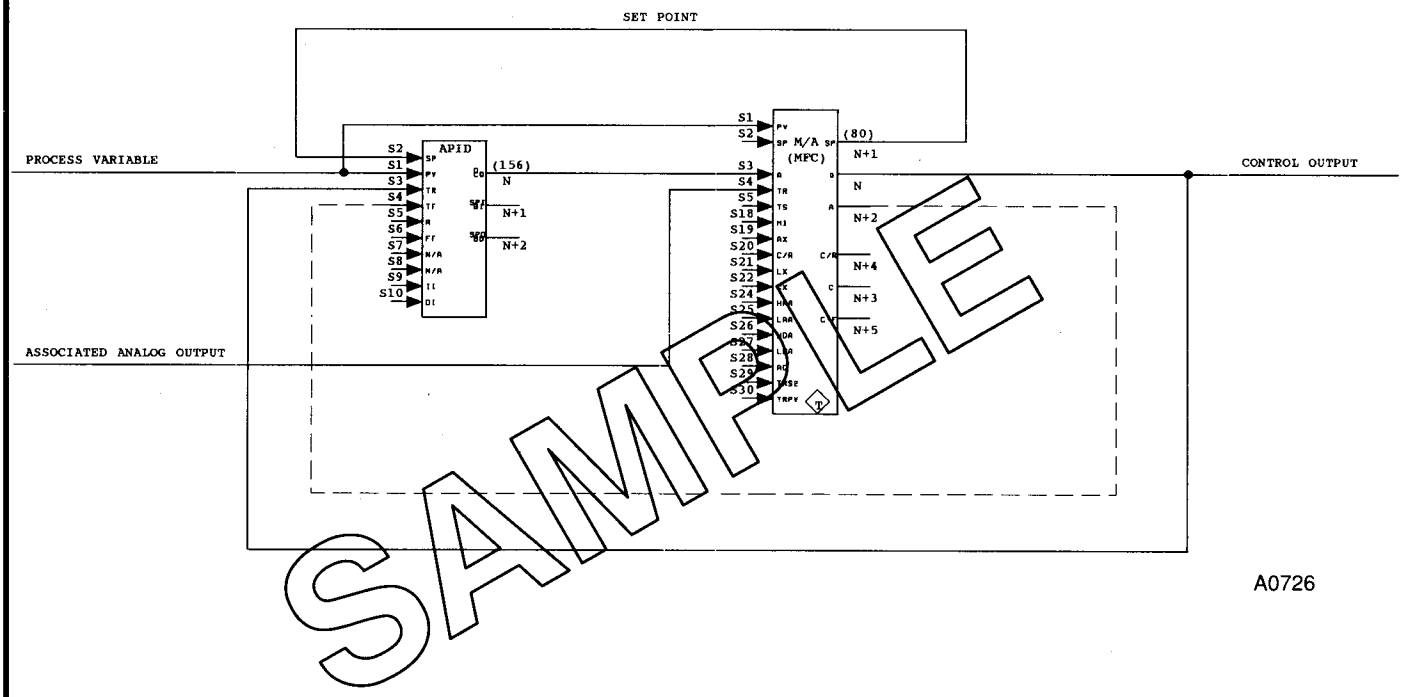


NOTE: In order to generate Exception Reports, make Spec 1 of Block 0 = 570. TP80157

DESCRIPTION: Enable Exception Report Log in CBC Executive Block for one cycle to print batch report. Wait for operator to press the F1 key on the faceplate before restarting the batch sequence.

Bailey Controls

PID With Station



M/A STATION – Function Code 80 Specifications

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	5	420	BLOCK ADDRESS OF PROCESS VARIABLE (PV) = REACTOR TEMP. + REACTOR LEVEL (FIGURE C2 – SHEET 6)
S2	5	1480	BLOCK ADDRESS OF SET POINT (SP) TRACK SIGNAL
S3	5	897	BLOCK ADDRESS OF AUTO SIGNAL
S4	5	61	BLOCK ADDRESS OF CONTROL OUTPUT TRACK SIGNAL (TR)
S5	0	0	BLOCK ADDRESS OF CONTROL OUTPUT TRACK SWITCH (TS)
S6	5	5	INITIAL MODE OF STATION AFTER STARTUP
S7	9.2 E18	225	PROCESS VARIABLE HIGH ALARM LIMIT IN E.U.
S8	–9.2 E18	50	PROCESS VARIABLE LOW ALARM LIMIT IN E.U.
S9	9.2 E18	9.2E18	PV–SP DEVIATION ALARM LIMIT IN E.U.
S10	100.000	250	SIGNAL SPAN OF PROCESS VARIABLE IN E.U.
S11	0.000	0	ZERO VALUE OF PROCESS VARIABLE IN E.U.
S12	0	0	PROCESS VARIABLE ENGINEERING UNITS IDENTIFIER
S13	–5.000	–5.0	SIGNAL SPAN OF SET POINT IN E.U.
S14	0.000	0	ZERO VALUE OF SET POINT IN E.U.
S15	0	0	SET POINT ENGINEERING UNITS IDENTIFIER
S16	255	254*	DIGITAL CONTROL STATION ADDRESS
S17	0	0	THE VALUE SPECIFYING WHICH MODE THE SYSTEM WILL DEFAULT TO IF THE COMPUTER FAILS WHILE THE LOOP IS UNDER COMPUTER CONTROL.

M/A STATION – Function Code 80 Specifications (continued)

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S18	0	0	BLOCK ADDRESS OF THE TRANSFER–TO–MANUAL SIGNAL
S19	0	0	BLOCK ADDRESS OF THE TRANSFER–TO–AUTO SIGNAL
S20	0	0	BLOCK ADDRESS OF THE TRANSFER–TO–CASCADE/RATIO SIGNAL
S21	0	0	BLOCK ADDRESS OF THE TRANSFER–TO–LOCAL SIGNAL
S22	0	0	BLOCK ADDRESS OF THE TRANSFER–TO–COMPUTER SIGNAL
S23	0	0	STATION TYPE
S24	0	0	BLOCK ADDRESS OF EXTERNAL HIGH ABSOLUTE ALARM FLAG
S25	0	0	BLOCK ADDRESS OF EXTERNAL LOW ABSOLUTE ALARM FLAG
S26	0	0	BLOCK ADDRESS OF EXTERNAL HIGH DEVIATION ALARM FLAG
S27	0	0	BLOCK ADDRESS OF EXTERNAL LOW DEVIATION ALARM FLAG
S28	0	0	BLOCK ADDRESS OF ANALOG OUTPUT ASSOCIATED WITH THIS STATION
S29	0	885	BLOCK ADDRESS OF SWITCH TO HAVE SET POINT TRACK S2 INPUT
S30	0	0	BLOCK ADDRESS OF SWITCH TO HAVE SET POINT TRACK S1 INPUT
S31	60.000	60.0	COMPUTER WATCHDOG TIME PERIOD IN SECONDS

* If M/A Station is linked to the Batch Station.

ADVANCED PID – Function Code 156 Specifications

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	5	420	BLOCK ADDRESS OF PROCESS VARIABLE (PV) = REACTOR TEMP.
S2	5	926	BLOCK ADDRESS OF SETPOINT (SP)
S3	5	925	BLOCK ADDRESS OF TRACK REF (TRK)
S4	0	927	BLOCK ADDRESS OF TRACK FLAG (TF)
S5	5	5	BLOCK ADDRESS OF EXTERNAL RESET (ER)
S6	5	5	BLOCK ADDRESS OF FEEDFORWARD SIGNAL (FF)
S7	5	5	SPARE INPUT
S8	0	0	SPARE INPUT
S9	0	0	BLOCK ADDRESS OF BLOCK INCREASE (BLK – I)
S10	0	0	BLOCK ADDRESS OF BLOCK DECREASE (BLK – D)
S11	1.0	1.25	GAIN MULTIPLIER (K)
S12	1.0	0.0	PROPORTIONAL GAIN (KP)
S13	0.0	6.5	INTEGRAL RESET (KI)
S14	0.0	0.0	DERIVATIVE RATE ACTION (KD)
S15	10.0	10.0	DERIVATIVE LAG CONSTANT (KA)
S16	105.0	225	HIGH OUTPUT LIMIT (HL)
S17	–5.0	50	LOW OUTPUT LIMIT (LL)
S18	0	0	ALGORITHM TYPE (ALG)
S19	0	0	INTEGRAL LIMIT TYPE (LIM)
S20	0	0	SETPOINT MODIFIER (SPM)
S21	0	0	DIRECTION SWITCH
S22	0.0	0.0	SPARE
S23	0	0	SPARE

AUXILIARY LOGIC REQUIRED

Alarm Output

It is desirable to generate an alarm signal if any alarm conditions are indicated by the configuration or the Controller is forced into the E–STOP step. Some auxiliary logic will have to be added to accomplish this. Refer to Figure C3.

Batch Report

A batch report will be generated using a printer connected to the RS232 port. Exception Report blocks (Function Codes 30 and 45) must be configured and tied to the parameters to be logged in the batch report. The points chosen for this example are:

