MODEL 385 LOOP OPERATOR'S STATION
LOCAL INSTRUMENT LINK
COMMUNICATIONS
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1.0 LOCAL INSTRUMENT LINK (LIL)

1.1 DEFINITION

The Local Instrument Link (LIL) is a communication network which connects a group of stations such as a Model 320 Independent Computer Interface, Model 321 Expansion Satellite, Model 324 Programmable Sequence Controller (PSC), Model 351 Triple-Loop Digital Controller (TLDC), Model 352 Single-Loop Digital Controller (SLDC), Model 363 VIEWPAC, Model 382 Logic and Sequence Controller, Model 383 Multi-Point Display Controller, Model 385 Loop Operator Station and any future devices for the purpose of inter-station communication.

1.1.1 Minimum System

A minimum system consists of at least (2) stations and up to a maximum of (32) stations. Each station on the LINK must have LINK interface cards which are connected together with a LINK cable.

1.1.2 Expanded System

A Local Instrument Link (LIL) can be expanded up to a maximum of (64) stations by using a Model 321 Expansion Satellite.

1.1.3 Hi-Level Link Connection

A Local Instrument Link (LIL) can also be connected to a MYCRO Hi-Level Data Link using a Model 321 Expansion Satellite.

1.2 LOCAL INSTRUMENT LINK (LIL) SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tr>
<td>Electrical</td>
<td>RS-422 HALF-DUPLEX</td>
</tr>
<tr>
<td>Protocol</td>
<td>ENHANCED HDLC</td>
</tr>
<tr>
<td>Speed</td>
<td>500K BITS/SECOND</td>
</tr>
<tr>
<td>Mode</td>
<td>BASEBAND</td>
</tr>
<tr>
<td>Access</td>
<td>TOKEN PASSING</td>
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<tr>
<td>Network</td>
<td>BUS</td>
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<tr>
<td>Stations</td>
<td>32 (MAX)</td>
</tr>
<tr>
<td>Medium</td>
<td>TWISTED PAIR</td>
</tr>
<tr>
<td>Distance</td>
<td>1500 FEET - MAX (BELDEN #9182)</td>
</tr>
<tr>
<td></td>
<td>4000 FEET - MAX (BELDEN #9860)</td>
</tr>
</tbody>
</table>

1.3 DATA COMMUNICATIONS

1.3.1 Definition

Each station on the Local Instrument Link (LIL) can have up to a maximum of (256) data channels, with each channel having a maximum of (256) data parameters. Stations will transmit all parameter 1 data values every 0.5 second to form the Global Data Base of the Local Instrument Link. A Local Instrument Link (LIL) can have up to 1600 Global parameters. An expanded LIL can have a maximum of 1600 per side for a total of 3200 parameters. Each station's LINK interface supports commands to send parameter data as well as receive changes to certain parameter values. The LINK interface also supports the uploading and downloading of the station's database.
1.3.2 Data Security

The equivalent of a CRC data check is used on all Local Instrument Link (LIL) data transmissions.

1.3.3 Word Size

All the Model 385 Global parameters are 16-bit (2-byte) words. Normalized variables have a range of $80 - $0F80 representing 0.00 - 100.00%. Some parameters will represent ASCII characters, some part of an IEEE 32-bit floating point number, others 16-bit integer. All parameters for the Model 385 Loop Operator Station are given in this manual.
2.0 LINK INTERFACE OPTION - MODEL 385 LOOP OPERATOR STATION

2.1 LINK INTERFACE COMMUNICATIONS

This manual describes parameters available through the LINK interface option of the Model 385 and should be used with the appropriate Independent Computer Interface user's manual which includes complete information regarding commands and command structures. NOTE: Only the COMMAND types and formats referenced in this manual should be used when communicating with the Model 385.

2.1.1 Channel Parameters

The Model 385 Link Interface has 61 information channels. A summary of this data is given in Table 1.

2.1.1.1 Global Data Parameters

The LINK interface will transmit (broadcast) the following 16-bit data values every 0.5 seconds to form part of the Local Instrument Link global data.