1. Recipe number.
2. Total product output for batch.
3. Recipe parameter used.
4. Alarm summary flag.

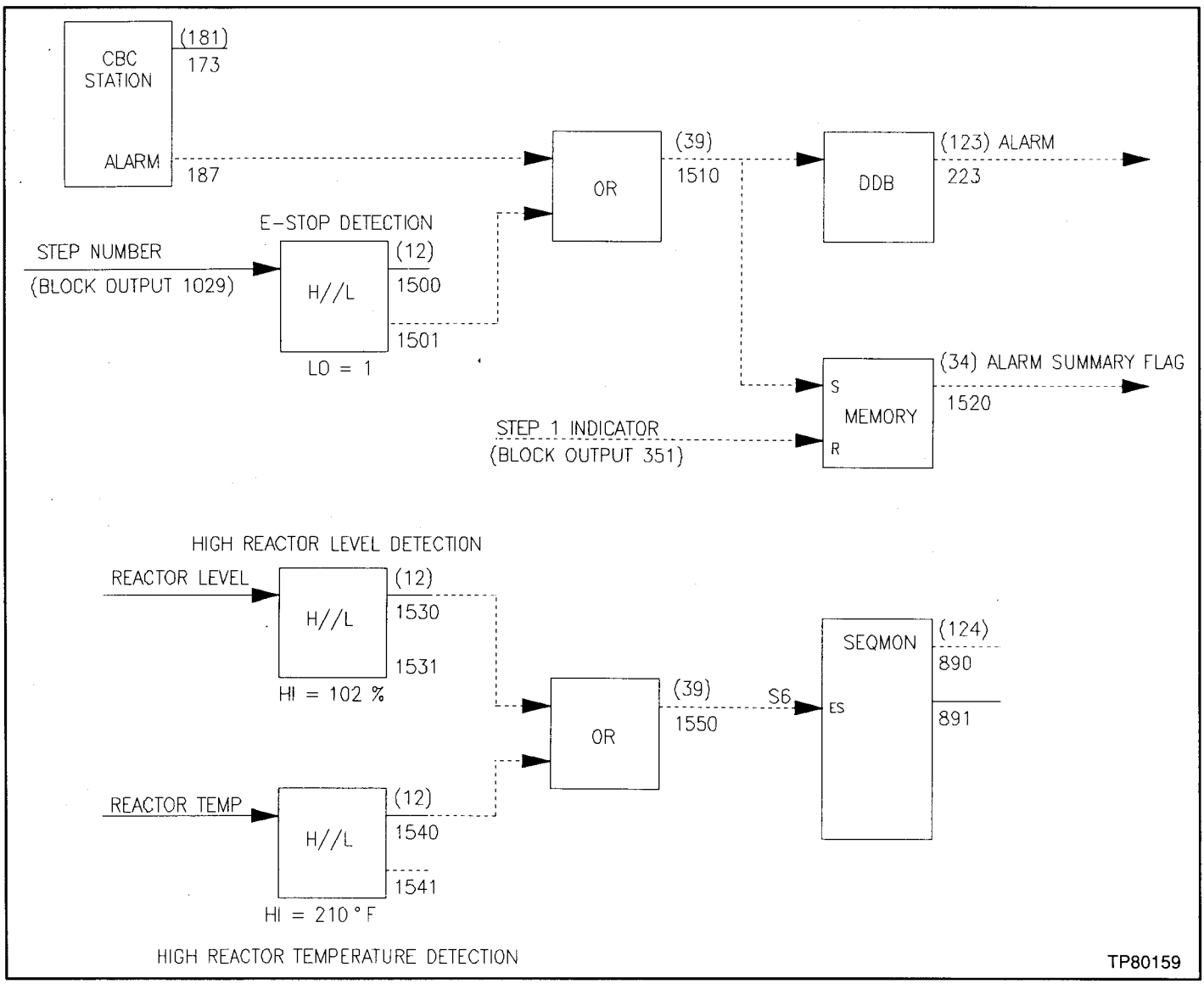


FIGURE C3 – Auxiliary Logic for Alarm Outputs

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE

Objective	Keystrokes	Display	Comments
1)Address Target Unit	ADDRESS	ENTER MODULE ADDR >	
	4, ENTER	MODULE – 4 TYPE – BATCH CMD MODE – CONFIGURE F4 – diagnostics	Target unit to be selected. See *Possible Response for this line.
	* Possible Response	MODE – CONFIGURE	The target unit is already in the CONFIGURE mode. If true, disregard Objective 2) and proceed to Objective 3).
		MODE – EXECUTE	The target unit is in the EXECUTE mode. A mode change is required before configuration can be started. Proceed to Objective 2).
		MODE – ERROR	The target unit is in the ERROR mode. A mode change is required before configuration can be started. Proceed to Objective 2).
2)Changing Mode of Target Unit to CONFIGURE.	CONFIGURE	MODE CHANGE TO CONFIGURE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODE – CONFIGURE	Verification that the target unit is now in the CONFIGURE mode. Proceed to Objective 3).
		or	**NOTE:** Also address the Sequence Command Controller being used to store the recipe data and put it in the CONFIGURE mode before entering the EASY STEP PLUS mode.
		MODE – EXECUTE	Action depends upon status or error message meaning. Proceed based on these.
		or	
		MODE – ERROR	
3)Select EASY STEP PLUS.	SPECIAL FEATURE	F1–UP/DOWNLOAD F2–EASYSTEP PLUS F3–SET TIME F4–CONFG. DUMP	
	F2	***WARNING*** THE EXISTING TARGET CONFIG. WILL BE LOST	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
		PROCEED? F1 – YES F2 – NO	
4)Enter the data when prompted by the CTT02.	F1	EZ ENTER # OF BATCH COMMAND UNITS (1–2):	
	1,ENTER	EZ ENTER # OF SEQUENCE COMMAND UNITS (0–4):	
	1,ENTER	EZ ENTER # OF STEPS (1–32):	
	12,ENTER	EZ ENTER # OF CBC DIGITAL INPUTS (0–2):*	*The input and output ranges on the 4th line of the screens will vary depending on the number of Batch and/or Sequence units used in the process.
	2,ENTER	EZ ENTER # OF CSC DIGITAL INPUTS (0–16):*	
	16,ENTER	EZ ENTER # OF CBC DIGITAL OUTPUTS (0–2):*	
	2,ENTER	EZ ENTER # OF CSC DIGITAL OUTPUTS (0–12):*	
	10,ENTER	EZ ENTER # OF HIGH LEVEL ANALOG INPUTS (0–6):*	*The input and output values on the 4th line of the screens will vary depending on the number of Batch and/or Sequence units used in the process.
	1,ENTER	EZ ENTER # OF LOW LEVEL ANALOG INPUTS (0–3):*	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	2,ENTER	EZ ENTER # OF PULSE INPUTS (0–2):*	
	1,ENTER	EZ ENTER # OF ANALOG LOOPS (0–2):	
	1,ENTER	EZ ENTER # OF RECIPES (0–32):	
	2,ENTER	EZ ENTER # OF RECIPE PARAM'S (0–10):	
	6,ENTER	EZ ENTER MODULE ADDRESS TO STORE RECIPES:	Enter address of target unit that will store recipe data, typically CBC or CSC.
	3,ENTER	EZ ENTER CSC SLAVE #1 1/O ADDRESS (2–30):	
	2,ENTER	EZ ENTER CSC SLAVE #1 STATION ADDRESS (0–7):	
	1,ENTER	EZ AUTO RESTORE? F1 – YES F2 – NO	
	F2	**STANDBY** □□□□□□□□ PROCESSING EASYSTEP DATA	
		F1–STEP MASK F2–STEP LOGIC F3–DEVICE DRIVER F4–END	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
5)Setting Step Mask Inputs	F1	STEP MASK INPUT ENTER STEP #: (OR F1 TO END)	
	1,ENTER	MASK STEP # 1 B1 0 <— B2 0 S1 0	Enter digital outputs for Batch and Sequence per the Step Mask worksheet. Maximum equals 2 for CBC and 12 for CSC.
	0	MASK STEP # 1 B1 0 B2 0 <— S1 0	
	0	MASK STEP # 1 B1 0 B2 0 S1 0 <—	
	0	MASK STEP # 1 B2 0 S1 0 S2 0 <—	
	0	MASK STEP # 1 S1 0 S2 0 S3 0 <—	
	0	MASK STEP # 1 S2 0 S3 0 S4 0 <—	
	1	MASK STEP # 1 S3 0 S4 1 S5 0 <—	
	0	MASK STEP # 1 S4 1 S5 0 S6 0 <—	
	0	MASK STEP # 1 S5 0 S6 0 S7 0 <—	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	0	MASK STEP # 1 S6 0 S7 0 S8 0 <——	
	0	MASK STEP # 1 S7 0 S8 0 S9 0 <——	
	1	MASK STEP # 1 S8 0 S9 1 S10 0 <——	
	ENTER	***STANDBY*** □□□□□□□□ PROCESSING EASYSTEP DATA	
		STEP MASK INPUT ENTER STEP #: (OR F1 TO END)	Repeat procedure. Enter Steps 2–12 and for Step 0 (E–STOP Step). Enter output states for each Step.
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
6)Setting the Step Logic Inputs	F2	STEP LOGIC INPUT ENTER STEP #: (OR F1 TO END)	
	1,ENTER	STEP 1 LOGIC STEP INDICATOR AT BLOCK # 351 ENTER FCODE:	
	12,ENTER	BLK – 405 *ADD* CODE – 12 H//L SPEC #1 [X] VALUE: 0	
7)Enter correct specifications.	55,ENTER	BLK – 405 *ADD* CODE – 12 H//L SPEC #2 H VALUE: 0.000 T	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	95,ENTER	BLK – 405 *ADD* CODE – 12 H//L SPEC #3 L VALUE: 0.000 T	
	NEXT	BLK – 405 *ADD* CODE – 12 H//L SPEC # END VALUE:	
	SEND	BLK – 405 *SND* CODE – 12 H//L CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 1 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	F1	STEP LOGIC INPUT ENTER STEP #: (OR F1 TO END)	
	2,ENTER	STEP 2 LOGIC STEP INDICATOR AT BLOCK # 352 ENTER FCODE:	
	10,ENTER	BLK – 420 *ADD* CODE – 10 HI SEL SPEC #1 [X1] VALUE: 8	
	58,ENTER	BLK – 420 *ADD* CODE – 10 HI SEL SPEC #2 [X2] VALUE: 8	
	59,ENTER	BLK – 420 *ADD* CODE – 10 HI SEL SPEC #3 [X3] VALUE: 8	
	NEXT	BLK – 420 *ADD* CODE – 10 HI SEL SPEC #4 [X4] VALUE: 8	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	NEXT	BLK – 420 *ADD* CODE – 10 HI SEL SPEC # END VALUE:	
	SEND	BLK – 420 *SND* CODE – 10 HI SEL CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 2 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	12,ENTER	BLK – 421 *ADD* CODE – 12 H//L SPEC #1 [X] VALUE: 0	
	420,ENTER	BLK – 421 *ADD* CODE – 12 H//L SPEC #2 H VALUE: 0.000 T	
	200,ENTER	BLK – 421 *ADD* CODE – 12 H//L SPEC #3 L VALUE: 0.000 T	
	NEXT	BLK – 421 *ADD* CODE – 12 H//L SPEC # END VALUE:	
	SEND	BLK – 421 *SND* CODE – 12 H//L CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 2 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	37,ENTER	BLK – 423 *ADD* CODE – 37 AND–2 SPEC #1 [X1] VALUE: 1	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	352,ENTER	BLK – 423 *ADD* CODE – 37 AND–2 SPEC #2 [X2] VALUE: 1	
	421,ENTER	BLK – 423 *ADD* CODE – 37 AND–2 SPEC # END VALUE:	
	SEND	BLK – 423 *SND* CODE – 37 AND–2 CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 2 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	
	35,ENTER	BLK – 424 *ADD* CODE – 35 TD–DIG SPEC #1 [X] VALUE: 0	
	423,ENTER	BLK – 424 *ADD* CODE – 35 TD–DIG SPEC #2 TYPE VALUE: 0	
	1,ENTER	BLK – 424 *ADD* CODE – 35 TD–DIG SPEC #3 SEC VALUE: 0.000 T	
	600,ENTER	BLK – 424 *ADD* CODE – 35 TD–DIG SPEC # END VALUE:	
	SEND	BLK – 424 *SND* CODE 35 TD–DIG CLEAR – ABORT F2 – SEND BLOCK	
	F2	STEP 2 LOGIC CONTINUED ENTER FCODE: (OR F1 TO END)	Complete entering step logic for other steps in similar manner.

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	F1	STEP LOGIC INPUT ENTER STEP #: (OR F1 TO END)	
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
	F3	DEVICE DRIVER SET–UP F1 – CBC OUTPUTS F2 – CSC OUTPUTS	
	F1	DEVICE DRIVER SET–UP CBC OUTPUT #: (OR F1 TO END)	
8)Function Code required for Device Driver block.	1,ENTER	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #1 C1 VALUE: 1025	CBC Output #1 device driver (EASY STEP PLUS default value is Sequence Master Output block address for CBC Output #1.)
9)Enter specifications for CBC outputs.	1510,ENTER	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #2 FEED 1 VALUE: 0	Block address of Feedback Signal #1.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #3 FEED 2 VALUE: 0	Block address of Feedback Signal #2.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #4 COSOV VALUE: 0 T	COSOV = Control Output Status Override. When Set = 1, No interlocking for sequencing on this unit.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #5 OOPER VALUE: 1	OOPER = Output Override Permission. If equal to 1, operator can put Controller in MANUAL from faceplate. If equal to 0, then Controller locked into AUTO.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #6 OVOUT VALUE: O	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #7 FDMSK0 VALUE: 0 T	Logic level of Feedback Signal indicating an output 0 condition.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #8 FDMSK1 VALUE: 0 T	Logic level of Feedback Signal indicating an output 1 condition.
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #9 FDWAIT VALUE: 0.000 T	
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC #10 DISPLY VALUE: O	
	NEXT	BLK – 223 *MOD* CODE – 123 DDRIVE SPEC # END VALUE:	
	SEND	BLK – 223 *SND* CODE – 123 DDRIVE CLEAR – ABORT F2 – SEND BLOCK	
	F2	DEVICE DRIVER SET–UP CBC OUTPUT #: (OR F1 TO END)	Set up the remaining Device Driver blocks for the CBC outputs.
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
	F3	DEVICE DRIVER SET–UP F1 – CBC OUTPUTS F2 – CSC OUTPUTS	
10)Enter specifications for CSC outputs.	F2	DEVICE DRIVER SET–UP CSC OUTPUT #: (OR F1 TO END)	Repeat Device Driver block procedure and enter outputs for CSC.

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	F1	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
	NEXT	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	
	F1	ANALOG INPUT SET–UP ENTER AI #: (OR F1 TO END)	
11)Setting the Analog Inputs.	1,ENTER	BLK – 31 *MOD* CODE 182 AI/DEF SPEC #1 INTYPE VALUE: O	
	40,ENTER	BLK – 31 *MOD* CODE 182 AI/DEF SPEC #2 EUTYPE VALUE: 2	Specifications 2–8 remain at their default settings. Use the NEXT key to scroll screens.
	NEXT	BLK – 31 *MOD* CODE 182 AI/DEF SPEC # END VALUE:	
	SEND	BLK – 31 *MOD* CODE 182 CLEAR – ABORT F2 – SEND BLOCK	
	F2	ANALOG INPUT SET–UP ENTER AI #: (OR F1 TO END)	
	4,ENTER	BLK – 37 *MOD* CODE 182 AI/DEF SPEC #1 INTYPE VALUE: 0	
	021,ENTER	BLK – 37 *MOD* CODE 182 AI/DEF SPEC #2 EUTYPE VALUE: 2	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	1,ENTER	BLK – 37 *MOD* CODE 182 AI/DEF SPEC #3 SPARE VALUE: 0 T	Specifications 3–5 remain at their default values. Use the NEXT key to advance the screens to SPEC #6.
	NEXT	BLK – 37 *MOD* CODE 182 AI/DEF SPEC #6 LDWIRE VALUE: 0 T	
	3,ENTER	BLK – 37 *MOD* CODE 182 AI/DEF SPEC #7 OFFSET VALUE: 1800.00 T	Specifications 7–13 remain at their default values. Use the NEXT key to advance the screens.
	NEXT	BLK – 37 *MOD* CODE 182 AI/DEF SPEC # END VALUE:	
	SEND	BLK – 37 *SND* CODE 182 AI/DEF CLEAR – ABORT F2 – SEND BLOCK	
	F2	ANALOG INPUT SET–UP ENTER AI #: (OR F1 TO END)	Repeat the procedure to enter data for Analog Input #5. When complete, press SEND,F2.
	F1	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	
12)Setting the Pulse Inputs.	F2	PULSE INPUT SETUP ENTER PI #: (OR F1 TO END)	
	1,ENTER	SELECT ONE F1 – FREQUENCY F2 – PERIOD F3 – TOTALIZE	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	F3	BLK – 91 *MOD* CODE 104 PI/TOT SPEC #1 SLVADR VALUE: 0	
	1,ENTER	BLK – 91 *MOD* CODE 104 PI/TOT SPEC #2 CHNL VALUE: 1	Specifications 2–10 remain at their default settings. Use the NEXT key to scroll through screens.
	NEXT	BLK – 91 *MOD* CODE 104 PI/TOT SPEC # END VALUE:	
	SEND	BLK – 91 *SND* CODE 104 PI/TOT CLEAR – ABORT F2 – SEND BLOCK	
	F2	PULSE INPUT SET–UP ENTER PI#: (OR F1 TO END)	
	F1	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	
13)Entering the recipe parameters.	F3	RECIPE DATA ENTER PARAMETER #: (OR F1 TO END)	
	1,ENTER	PARAMETER # 1 (F1 TO END) RECIPE VALUE 1 _____	
	15,ENTER	PARAMETER # 1 (F1 TO END) RECIPE VALUE 2 _____	
	30,ENTER	RECIPE DATA ENTER PARAMETER #: (OR F1 TO END)	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	2,ENTER	PARAMETER # 2 (F1 TO END) RECIPE VALUE 1 ____	
	30,ENTER	PARAMETER # 2 (F1 TO END) RECIPE VALUE 2 ____	
	60,ENTER	RECIPE DATA ENTER PARAMETER #: (OR F1 TO END)	
	3,ENTER	PARAMETER # 3 (F1 TO END) RECIPE VALUE 1 ____	
	180,ENTER	PARAMETER # 3 (F1 TO END) RECIPE VALUE 2 ____	
	160,ENTER	RECIPE DATA ENTER PARAMETER #: (OR F1 TO END)	
	4,ENTER	PARAMETER # 4 (F1 TO END) RECIPE VALUE 1 ____	Enter values from the Recipe Data worksheet for parameters 4–6, Recipes 1 and 2.
		RECIPE DATA ENTER PARAMETER #: (OR F1 TO END)	
	F1	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	
14)Selecting the Start up Mode.	F4	SELECT USING F1: MAN >>AUTO SELECT USING F2: RUN >>HOLD	Selection will determine state of the process when the mode is changed from CONFIGURE to EXECUTE.

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	F2	SELECT USING F1: MAN >>AUTO SELECT USING F2: RUN>> HOLD	Want Sequencer to come up in RUN Mode after startup.
	ENTER	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	
	NEXT	F1 – TAG NAMES F2 – ENG UNITS F3 – STEP NAMES F4 – RECIPE NAMES	
15)Entering the Loop Tag Name.	F1	TAG NAME ENTRY LOOP NAME 1 A_____ ^	Use F1–F4 arrow keys to scroll available characters and move the cursor.
	TIC101,ENTER	F1 – TAG NAMES F2 – ENG UNITS F3 – STEP NAMES F4 – RECIPE NAMES	
16)Entering the Engineering Units.	F2	ENG UNIT ENTRY LOOP VAR NAME 1 PV A__ ^	Use F1–F4 arrow keys to scroll available characters and move the cursor.
	deg,ENTER	ENG UNIT ENTRY LOOP VAR NAME 1 SP A__ ^	Enter the SP and AX units in the same manner.
	ENTER	F1 – TAG NAMES F2 – ENG UNITS F3 – STEP NAMES F4 – RECIPE NAMES	
17)Entering the recipe Step Names.	F3	STEP NAME ENTRY STEP NAME 1 A_____ ^	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	CLEAN 1,ENTER	STEP NAME ENTRY STEP NAME 2 A_____ ^	
	CLEAN 2,ENTER	STEP NAME ENTRY STEP NAME 3 A_____ ^	
	CLEAN 3,ENTER	STEP NAME ENTRY STEP NAME 4 A_____ ^	
	ADD A,ENTER	STEP NAME ENTRY STEP NAME 5 A_____ ^	
	ADD B,ENTER	STEP NAME ENTRY STEP NAME 6 A_____ ^	Add names for Steps 6–12. Use F1–F4 keys to scroll available characters and move the cursor. When last step is entered the submenu will reappear.
	NEXT	F1 – TAG NAMES F2 – ENG UNITS F3 – STEP NAMES F4 – RECIPE NAMES	
18)Entering the Recipe Names.	F4	RECIPE NAMES REC # NAME 1 A_____ ^	
	STANDARD,ENTER	RECIPE NAMES REC # NAME 2 A_____ ^	Add recipe names using F1–F4 keys to scroll available characters and move the cursor. When last name is entered, the submenu will reappear.
	DELUXE,ENTER	F1 – TAG NAMES F2 – ENG UNITS F3 – STEP NAMES F4 – RECIPE NAMES	
	PREV	F1 – ANALOG INPUT F2 – PULSE INPUT F3 – RECIPE DATA F4 – STARTUP MODES	

Batch Command Controller – EASY STEP PLUS KEYSTROKE SEQUENCE (continued)

Objective	Keystrokes	Display	Comments
	PREV	F1 – STEP MASK F2 – STEP LOGIC F3 – DEVICE DRIVER F4 – END	
19)Ending the config–uration.	F4	MODULE – 4 TYPE – BATCH CMD MODE – CONFIGURE F4 – diagnostics	
20)Enter the auxiliary logic required to set up the PID loop in the desired way using the manual block entry and modification method.			
21)Change the mode to EXECUTE.	EXECUTE	MODE CHAGE TO: EXECUTE MODE CLEAR – ABORT F2 – PROCEED	
	F2	MODULE – 4 TYPE – BATCH CMD MODE – EXECUTE F4 – diagnostics	

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
0	29	RESERVED					
30		UNUSED					
31		ANALOG INPUT DEFINITION	182	60	142	MASTER	ANALOG INPUT NO. 1
33		ANALOG INPUT DEFINITION		60	142	MASTER	ANALOG INPUT NO. 2
35		ANALOG INPUT DEFINITION		60	142	MASTER	ANALOG INPUT NO. 3
37		ANALOG INPUT DEFINITION		60	142	MASTER	ANALOG INPUT NO. 4
39		ANALOG INPUT DEFINITION		60	142	MASTER	ANALOG INPUT NO. 5
41		ANALOG INPUT DEFINITION		60	142	MASTER	ANALOG INPUT NO. 6
43		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 7
45		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 8
47		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 9
49		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 10
51		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 11
53		ANALOG INPUT DEFINITION		60	142	CBC SLAVE	ANALOG INPUT NO. 12
55		CBC BATCH I/O	180	42	408	MASTER	CBC DIGITAL AND ANALOG I/0 INTERFACE.
70		CBC BATCH I/O		42	408	CBC SLAVE #1	CBC DIGITAL AND ANALOG I/O INTERFACE.
85	90	UNUSED					
91		PULSE INPUT FUNCTION CODE		26	126	MASTER	PULSE INPUT NO. 1 PERIOD/FREQ/TOTAL
95		PULSE INPUT FUNCTION CODE		26	126	MASTER	PULSE INPUT NO. 2 PERIOD/FREQ/TOTAL
99		PULSE INPUT FUNCTION CODE		26	126	CBC SLAVE	PULSE INPUT NO. 3 PERIOD/FREQ/TOTAL
103		PULSE INPUT FUNCTION CODE		26	126	CBC SLAVE	PULSE INPUT NO. 4 PERIOD/FREQ/TOTAL
109		DIGITAL INPUT GROUP	84	16	114	CSC SLAVE #1	DIGITAL INPUTS S1–8
117		DIGITAL INPUT GROUP		16	114	CSC SLAVE #1	DIGITAL INPUTS S9–S16
125		DIGITAL INPUT GROUP		16	114	CSC SLAVE #2	DIGITAL INPUTS S17–S24
133		DIGITAL INPUT GROUP	84	16	114	CSC SLAVE #2	DIGITAL INPUTS S25–S32
141		DIGITAL INPUT GROUP		16	114	CSC SLAVE #3	DIGITAL INPUTS S33–S40
149		DIGITAL INPUT GROUP		16	114	CSC SLAVE #3	DIGITAL INPUTS S41–S48
157		DIGITAL INPUT GROUP		16	114	CSC SLAVE #4	DIGITAL INPUTS S49–S56