Each Global Data Parameter (first parameter of each channel) will be assigned a GLOBAL PARAMETER DATA TYPE. This will be used to identify the kind of input that a device might be looking at. This value will be accessed via a LIL parameter request to parameter 256 of the channel in which the Global Data Parameter resides.

Global Parameter Data Types and their corresponding values:

GLOBAL PARAMETER DATA TYPES

<table>
<thead>
<tr>
<th>DATA TYPE</th>
<th>DATA TYPE DESCRIPTION</th>
</tr>
</thead>
</table>

GENERAL DATA TYPES (1 to 999)

| 1          | STATION SIZE          |
| 2          | STATION TYPE          |
| 3          | STATION STATUS WORD   |
| 4          | STATION ERROR         |
| 5          | LOOP STATUS WORD      |
| 6          | CHANNEL STATUS WORD   |
| 7          | ALARM STATUS WORD (channel and loop alarms) |
| 8          | RETRANSMISSION OF LINK FB OUTPUT |

PERCENT OF SCALE VARIABLES - $0 to $FFFF (-3.3 to 103.1%)

NOTE: Certain PERCENT OF SCALE variables have the following information associated with them:

- 12 character TAG NAME (6 LIL parameters)
- 4 character ENGINEERING UNITS (2 LIL parameters)
- PROCESS HIGH (1 LIL parameter)
- PROCESS LOW (1 LIL parameter)
- DECIMAL POINT POSITION (1 LIL parameter)

This information is located in consecutive LIL parameters relative to the variable itself as described below:

100 CHANNEL VARIABLE - no tag name or scaling information
101 CHANNEL VARIABLE - Tag Name starts in the same channel, 4th parameter
102 PROCESS VARIABLE - Tag Name starts 3 channels down, 2nd parameter
103 SETPOINT VARIABLE - Tag Name starts 2 channels down, 2nd parameter
104 VALVE VARIABLE - Tag Name starts 1 channel down, 2nd parameter

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LINK INTERFACE OPTION

LINK FULL RANGE VARIABLES - $0 to $FFFF
150 LINK FULL RANGE (-500 to 3500 deg F) - no tag name or scaling information
151 LINK FULL RANGE (-500 to 3500 deg F) - Tag Name starts in the same channel, 4th parameter

The LINK interface will transmit (broadcast) the following 16-bit data values every 0.5 seconds to form part of the Local Instrument Link Global Data.