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
165		DIGITAL INPUT GROUP		16	114	CSC SLAVE #4	DIGITAL INPUTS S57–S64
173		CBC BATCH STATION	181	48	554	CBC MASTER	FACEPLATE INTERFACE
190		CBC BATCH STATION		48	554	CBC SLAVE	FACEPLATE INTERFACE
207		CSC STATION	176	80	304	CSC SLAVE #1	FACEPLATE INTERFACE
211		CSC STATION		80	304	CSC SLAVE #2	FACEPLATE INTERFACE
215		CSC STATION		80	304	CSC SLAVE #3	FACEPLATE INTERFACE
219		CSC STATION		80	304	CSC SLAVE #4	FACEPLATE INTERFACE
223		DEVICE DRIVER	123	30	100	MASTER	DIGITAL OUTPUT B1 DEVICE DRIVER
225		DEVICE DRIVER		30	100	MASTER	DIGITAL OUTPUT B2 DEVICE DRIVER
227		DEVICE DRIVER		30	100	CBC SLAVE	DIGITAL OUTPUT B3 DEVICE DRIVER
229		DEVICE DRIVER		30	100	CBC SLAVE	DIGITAL OUTPUT B4 DEVICE DRIVER
231		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S1 DEVICE DRIVER
233		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S2 DEVICE DRIVER
235		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S3 DEVICE DRIVER
237		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S4 DEVICE DRIVER
239		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S5 DEVICE DRIVER
241		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S6 DEVICE DRIVER
243		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S7 DEVICE DRIVER
245		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S8 DEVICE DRIVER
247		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S9 DEVICE DRIVER
249		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S10 DEVICE DRIVER
251		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S11 DEVICE DRIVER
253		DEVICE DRIVER		30	100	CSC SLAVE #1	DIGITAL OUTPUT S12 DEVICE DRIVER

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
255		DEVICE DRIVER	123	30	100	CSC SLAVE #2	DIGITAL OUTPUT S13 DEVICE DRIVER
257		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S14 DEVICE DRIVER
259		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S15 DEVICE DRIVER
261		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S16 DEVICE DRIVER
263		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S17 DEVICE DRIVER
265		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S18 DEVICE DRIVER
267		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S19 DEVICE DRIVER
269		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S20 DEVICE DRIVER
271		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S21 DEVICE DRIVER
273		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S22 DEVICE DRIVER
275		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S23 DEVICE DRIVER
277		DEVICE DRIVER		30	100	CSC SLAVE #2	DIGITAL OUTPUT S24 DEVICE DRIVER
279		DEVICE DRIVER	123	30	100	CSC SLAVE #3	DIGITAL OUTPUT S25 DEVICE DRIVER
281		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S26 DEVICE DRIVER
283		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S27 DEVICE DRIVER
285		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S28 DEVICE DRIVER
287		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S29 DEVICE DRIVER
289		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S30 DEVICE DRIVER
291		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S31 DEVICE DRIVER
293		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S32 DEVICE DRIVER
295		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S33 DEVICE DRIVER
297		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S34 DEVICE DRIVER

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
299		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S35 DEVICE DRIVER
301		DEVICE DRIVER		30	100	CSC SLAVE #3	DIGITAL OUTPUT S36 DEVICE DRIVER
303		DEVICE DRIVER	123	30	100	CSC SLAVE #4	DIGITAL OUTPUT S37 DEVICE DRIVER
305		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S38 DEVICE DRIVER
307		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S39 DEVICE DRIVER
309		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S40 DEVICE DRIVER
311		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S41 DEVICE DRIVER
313		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S42 DEVICE DRIVER
315		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S43 DEVICE DRIVER
317		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S44 DEVICE DRIVER
319		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S45 DEVICE DRIVER
321		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S46 DEVICE DRIVER
323		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S47 DEVICE DRIVER
325		DEVICE DRIVER		30	100	CSC SLAVE #4	DIGITAL OUTPUT S48 DEVICE DRIVER
327		RESERVED FOR MULTI–STATE DEVICE DRIVER		0	0		
331		RESERVED FOR MULTI–STATE DEVICE DRIVER		0	0		
341		DEVICE MONITOR	125	40	102		DEVICE MONITOR FOR B1–B4 CBC MASTER & SLAVE DDB'S
342		DEVICE MONITOR		40	102		DEVICE MONITOR FOR S1–S12 CSC SLAVE #1's DDB'S
343		DEVICE MONITOR		40	102		DEVICE MONITOR FOR S13–S24 CSC SLAVE #2's DDB'S
344		DEVICE MONITOR		40	102		DEVICE MONITOR FOR S25–S36 CSC SLAVE #3's DDB'S

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
345		DEVICE MONITOR		40	102		DEVICE MONITOR FOR S37–S48 CSC SLAVE #4's DDB'S.
350		REAL SIGNAL DEMULTI-PLEXER	126	12	92		STEP INDICATOR FOR STEPS 0–7 STEP LOGIC
358		REAL SIGNAL DEMULTI-PLEXER		12	92		STEP INDICATOR FOR STEPS 8–15 STEP LOGIC
366		REAL SIGNAL DEMULTI-PLEXER		12	92		STEP INDICATOR FOR STEPS 16–23 STEP LOGIC
374		REAL SIGNAL DEMULTI-PLEXER		12	92		STEP INDICATOR FOR STEPS 24–31 STEP LOGIC
382		REAL SIGNAL DEMULTI-PLEXER		12	92		STEP INDICATOR FOR STEP 32 STEP LOGIC
390		RESERVED		50	226		RESERVED
405		STEP 01 LOGIC		50	226		STEP INDICATOR = 351 STEP DONE TRIGGER LOGIC
420		STEP 02 LOGIC		50	226		STEP INDICATOR = 352 STEP DONE TRIGGER LOGIC
435		STEP 03 LOGIC		50	226		STEP INDICATOR = 353 STEP DONE TRIGGER LOGIC
450		STEP 04 LOGIC		50	226		STEP INDICATOR = 354 STEP DONE TRIGGER LOGIC
465		STEP 05 LOGIC		50	226		STEP INDICATOR = 355 STEP DONE TRIGGER LOGIC
480		STEP 06 LOGIC		50	226		STEP INDICATOR = 356 STEP DONE TRIGGER LOGIC
495		STEP 07 LOGIC		50	226		STEP INDICATOR = 357 STEP DONE TRIGGER LOGIC
510		STEP 08 LOGIC		50	226		STEP INDICATOR = 358 STEP DONE TRIGGER LOGIC
525		STEP 09 LOGIC		50	226		STEP INDICATOR = 359 STEP DONE TRIGGER LOGIC
540		STEP 10 LOGIC		50	226		STEP INDICATOR = 360 STEP DONE TRIGGER LOGIC
555		STEP 11 LOGIC		50	226		STEP INDICATOR = 361 STEP DONE TRIGGER LOGIC

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
570		STEP 12 LOGIC		50	226		STEP INDICATOR = 362 STEP DONE TRIGGER LOGIC
585		STEP 13 LOGIC		50	226		STEP INDICATOR = 363 STEP DONE TRIGGER LOGIC
600		STEP 14 LOGIC		50	226		STEP INDICATOR = 364 STEP DONE TRIGGER LOGIC
615		STEP 15 LOGIC		50	226		STEP INDICATOR = 365 STEP DONE TRIGGER LOGIC
630		STEP 16 LOGIC		50	226		STEP INDICATOR = 366 STEP DONE TRIGGER LOGIC
645		STEP 17 LOGIC		50	226		STEP INDICATOR = 367 STEP DONE TRIGGER LOGIC
660		STEP 18 LOGIC		50	226		STEP INDICATOR = 368 STEP DONE TRIGGER LOGIC
675		STEP 19 LOGIC		50	226		STEP INDICATOR = 369 STEP DONE TRIGGER LOGIC
690		STEP 20 LOGIC		50	226		STEP INDICATOR = 370 STEP DONE TRIGGER LOGIC
705		STEP 21 LOGIC		50	226		STEP INDICATOR = 371 STEP DONE TRIGGER LOGIC
720		STEP 22 LOGIC		50	226		STEP INDICATOR = 372 STEP DONE TRIGGER LOGIC
735		STEP 23 LOGIC		50	226		STEP INDICATOR = 373 STEP DONE TRIGGER LOGIC
750		STEP 24 LOGIC		50	226		STEP INDICATOR = 374 STEP DONE TRIGGER LOGIC
765		STEP 25 LOGIC		50	2260		STEP INDICATOR = 375 STEP DONE TRIGGER LOGIC
780		STEP 26 LOGIC		50	226		STEP INDICATOR = 376 STEP DONE TRIGGER LOGIC
795		STEP 27 LOGIC		50	226		STEP INDICATOR = 377 STEP DONE TRIGGER LOGIC

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
810		STEP 28 LOGIC		50	226		STEP INDICATOR = 378 STEP DONE TRIGGER LOGIC
825		STEP 29 LOGIC		50	226		STEP INDICATOR = 379 STEP DONE TRIGGER LOGIC
840		STEP 30 LOGIC		50	226		STEP INDICATOR = 380 STEP DONE TRIGGER LOGIC
855		STEP 31 LOGIC		50	226		STEP INDICATOR = 381 STEP DONE TRIGGER LOGIC
870		STEP 32 LOGIC		50	226		STEP INDICATOR = 382 STEP DONE TRIGGER LOGIC
885		BOOLEAN SIGNAL MULTIPLEXER	119	32	86		STEP TRIGGERS 1–9
886		BOOLEAN SIGNAL MULTIPLEXER		32	86		STEP TRIGGERS 10–19
887		BOOLEAN SIGNAL MULTIPLEXER		32	86		STEP TRIGGERS 20–29
888		BOOLEAN SIGNAL MULTIPLEXER		32	86		STEP TRIGGERS 30–32
889		SEQUENCE MONITOR (STEPS 1–8)		124	80	162	NEXT AND FAULT STEPS FOR EACH STEP ARE CONFIGURED IN THE SEQUENCE MONITORS
891		SEQUENCE MONITOR (STEPS 9–16)		80	162		
893		SEQUENCE MONITOR (STEPS 17–24)		80	162		
895		SEQUENCE MONITOR (STEPS 25–32)		80	162		
897		ADVANCED PID	156	58	186		PID PARAMETERS ASSOCIATED WITH ANALOG OUTPUT #1
900		RESERVED					
904		ADVANCED PID		58	186		PID PARAMETERS ASSOCIATED WITH ANALOG OUTPUT #2
907		RESERVED					
911		ADVANCED PID		58	186		PID PARAMETERS ASSOCIATED WITH ANALOG OUTPUT #3
914		RESERVED					
918		ADVANCED PID	156	58	186		PID PARAMETERS ASSOCIATED WITH ANALOG OUTPUT #4

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
921		RESERVED					
925		CONTROL STATION (MFC)	80	84	366		M/A CONTROL AND MONITORING ASSOCIATED WITH PID #1
931		CONTROL STATION (MFC)		84	366		M/A CONTROL AND MONITORING ASSOCIATED WITH PID #2
937		CONTROL STATION (MFC)		84	366		M/A CONTROL AND MONITORING ASSOCIATED WITH PID #3
943		CONTROL STATION (MFC)		84	366		M/A CONTROL AND MONITORING ASSOCIATED WITH PID #4
949	1024	RESERVED FOR ANALOG AND DIGITAL EXCEPTION REPORTS					
1025		SEQUENCE MASTER	141	80	142	MASTER & SLAVE	DIGITAL OUTPUTS B1–B4
1030		SEQUENCE MASTER		80	142	CSC SLAVE #1	DIGITAL OUTPUTS S1–S4
1035		SEQUENCE MASTER		80	142	CSC SLAVE #1	DIGITAL OUTPUTS S5–S8
1040		SEQUENCE MASTER		80	142	CSC SLAVE #1	DIGITAL OUTPUTS S9–S12
1045		SEQUENCE MASTER		80	142	CSC SLAVE #2	DIGITAL OUTPUTS S13–S16
1050		SEQUENCE MASTER		80	142	CSC SLAVE #2	DIGITAL OUTPUTS S17–S20
1055		SEQUENCE MASTER		80	142	CSC SLAVE #2	DIGITAL OUTPUTS S21–S24
1060		SEQUENCE MASTER		80	142	CSC SLAVE #3	DIGITAL OUTPUTS S25–S28
1065		SEQUENCE MASTER		80	142	CSC SLAVE #3	DIGITAL OUTPUTS S29–S32
1070		SEQUENCE MASTER		80	142	CSC SLAVE #3	DIGITAL OUTPUTS S33–S36
1075		SEQUENCE MASTER		80	142	CSC SLAVE #4	DIGITAL OUTPUTS S37–S40
1080		SEQUENCE MASTER		80	142	CSC SLAVE #4	DIGITAL OUTPUTS S41–S44
1085		SEQUENCE MASTER		80	142	CSC SLAVE #4	DIGITAL OUTPUTS S45–S48
1090		RESERVED		80	142		RESERVED FOR DIGITAL OUTPUTS 1–4 OF MULTI–STATE DEVICE DRIVERS

SECTION C2 – BATCH COMMAND EASY STEP PLUS Block Address Map (continued)

BLOCK ADDRESS		CONTROL FUNCTION	FUNCTION CODE	MEMORY USAGE		I/O LOCATION	COMMENTS AND DEFAULT SETTINGS
START	END			NVRAM	RAM		
1096		DIGITAL OUTPUT GROUP	83	32	90	CSC SLAVE #1	DIGITAL OUTPUTS S1–S8 HARDWARE INTERFACE
1097		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #1	DIGITAL OUTPUTS S9–S12 HARDWARE INTERFACE
1098		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #2	DIGITAL OUTPUTS S13–S20 HARDWARE INTERFACE
1099		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #2	DIGITAL OUTPUTS S21–S24 HARDWARE INTERFACE
1100		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #3	DIGITAL OUTPUTS S25–S32 HARDWARE INTERFACE
1101		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #3	DIGITAL OUTPUTS S33–S36 HARDWARE INTERFACE
1102		DIGITAL OUTPUT GROUP		32	90	CSC SLAVE #4	DIGITAL OUTPUTS S37–S44 HARDWARE INTERFACE
1103		DIGITAL OUTPUT GROUP	83	32	90	CSC SLAVE #4	DIGITAL OUTPUTS S45–S48 HARDWARE INTERFACE
1104		ASCII STRING DESCRIPTOR	113	71	110		
1105		ASCII STRING DESCRIPTOR		71	110		
1106		ASCII STRING DESCRIPTOR		71	110		
1107		ASCII STRING DESCRIPTOR		71	110		RESERVED AREA FOR CBC
1108		ASCII STRING DESCRIPTOR		71	110		FACEPLATE STEP AND
1109		ASCII STRING DESCRIPTOR		71	110		RECIPE NAMES.
1110		ASCII STRING DESCRIPTOR		71	110		
1111		ASCII STRING DESCRIPTOR		71	110		
1112		ASCII STRING DESCRIPTOR		71	110		
1113		ASCII STRING DESCRIPTOR		71	110		
1114		ASCII STRING DESCRIPTOR		71	110		
1115		ASCII STRING DESCRIPTOR		71	110		
1116		ANALOG INPUT LIST	63	28	286		RECIPE PARAMETERS #1–8
1124		ANALOG INPUT LIST		28	286		RECIPE PARAMETERS #9–10
1132	1470	RESERVED FOR AUTOMATIC RESTORE					REFER TO AUTOMATIC RESTORE OPTION TABLE A FOR USER DEFINED BLOCKS
1471	1509	USER AREA					
*1510	1609	REAL RECIPE TABLES					REFER TO RECIPE DATA STRUCTURE TABLE B FOR USER DEFINED BLOCKS
1610	2045	USER AREA					
2046	2046	ASCII STRING DESCRIPTOR	113	71	110	MASTER	TAG NAMES AND ENGINEERING UNITS

* Addresses used only when no Sequence Command Controller is being used to store recipe data.

TABLE A – EASY STEP PLUS Block Structure for Automatic Restore Option

BLOCK ADDRESS	FUNCTIONS TO BE RESTORED	FUNCTION-CODE	MEMORY USAGE		RAM
			EXTRA NVRAM	TOTAL NVRAM	
1132	ANALOG INPUT DEFINITION	182	56	672	1056
1144	PULSE/FREQUENCY INPUTS		70	280	352
1148	CBC BATCH I/O	180	130	260	176
1150	CBC BATCH STATION	181	136	272	176
1152	CSC STATION	176	164	328	352
1156	DEVICE DRIVERS	123	66	3432	4576
1208	SEQUENCE MONITORS	124	58	232	352
1212	SEQUENCE MASTERS	141	62	806	1144
1226	SEGMENT CONTROL	82	66	66	88
1229	EXTENDED EXECUTIVE	90	98	98	88
1230	PID's	156	86	344	352
1234	CONTROL STATIONS	80	114	456	352
1238	ANALOG INPUT LISTS	63	164	328	176
1240	ANALOG & DIGITAL EXCEPTION REPORT RESTORE				
1317	STEP LOGIC		*	*	*

* Varies with type and amount of Function Codes added by the user.

TABLE B – Recipe Data Structure (Stored in the slave Sequence Command Controller (CSC01)

BLOCK ADDRESS	CONTROL FUNCTION	FUNCTION-CODE	NVRAM	RAM	COMMENTS
50	ANALOG INPUT/BUS	25	10	100	RECIPE NUMBER FROM CBC01
1510–1519	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #1 RECIPE #0–99
1520–1529	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #2 RECIPE #0–99
1530–1539	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #3 RECIPE #0–99
1540–1549	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #4 RECIPE #0–99
1550–1559	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #5 RECIPE #0–99
1560–1569	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #6 RECIPE #0–99
1570–1579	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #7 RECIPE #0–99
1580–1589	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #8 RECIPE #0–99
1590–1599	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #9 RECIPE #0–99
1600–1609	REAL RECIPE TABLES	118	480	2000	RECIPE DATA – PARAMETER #10 RECIPE #0–99

SECTION C3 – OPERATING STATUS DISPLAYS

Batch Command Controller

Press F3 while in any mode to obtain status byte information.

Status bytes #1 and #2 have a common definition regardless of the target unit being used. Refer to DIAGNOSTICS, **Operating Status Display** for information on Status Bytes #1 and #2. The contents of status bytes #3 through #5 are defined on a target unit basis.

NOTE: Batch Command Controller status byte #1, #2 and #3 data displayed on CTT02 in hexadecimal format. All status byte #4 and #5 data displayed in binary coded decimal (BCD) format.

Status Bytes #3 – #5

Mode	Byte 3	Byte 4	Byte 5	Description
ERR	02	(1)	(2)	Analog Input reference error. (1), (2) = Block Number of Batch Command I/O Block.
ERR	03	(1)	(2)	Missing Slave Module. (1), (2) = Block Number of Batch Command I/O Module.
ERR	05	(1)	(2)	Configuration error – undefined block (1), (2)= Block* making reference.
ERR	06	(1)	(2)	Configuration error – input data type is incorrect. (1), (2) = Block* making reference.
ERR	08	(1)	(2)	Trip block activated (1), (2) = Block* making reference.
	09	(1)	(2)	Too many segment control blocks. (1), (2) = Block* making reference.
	0F	—	—	Primary failed and configuration not current
	10	—	—	Primary failed and checkpoint data not available.

*All block numbers are encoded in BCD (Binary Coded Decimal) with (1) = MSB (most significant byte) and 2 = LSB (least significant byte).
Example: Block number 1024: (1) = 10 and (2) = 24.

Configuration Worksheets

The worksheets have been placed on individual pages so they can be removed from this Instruction Book and easily reproduced.