CHANNEL 1, PARAMETER 1 - Station Data Size --- Transmitted as $000B to $003D indicating 11 to 61 active channels.
CHANNEL 2, PARAMETER 1 - Station Type ------ Transmitted as $000B indicating that this station is a Model 385.
CHANNEL 3, PARAMETER 1 - Station Status
CHANNEL 4, PARAMETER 1 - Station Error Code
CHANNEL 5, PARAMETER 1 - Function Block
CHANNEL 6, PARAMETER 1 - Trending Status
CHANNEL 7, PARAMETER 1 - Bargraph Status
CHANNEL 8, PARAMETER 1 - Channel A
CHANNEL 9, PARAMETER 1 - Ch. A Alarm
CHANNEL 10, PARAMETER 1 - Channel B
CHANNEL 11, PARAMETER 1 - Ch. B Alarm
CHANNEL 12, PARAMETER 1 - Process Loop No. 1
CHANNEL 13, PARAMETER 1 - Setpoint Loop No. 1
CHANNEL 14, PARAMETER 1 - Valve Loop No. 1
CHANNEL 15, PARAMETER 1 - Status Loop No. 1
CHANNEL 16, PARAMETER 1 - Alarm Status Loop No. 1
CHANNEL 17, PARAMETER 1 - Process Loop No. 2
CHANNEL 18, PARAMETER 1 - Setpoint Loop No. 2
CHANNEL 19, PARAMETER 1 - Valve Loop No. 2
CHANNEL 20, PARAMETER 1 - Status Loop No. 2
CHANNEL 21, PARAMETER 1 - Alarm Status Loop No. 2
CHANNEL 22, PARAMETER 1 - Process Loop No. 3
CHANNEL 23, PARAMETER 1 - Setpoint Loop No. 3
CHANNEL 24, PARAMETER 1 - Valve Loop No. 3
CHANNEL 25, PARAMETER 1 - Status Loop No. 3
CHANNEL 26, PARAMETER 1 - Alarm Status Loop No. 3
CHANNEL 27, PARAMETER 1 - Process Loop No. 4
CHANNEL 28, PARAMETER 1 - Setpoint Loop No. 4
CHANNEL 29, PARAMETER 1 - Valve Loop No. 4
CHANNEL 30, PARAMETER 1 - Status Loop No. 4
CHANNEL 31, PARAMETER 1 - Alarm Status Loop No. 4
CHANNEL 32, PARAMETER 1 - Process Loop No. 5
CHANNEL 33, PARAMETER 1 - Setpoint Loop No. 5
CHANNEL 34, PARAMETER 1 - Valve Loop No. 5
CHANNEL 35, PARAMETER 1 - Status Loop No. 5
CHANNEL 36, PARAMETER 1 - Alarm Status Loop No. 5
CHANNEL 37, PARAMETER 1 - Process Loop No. 6
CHANNEL 38, PARAMETER 1 - Setpoint Loop No. 6
CHANNEL 39, PARAMETER 1 - Valve Loop No. 6
CHANNEL 40, PARAMETER 1 - Status Loop No. 6
CHANNEL 41, PARAMETER 1 - Alarm Status Loop No. 6
CHANNEL 42, PARAMETER 1 - Process Loop No. 7
CHANNEL 43, PARAMETER 1 - Setpoint Loop No. 7
CHANNEL 44, PARAMETER 1 - Valve Loop No. 7
CHANNEL 45, PARAMETER 1 - Status Loop No. 7
CHANNEL 46, PARAMETER 1 - Alarm Status Loop No. 7
CHANNEL 47, PARAMETER 1 - Process Loop No. 8
CHANNEL 48, PARAMETER 1 - Setpoint Loop No. 8
CHANNEL 49, PARAMETER 1 - Valve Loop No. 8
CHANNEL 50, PARAMETER 1 - Status Loop No. 8
CHANNEL 51, PARAMETER 1 - Alarm Status Loop No. 8
CHANNEL 52, PARAMETER 1 - Process Loop No. 9
CHANNEL 53, PARAMETER 1 - Setpoint Loop No. 9
2.1.2 Parameters

2.1.2.1 Parameter Requests

The LINK interface will transmit the following Parameter Data in RESPONSE to a RANDOM PARAMETER DATA REQUEST which requests the Model 385 to send from 1 to 5 random parameter values. When more than 5 parameters are requested, the Model 385 will transmit the first 5. Any invalid parameters will be transmitted as $0$. Also certain parameters will respond to a MULTI-BYTE PARAMETER REQUEST in which case the Model 385 will transmit all the parameter data associated with the multi-byte data. Responses to invalid MULTI-BYTE PARAMETER REQUESTS (incorrect starting parameter or incorrect length) will be transmitted as $0$.

2.1.2.2 Parameter Changes

The LINK interface will accept CHANGES to parameter data when a proper COMMAND is received. Unless otherwise noted, an **** indicates that this character is ignored and any number can be substituted in its place.

2.2 Parameter Descriptions

**STATUS WORD 01 - BOARD STATUS**
CHANNEL 1, PARAMETER 2 - Indicates which boards are installed.

BIT 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
"1" -- -- -- -- -- -- H -- -- -- -- D EX LK MP
"0" -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

BIT 0: MPU (MP)----------this bit indicates the presence of MPU board, set to "1"

"1" ........ MPU BOARD

BIT 1: LINK (LK)----------this bit indicates the presence of LINK board, set to "1"

"1" ........ LINK BOARD

BIT 2: EXPANDER (EX)-----this bit indicates presence of Expander board, set to "1"

"1" ........ EXPANDER BOARD
"0" ........ no expander

NOTE: Bits 2 and 9 are both set to "1" when the HART EXPANDER is installed.