Analog I/O

UNIT TAG: _____

MODULE BUS ADDRESS: _____

TAG _____

☐ 1–5 V
☐ 4–20 mA

AI #1 → (27) 201

SPEC#	DEFAULT	USER VALUE	DESC
S1	0.0	_____	ZERO
S2	0.0	_____	SPAN

TAG _____

☐ 1–5 V
☐ 4–20 mA

AI #2 → (27) 202

SPEC#	DEFAULT	USER VALUE	DESC
S1	0.0	_____	ZERO
S2	0.0	_____	SPAN

TAG _____

☐ 1–5 V
☐ 4–20 mA

AI #3 → (27) 203

SPEC#	DEFAULT	USER VALUE	DESC
S1	0.0	_____	ZERO
S2	0.0	_____	SPAN

TAG _____

☐ 1–5 V
☐ 4–20 mA

AI #4 → (27) 204

SPEC#	DEFAULT	USER VALUE	DESC
S1	0.0	_____	ZERO
S2	0.0	_____	SPAN

S1 → AO #1 → (29) 211 → TAG _____

☐ 1–5 V
☐ 4–20 mA

S1	211	_____	INPUT BLOCK ADDRESS
S2	0	_____	STATION BLOCK ADDRESS

S1 → AO #2 → (29) 212 → TAG _____

☐ 1–5 V
☐ 4–20 mA

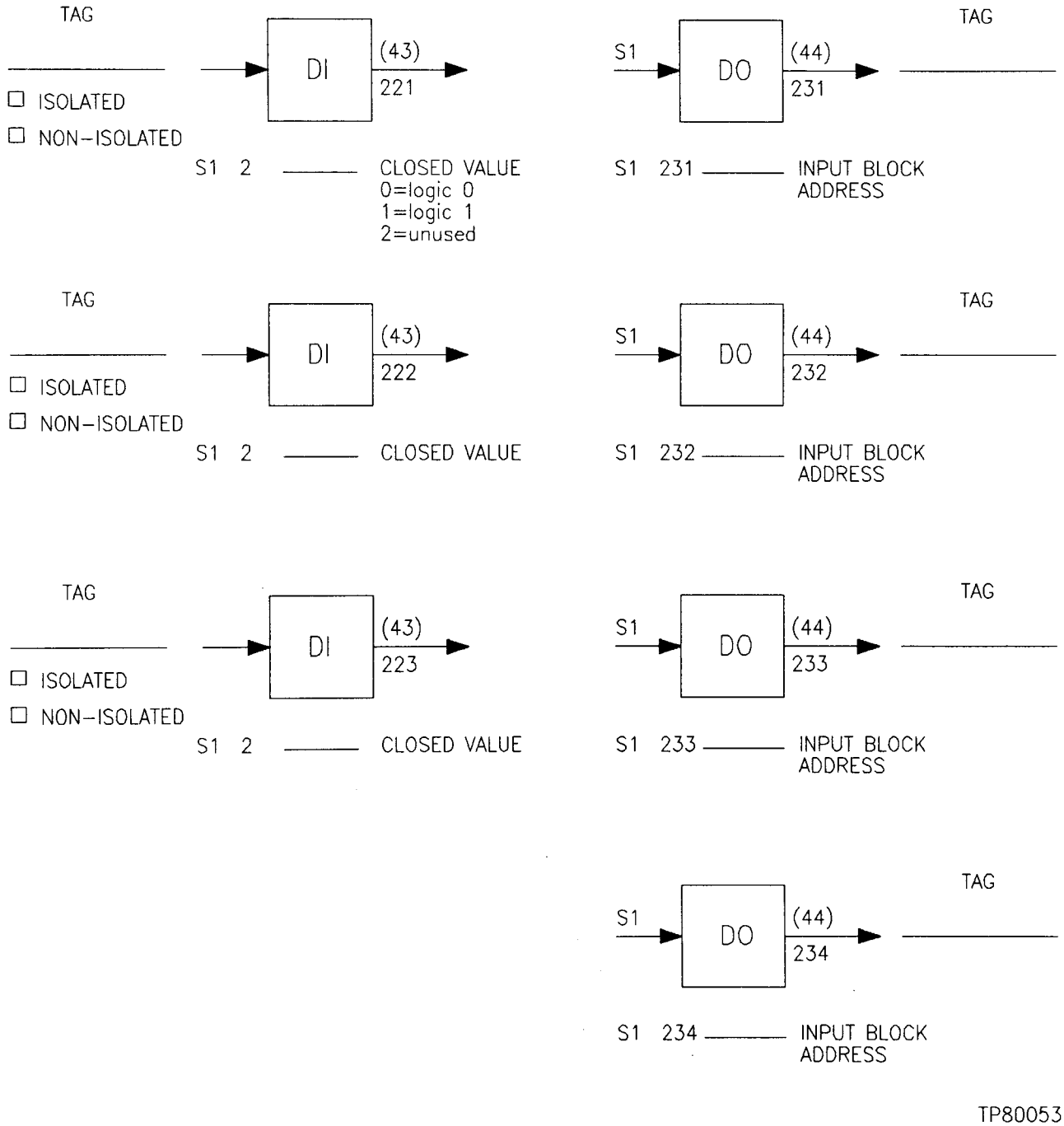
S1	212	_____	INPUT BLOCK ADDRESS
S2	0	_____	STATION BLOCK ADDRESS

TP80054

Digital I/O

UNIT TAG: _____

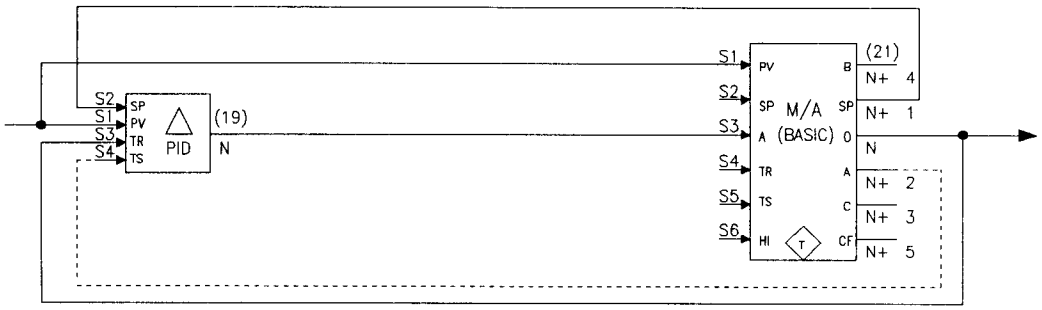
MODULE BUS ADDRESS: _____



TP80053

PID With Station

UNIT TAG _____
MODULE BUS ADDRESS _____
LOOP TAG _____
PV ENGRG UNITS _____
SP ENGRG UNITS _____
CO ENGRG UNITS _____



SPEC#	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	5	_____	PROCESS VARIABLE BLOCK ADDRESS
S2	5	_____	SET POINT BLOCK ADDRESS
S3	5	_____	TRACK SIGNAL BLOCK ADDRESS
S4	1	_____	RELEASE FLAG BLOCK ADDRESS
S5	1.0	_____	(K) GAIN MULTIPLIER
S6	1.0	_____	(KP) PROPORTIONAL CONSTANT
S7	0.0	_____	(KI) INTEGRAL CONSTANT (REP/MIN)
S8	0.0	_____	(KD) DERIV CONST (MIN)
S9	105.0	_____	HIGH OUTPUT LIMIT
S10	-5.0	_____	LOW OUTPUT LIMIT
S11	0	_____	0=NORM 1=INTEG ONLY (KI .NE. 0) SP CHG
S12	0	_____	0=REVR 1=DIR ACTING CNTR

SPEC#	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	0	_____	PROCESS VARIABLE BLOCK ADDRESS
S2	5	_____	TRACK SET POINT BLOCK ADDRESS
S3	0	_____	AUTO SIGNAL BLOCK ADDRESS
S4	5	_____	TRACK 0.0. BLOCK ADDRESS
S5	0	_____	TRANSFER FLAG BLOCK ADDRESS
S6	0	_____	TRANSFER SIGNAL BLOCK ADDRESS
S7	100.0	_____	PV HIGH ALARM PT IN EU
S8	0.0	_____	PV LOW ALARM PT IN EU
S9	999999	_____	PV/SP DEVIATION ALARM PT IN EU
S10	100.0	_____	PV/SP SIGNAL SPAN IN EU
S11	0.0	_____	ZERO VALUE IN EU OF PV
S12	0.0	_____	ZERC VALUE IN EU OF SP
S13	0	_____	EU ID (OIU USE ONLY)
S14	0	_____	SP TRACK OPT 0=NO 1=PV 2=S2 3=S2/MAN+AU
S15	0	_____	COMP BACKUP 0=HOLD 1=MAN 2=AUTO
S16	0	_____	DCS ADD (>15 NO STATION)

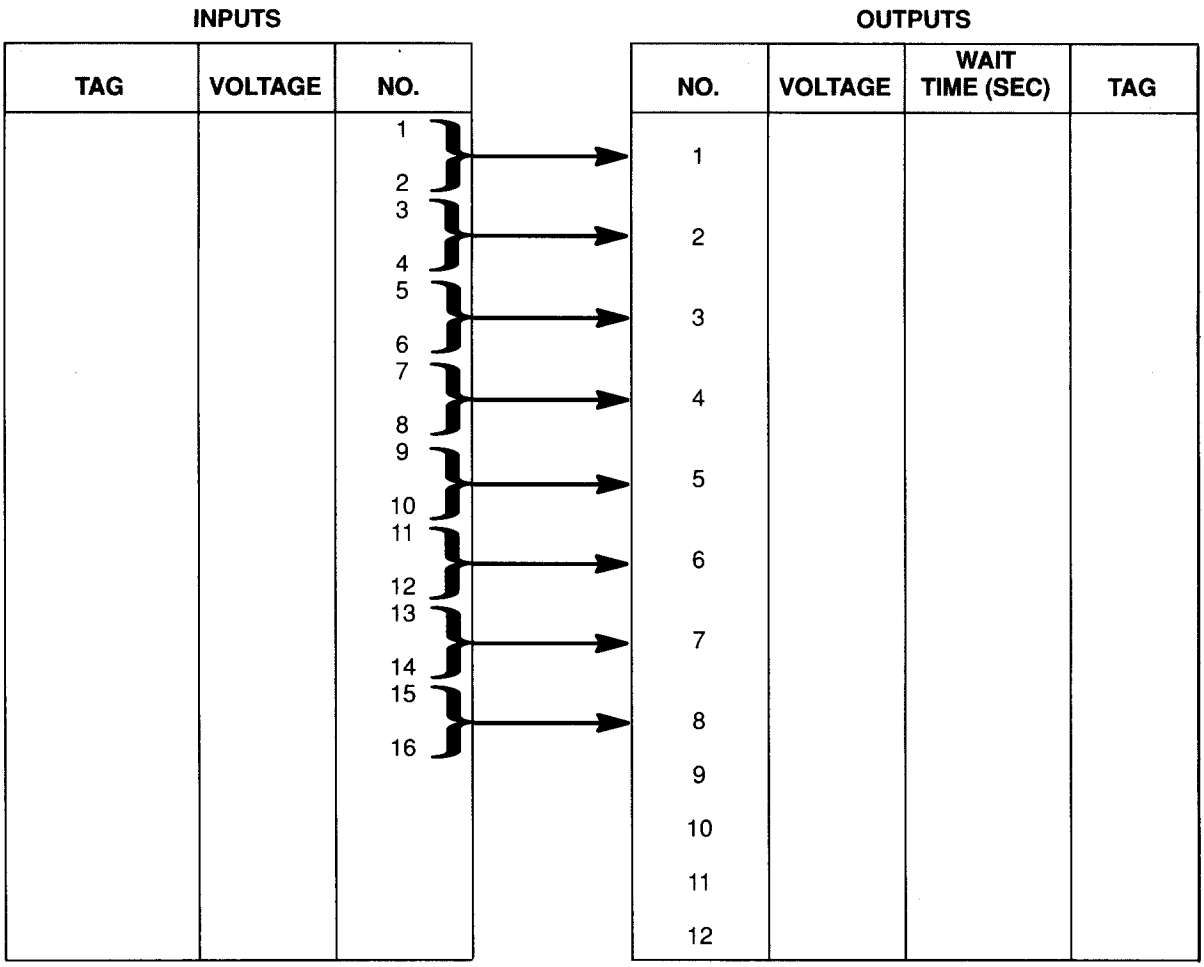
TP80055

EASY STEP PLUS I/O Data

UNIT'S TAG _____
MASTER _____ PRIMARY _____
SLAVE _____ BACKUP _____

MODULE ADDRESS _____
STATION ADDRESS _____
INPUT BD. ADDRESS _____
OUTPUT BD. ADDRESS _____

NUMBER OF STEPS _____ (32 MAX.)
NUMBER OF INPUTS _____ (64 MAX.)
NUMBER OF OUTPUTS _____ (48 MAX.)