BIT 3: DISPLAY (D)--------this bit indicates presence of a 385 Display, set to "1"

"1" ........ DISPLAY
"0" ........ no display

BITS 4-8:-----------------not used - set to "0"

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BIT 9: HART (H)------------------this bit indicates the presence of HART EXPANDER board, set to "1".

  "1" ...... HART
  "0" ...... no HART

NOTE: Bits 2 and 9 are both set to "1" when the HART EXPANDER is installed.

BITS 10-15:----------------------not used - set to "0"

SOFTWARE LEVEL - MPU
CHANNEL 1, PARAMETER 3 - Characters 1 & 2 of the MPU software level. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all the data associated with parameters 03 thru 04.

  $$++ \quad ** = $20 to $5E ASCII code for character 1
                ++ = $20 to $5E ASCII code for character 2

CHANNEL 1, PARAMETER 4 - Character 3 of the MPU software level.

  $++20 \quad ++ = $20 to $5E ASCII code for character 3

SOFTWARE LEVEL - LINK
CHANNEL 1, PARAMETER 5 - Characters 1 & 2 of the LINK software level. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all the data associated with parameters 05 thru 06.

  $$++ \quad ** = $20 to $5E ASCII code for character 1
                ++ = $20 to $5E ASCII code for character 2

CHANNEL 1, PARAMETER 6 - Character 3 of the LINK software level.

  $++20 \quad ++ = $20 to $5E ASCII code for character 3

SOFTWARE LEVEL - EXP
CHANNEL 1, PARAMETER 7 - Characters 1 & 2 of the Expander software level. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all the data associated with parameters 07 thru 08.

  $$++ \quad ** = $20 to $5E ASCII code for character 1
                ++ = $20 to $5E ASCII code for character 2

CHANNEL 1, PARAMETER 8 - Character 3 of the Expander software level.

  $++20 \quad ++ = $20 to $5E ASCII code for character 3

STATION IDENTIFICATION - SID
CHANNEL 2, PARAMETER 2 - SID - Characters 1 & 2 of the station identification as entered during configuration. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all the data associated with parameters 02 thru 07.

  $$++ \quad ** = $20 to $5E ASCII code for character 1
                ++ = $20 to $5E ASCII code for character 2

CHANNEL 2, PARAMETER 3 - SID - Characters 3 & 4 of the station identification as entered during configuration.

  $$++ \quad ** = $20 to $5E ASCII code for character 3
                ++ = $20 to $5E ASCII code for character 4
CHANNEL 2, PARAMETER 4 - SID - Characters 5 & 6 of the station identification as entered during configuration.

$$++ 
** = $20 to $5E ASCII code for character 5
++ = $20 to $5E ASCII code for character 6

CHANNEL 2, PARAMETER 5 - SID - Characters 7 & 8 of the station identification as entered during configuration.

$$++ 
** = $20 to $5E ASCII code for character 7
++ = $20 to $5E ASCII code for character 8

CHANNEL 2, PARAMETER 6 - SID - Characters 9 & 10 of the station identification as entered during configuration.

$$++ 
** = $20 to $5E ASCII code for character 9
++ = $20 to $5E ASCII code for character 10

CHANNEL 2, PARAMETER 7 - SID - Characters 11 & 12 of the station identification as entered during configuration.

$$++ 
** = $20 to $5E ASCII code for character 11
++ = $20 to $5E ASCII code for character 12

DATABASE REVISION NUMBER - DRN

CHANNEL 2, PARAMETER 8 - DRN - The DATABASE REVISION NO. This number will automatically be incremented by 1 each time the configuration of the Model 385 is changed locally.