EASY STEP PLUS Device Driver Data

OUTPUT # _____ TAG _____

FUNCTION CODE 123 SPEC #	EASY STEP PLUS DEFAULT VALUES	USER VALUES	COMMENTS
S1 Control Input	(1)		
S2 Feedback 1	(2)		
S3 Feedback 2	(3)		
S4 Status Override	0		
S5 Output Override	1		
S6 Override Value	0		
S7 Feedback Mask 0	0		
S8 Feedback Mask 1	0		
S9 Wait Time	0.000		
S10 Unused	0		

OUTPUT # _____ TAG _____

FUNCTION CODE 123 SPEC #	EASY STEP PLUS DEFAULT VALUES	USER VALUES	COMMENTS
S1 Control Input	(1)		
S2 Feedback 1	(2)		
S3 Feedback 2	(3)		
S4 Status Override	0		
S5 Output Override	1		
S6 Override Value	0		
S7 Feedback Mask 0	0		
S8 Feedback Mask 1	0		
S9 Wait Time	0.000		
S10 Unused	0		

NOTES: (1) SEQUENCE MASTER OUTPUT BLOCK ADDRESS FOR OUTPUT # _____

(2) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 0

(3) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 1

EASY STEP PLUS Step Mask Data

STEP NAME → E-STOP

STEP NO. →	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TAG	DIGITAL OUTPUTS*																																
	B1																																
	B2																																
	B3																																
	B4																																
	S1																																
	S2																																
	S3																																
	S4																																
	S5																																
	S6																																
	S7																																
	S8																																
	S9																																
	S10																																
	S11																																
	S12																																

TAG	DIGITAL OUTPUTS*
	S1
	S2
	S3
	S4
	S5
	S6
	S7
	S8
	S9
	S10
	S11
	S12

* B PREFIX — BATCH COMMAND CONTROLLER DIGITAL OUTPUTS
S PREFIX — SEQUENCE COMMAND CONTROLLER DIGITAL OUTPUTS

Step Logic Definition

STEP # _____ STEP NAME_____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT #_____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)

STEP
INDICATOR ——————>

FUNCTION
CODE
#126
"RDEMUX"

STEP
DONE
TRIGGER
SELECT
——————>

FUNCTION
CODE
#119
"BMUX"

DESCRIPTION:

Configuration Parameters And Digital I/O Data

UNIT TAG _____

☐ MASTER
☐ SLAVE

☐ PRIMARY
☐ BACKUP

MODULE ADDRESS_____ (0–31)
STATION ADDRESS _____ (0–7)
I/O ADDRESS _____ (1–15)

FOR MASTER UNIT ONLY:

NUMBER OF PROCESS STEPS _____

NUMBER OF CBC01 DIGITAL INPUTS _____
NUMBER OF CSC01 DIGITAL INPUTS _____

NUMBER OF CBC01 DIGITAL OUTPUTS _____
NUMBER OF CSC01 DIGITAL OUTPUTS _____

NUMBER OF HIGH LEVEL
(1–5V/4–20mA) ANALOG INPUTS _____

NUMBER OF LOW LEVEL
(T/C, RTD, mV) ANALOG INPUTS _____

NUMBER OF PULSE INPUTS _____

NUMBER OF ANALOG LOOPS _____

NUMBER OF RECIPES _____

NUMBER OF RECIPE PARAMETERS _____

DIGITAL INPUTS

INPUT #1

TAG_____
VOLTAGE: ☐ 24 V DC ☐ 120 V AC

INPUT #2

TAG_____
VOLTAGE: ☐ 24 V DC ☐ 120 V AC

DIGITAL OUTPUTS

OUTPUT #1

TAG_____
VOLTAGE: ☐ 24 V DC ☐ 120 V AC
WAIT TIME:_____ (SEC)

OUTPUT #2

TAG_____
VOLTAGE ☐ 24 V DC ☐ 120 V AC
WAIT TIME: _____ (SEC)

Analog I/O Definition

UNIT TAG _____
MODULE BUS ADDRESS _____
I/O ADDRESS _____

ANALOG INPUT #1 I/O CHANNEL #1 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V

ANALOG INPUT #2 I/O CHANNEL #2 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V

ANALOG INPUT #3 I/O CHANNEL #3 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V

ANALOG INPUT #4 I/O CHANNEL #4 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V
☐ MILLIVOLT (–20 to +80 mV)
☐ THERMOCOUPLE: TYPE _____
☐ RTD (100 OHM): TYPE _____ 2–WIRE ☐ 3–WIRE ☐
LEAD WIRE RESISTANCE _____

ANALOG INPUT #5 I/O CHANNEL #5 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V
☐ MILLIVOLT (–20 TO +80 mV)
☐ THERMOCOUPLE: TYPE _____
☐ RTD (100 OHM): TYPE _____ 2–WIRE ☐ 3–WIRE ☐
LEAD WIRE RESISTANCE _____

ANALOG INPUT #6 I/O CHANNEL #6 TAG _____
☐ 4 – 20 mA ZERO _____ SPAN _____
☐ 1 – 5 V
☐ MILLIVOLT (–20 to +80 mV)
☐ THERMOCOUPLE: TYPE _____
☐ RTD (100 OHM): TYPE _____ 2–WIRE ☐ 3–WIRE ☐
LEAD WIRE RESISTANCE _____

ANALOG OUTPUT #1 TAG _____
☐ 4 – 20 mA
☐ 1 – 5 V

ANALOG OUTPUT #2 TAG _____
☐ 4 – 20 mA
☐ 1 – 5 V

Pulse Input Definition

I/O ADDRESS _____ UNIT TAG _____

INPUT # 1 **TAG** _____

CHANNEL #1

VOLTAGE LEVEL:
☐ LOW 3.5 – 8 V
☐ HIGH 14 – 30 V

INPUT TYPE:

☐ PERIOD ☐ FREQUENCY ☐ TOTALIZATION

FUNCTION CODE #102 _____

FUNCTION CODE #103 _____

FUNCTION CODE #104 _____

RANGE _____

RANGE _____

STARTING VALUE _____

GAIN _____

GAIN _____

INPUT # 2 **TAG** _____

CHANNEL #2

VOLTAGE LEVEL:
☐ LOW 3.5 – 8 V
☐ HIGH 14 – 30 V

INPUT TYPE:

☐ PERIOD ☐ FREQUENCY ☐ TOTALIZATION

FUNCTION CODE #102 _____

FUNCTION CODE #103 _____

FUNCTION CODE #104 _____

RANGE _____

RANGE _____

STARTING VALUE _____

GAIN _____

GAIN _____

I/0 Summary

I/O ADDRESS_____ UNIT TAG_____

BLOCK OUTPUT	BLOCK ADDRESS		TAG NAME	SIGNAL NAME
	CBC MASTER	CBC SLAVE		
ANALOG INPUT #1	55	70		
ANALOG INPUT #2	56	71		
ANALOG INPUT #3	57	72		
ANALOG INPUT #4	58	73		
ANALOG INPUT #5	59	74		
ANALOG INPUT #6	60	75		
ANALOG OUTPUT #1	61	76		
ANALOG OUTPUT #2	62	77		
DIGITAL INPUT #1	63	78		
DIGITAL INPUT #2	64	79		
PULSE INPUT #1	65	80		
PULSE INPUT #2	66	81		
I/O STATUS SUMMARY	67	82		
UNUSED	68	83		
UNUSED	69	84		
DIGITAL OUTPUT #1	N/A	N/A		
DIGITAL OUTPUT #2	N/A	N/A		

EASY STEP PLUS Device Driver Data

OUTPUT # _____ TAG _____

FUNCTION CODE 123 SPEC #	EASY STEP PLUS DEFAULT VALUES	USER VALUES	COMMENTS
S1 Control Input	(1)		
S2 Feedback 1	(2)		
S3 Feedback 2	(3)		
S4 Status Override	0		
S5 Output Override	1		
S6 Override Value	0		
S7 Feedback Mask 0	0		
S8 Feedback Mask 1	0		
S9 Wait Time	0.000		
S10 Unused	0		

OUTPUT # _____ TAG _____

FUNCTION CODE 123 SPEC #	EASY STEP PLUS DEFAULT VALUES	USER VALUES	COMMENTS
S1 Control Input	(1)		
S2 Feedback 1	(2)		
S3 Feedback 2	(3)		
S4 Status Override	0		
S5 Output Override	1		
S6 Override Value	0		
S7 Feedback Mask 0	0		
S8 Feedback Mask 1	0		
S9 Wait Time	0.000		
S10 Unused	0		

NOTES: (1) SEQUENCE MASTER OUTPUT BLOCK ADDRESS FOR OUTPUT # _____

(2) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 0

(3) BLOCK ADDRESS OF SIGNAL INDICATING OUTPUT # _____ = 1

Recipe Data

RECIPE NAME

RECIPE PARAMETER				RECIPE DATA							
NO.	NAME	EASY STEP PLUS BLOCK OUTPUT ADDRESS		1	2	3	4	5	6	7	8
		AIL/B*	RRT*								
1		1116	1510								
2		1117	1520								
3		1118	1530								
4		1119	1540								
5		1120	1550								
6		1121	1560								
7		1122	1570								
8		1123	1580								
9		1124	1590								
10		1125	1600								

* The AIL/B (Function Code 63) is used if the recipe parameters are not stored in the Batch Command Controller. The RRT addresses (Function Code 118) are what should be used if the parameters are stored in the Batch Command Controller.

EASY STEP PLUS Step Mask Data

STEP NAME → E-STOP

STEP NO. →	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
TAG / DIGITAL OUTPUTS																																	
	S1																																
	S2																																
	S3																																
	S4																																
	S5																																
	S6																																
	S7																																
	S8																																
	S9																																
	S10																																
	S11																																
	S12																																

TAG	DIGITAL OUTPUTS																																
	S1																																
	S2																																
	S3																																
	S4																																
	S5																																
	S6																																
	S7																																
	S8																																
	S9																																
	S10																																
	S11																																
	S12																																

EASY STEP PLUS I/O Data

UNIT'S TAG_____

MASTER_____ PRIMARY_____

SLAVE _____ BACKUP_____

MODULE ADDRESS_____

STATION ADDRESS_____

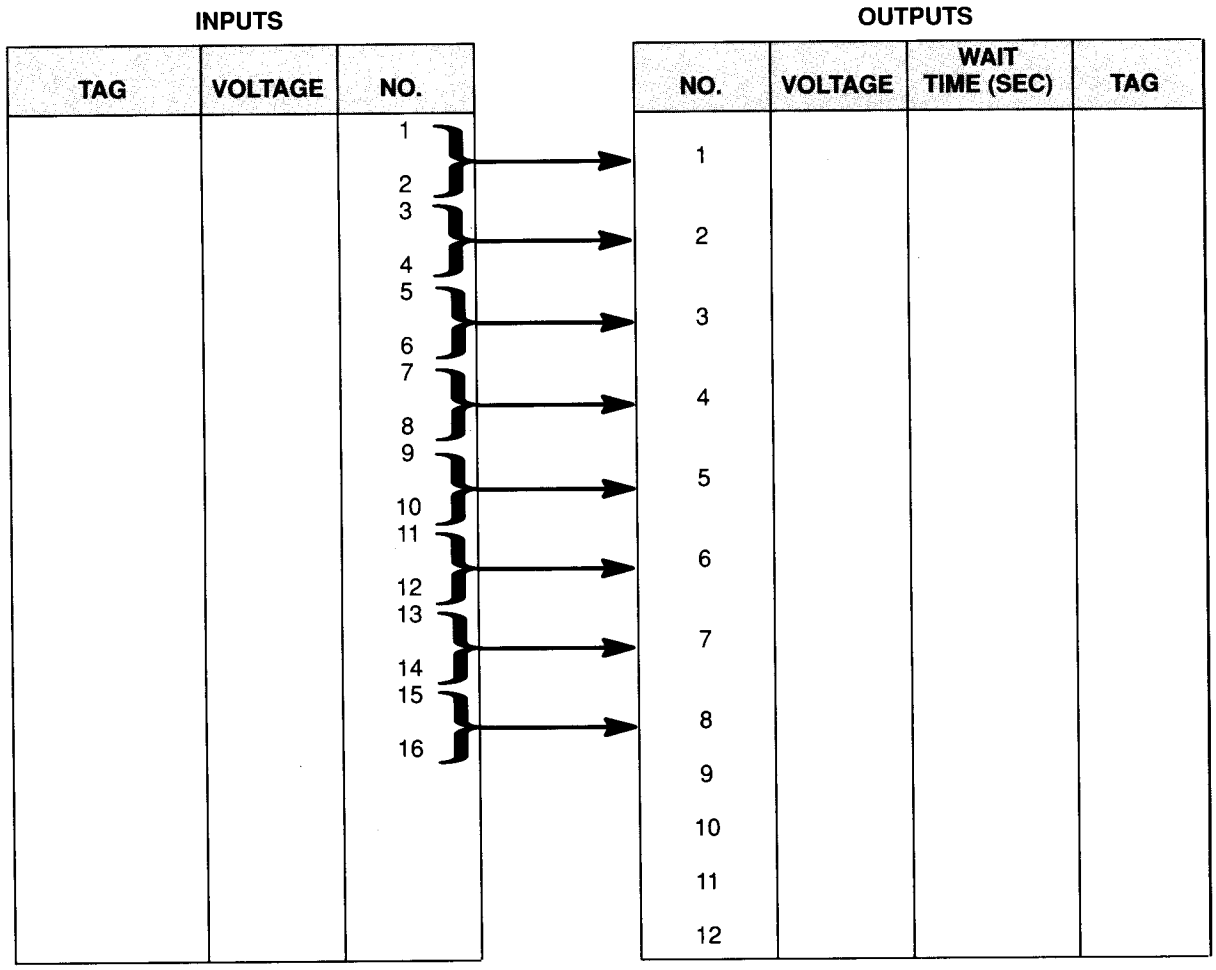
INPUT BD. ADDRESS_____

OUTPUT BD. ADDRESS_____

NUMBER OF STEPS_____(32 MAX.)

NUMBER OF INPUTS_____(64 MAX.)

NUMBER OF OUTPUTS_____(48 MAX.)



Step Logic Definition

STEP # _____ STEP NAME_____

STEP ACTIVE BOOLEAN INDICATOR LOCATED AT BLOCK OUTPUT #_____

NOTE: If using EASY STEP PLUS the block output # = 350 + STEP # (BATCH)
= 220 + STEP # (SEQUENCE)

STEP
INDICATOR ———>

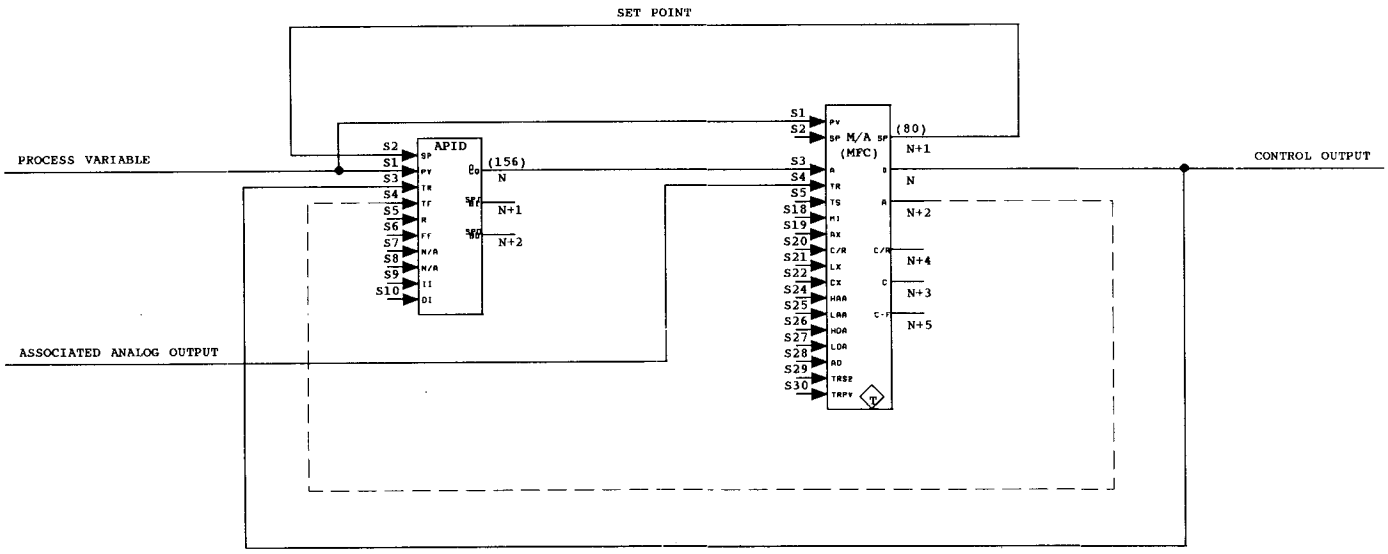
FUNCTION
CODE
#126
"RDEMUX"

STEP
DONE
TRIGGER
SELECT
———>

FUNCTION
CODE
#119
"BMUX"

DESCRIPTION:

Advanced PID With Station Worksheet



A0726

M/A STATION – Function Code 80 Specifications

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	5	_____	BLOCK ADDRESS OF PROCESS VARIABLE (PV)
			BLOCK ADDRESS OF SET POINT (SP) TRACK SIGNAL
S2	5	_____	BLOCK ADDRESS OF AUTO SIGNAL
S3	5	_____	BLOCK ADDRESS OF CONTROL OUTPUT TRACK SIGNAL (TR)
S4	5	_____	BLOCK ADDRESS OF CONTROL OUTPUT TRACK SWITCH (TS)
S5	0	_____	INITIAL MODE OF STATION AFTER STARTUP
S6	5	_____	PROCESS VARIABLE HIGH ALARM LIMIT IN E.U.
S7	9.2 E18	_____	PROCESS VARIABLE LOW ALARM LIMIT IN E.U.
S8	–9.2 E18	_____	PV–SP DEVIATION ALARM LIMIT IN E.U.
S9	9.2 E18	_____	SIGNAL SPAN OF PROCESS VARIABLE IN E.U.
S10	100.000	_____	ZERO VALUE OF PROCESS VARIABLE IN E.U.
S11	0.000	_____	PROCESS VARIABLE ENGINEERING UNITS IDENTIFIER
S12	0	_____	SIGNAL SPAN OF SET POINT IN E.U.
S13	–5.000	_____	ZERO VALUE OF SET POINT IN E.U.
S14	0.000	_____	SET POINT ENGINEERING UNITS IDENTIFIER
S15	0	_____	DIGITAL CONTROL STATION ADDRESS
S16	255	254*	THE VALUE SPECIFYING WHICH MODE THE SYSTEM WILL
S17	0	_____	DEFAULT TO IF THE COMPUTER FAILS WHILE THE LOOP IS UNDER COMPUTER CONTROL.

M/A STATION – Function Code 80 Specifications (continued)

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S18	0	_____	BLOCK ADDRESS OF THE TRANSFER–TO–MANUAL SIGNAL
S19	0	_____	BLOCK ADDRESS OF THE TRANSFER–TO–AUTO SIGNAL
S20	0	_____	BLOCK ADDRESS OF THE TRANSFER–TO–CASCADE/RATIO SIGNAL
S21	0	_____	BLOCK ADDRESS OF THE TRANSFER–TO–LOCAL SIGNAL
S22	0	_____	BLOCK ADDRESS OF THE TRANSFER–TO–COMPUTER SIGNAL
S23	0	_____	STATION TYPE
S24	0	_____	BLOCK ADDRESS OF EXTERNAL HIGH ABSOLUTE ALARM FLAG
S25	0	_____	BLOCK ADDRESS OF EXTERNAL LOW ABSOLUTE ALARM FLAG
S26	0	_____	BLOCK ADDRESS OF EXTERNAL HIGH DEVIATION ALARM FLAG
S27	0	_____	BLOCK ADDRESS OF EXTERNAL LOW DEVIATION ALARM FLAG
S28	0	_____	BLOCK ADDRESS OF ANALOG OUTPUT ASSOCIATED WITH THIS STATION
S29	0	_____	BLOCK ADDRESS OF SWITCH TO HAVE SET POINT TRACK S2 INPUT
S30	0	_____	BLOCK ADDRESS OF SWITCH TO HAVE SET POINT TRACK S1 INPUT
S31	60.000		COMPUTER WATCHDOG TIME PERIOD IN SECONDS

* If M/A Station is linked to the Batch Station.

ADVANCED PID – Function Code 156 Specifications

SPEC NO.	DEFAULT VALUE	USER VALUE	DESCRIPTION
S1	5	_____	BLOCK ADDRESS OF PROCESS VARIABLE (PV) = REACTOR TEMP.
S2	5	_____	BLOCK ADDRESS OF SETPOINT (SP)
S3	5	_____	BLOCK ADDRESS OF TRACK REF (TRK)
S4	0	_____	BLOCK ADDRESS OF TRACK FLAG (TF)
S5	5	_____	BLOCK ADDRESS OF EXTERNAL RESET (ER)
S6	5	_____	BLOCK ADDRESS OF FEEDFORWARD SIGNAL (FF)
S7	5	_____	SPARE INPUT
S8	0	_____	SPARE INPUT
S9	0	_____	BLOCK ADDRESS OF BLOCK INCREASE (BLK – I)
S10	0	_____	BLOCK ADDRESS OF BLOCK DECREASE (BLK – D)
S11	1.0	_____	GAIN MULTIPLIER (K)
S12	1.0	_____	PROPORTIONAL GAIN (KP)
S13	0.0	_____	INTEGRAL RESET (KI)
S14	0.0	_____	DERIVATIVE RATE ACTION (KD)
S15	10.0	_____	DERIVATIVE LAG CONSTANT (KA)
S16	105.0	_____	HIGH OUTPUT LIMIT (HL)
S17	–5.0	_____	LOW OUTPUT LIMIT (LL)
S18	0	_____	ALGORITHM TYPE (ALG)
S19	0	_____	INTEGRAL LIMIT TYPE (LIM)
S20	0	_____	SETPOINT MODIFIER (SPM)
S21	0	_____	DIRECTION SWITCH
S22	0.0	_____	SPARE
S23	0		SPARE

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Australia
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Telefax: 61-2-645-2212

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Bailey do Brasil
Sao Paulo
Phone: 55-11-288-4037
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Burlington, Ontario
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Telefax: (416) 639-8639

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Bailey MD Automation GmbH
Overath/Cologne
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Telefax: 49-220-4 739-79

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Telefax: 39-10-6001-611

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Bailey Japan Company Ltd.
Nirayama-cho, Tagata-gun
Shizuoka-ken
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Telefax: 81-559-49-1114

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Bailey Controls Jordan
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Phone: 962-6-795-908
Telefax: 962-6-795-908

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Bailey Mexico S.A. de C.V.
Mexico City
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Phone: 47-5-229-601
Telefax: 47-5-229-610

People's Republic of China
Bailey Beijing Company
Beijing
Phone: 86-1-401-0648
Telefax: 86-1-401-1643

Singapore
Elsag Bailey Pte. Ltd.
Singapore
Phone: 65-442-3200
Telefax: 65-442-2700

United Kingdom
ICS Bailey Controls Ltd.
Telford, Shropshire
Phone: 44-952-670-477
Telefax: 44-952-670-455

United States
Bailey Controls Company
Wickliffe, Ohio 44092 USA
Phone: (216) 585-8500
Telex: 980621
Telefax: (216) 585-8756

Venezuela
Bailey de Venezuela S.A.
Valencia
Phone: 58-41-336-825
Telefax: 58-41-333-433

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Bailey Controls Company
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