$0000 - $7FFF (DRN = 0 to 32,767)

CONFIGURATION FILENAME - CFN

CHANNEL 2, PARAMETER 9 - Characters 1 & 2 of the configuration filename. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all the data associated with parameters 09 thru 12.

$$++ 
** = $20 to $5E ASCII code for character 1
++ = $20 to $5E ASCII code for character 2

CHANNEL 2, PARAMETER 10 - Characters 3 & 4 of the configuration filename.

$$++ 
** = $20 to $5E ASCII code for character 3
++ = $20 to $5E ASCII code for character 4

CHANNEL 2, PARAMETER 11 - Characters 5 & 6 of the configuration filename.

$$++ 
** = $20 to $5E ASCII code for character 5
++ = $20 to $5E ASCII code for character 6

CHANNEL 2, PARAMETER 12 - Characters 7 & 8 of the configuration filename.

$$++ 
** = $20 to $5E ASCII code for character 7
++ = $20 to $5E ASCII code for character 8

STATUS WORD 02 - STATION STATUS

CHANNEL 3, PARAMETER 1

BIT 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
1 -- E C3 C2 C1 -- -- T R CH X1 X2 DV FB NA AA
0 -- -- -- -- -- -- -- -- -- -- -- -- --

BIT 0: ACTIVE ALARM (AA) - This bit indicates that an active alarm exists at this station address.

"1" .............. ACTIVE ALARM
"0" .............. No Active Alarm

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BIT 1: NOT ACKNOWLEDGED (NA) - This bit indicates that an alarm has not been acknowledged at this station address.

"1" ........................ NOT ACKNOWLEDGED
"0" ........................ Acknowledged

BIT 2: FLASHING BARGRAPH (FB) - This bit indicates that the bargraph in one or more loops is flashing at this station address.

"1" ........................ FLASHING BARGRAPH
"0" ........................ No Flashing Bargraph

BIT 3: DATABASE VALID (DV) - This bit indicates that the station has a valid configuration database. This bit will be cleared to "0" when the Model 385 is put into Configuration Hold (HOLD) and the first record (08) is downloaded. It will be set to "1" by the Model 385 when all four records have been successfully downloaded.

"1" ........................ DATABASE VALID
"0" ........................ Invalid

BIT 4: (X2) .......................... The least significant bit of a 2-bit configuration change counter. The counter increments after an exit from a "LOCAL" store, a "QUICK ACCESS" store, download from Configuration Management Program, or SMART Transmitter auto-configure of 385 parameter.

BIT 5: (X1) .......................... The most significant bit of a 2-bit configuration change counter.

BIT 6: CONFIG. HOLD (CH) - This bit indicates that the station is in Configuration Hold. The station will not accept any commands except RUN. This bit should be set to "1" prior to downloading a configuration database.

"1" ........................ CONFIGURATION HOLD
"0" ........................ Not Configuration Hold

BIT 7: RUN (R) .......................... This bit indicates that the station is in the RUN mode. It should be set to "1" after a configuration database has been downloaded. If this bit is set to "1" and bit 3 is "0", the Model 385 will use the previous data.

"1" ........................ RUN
"0" ........................ Configuration Hold

BIT 8: TRENDING (T) .......................... This bit indicates that the station is trending. This bit can be set to "0" by an external device.

"1" ........................ TRENDING
"0" ........................ Not Trending

Status Word 4, Channel 6, Parameter 1 indicates which loop will trend.

BITS 9 & 10 .......................... Not Used - Set to "0"

BIT 11: CONFIG. CHANGE #1 (C1) - This bit indicates that the configuration database was changed. This bit can be reset to "0" by an external device.

"1" ........................ CONFIG. CHANGE #1
"0" ........................ Reset

BIT 12: CONFIG. CHANGE #2 (C2) - This bit indicates that the configuration database was changed. This bit can be reset to "0" by an external device.

"1" ........................ CONFIG. CHANGE #2
"0" ........................ Reset
BIT 13: CONFIG. CHANGE #3 (C3) - This bit indicates that the configuration database was changed. This bit can be reset to "0" by an external device.

*1* ................. CONFIG. CHANGE #3
*0* ................. Reset

BIT 14: ERROR (E) ------- This bit indicates that an error exists in the Model 385.

*1* ................. ERROR
*0* ................. No Error

BIT 15 ------------------- Not Used - Set to "0"

PARAMETER CHANGES - Changes can be made to status word 02 by sending a 16-bit word with a "1" ONLY in the BIT position to be changed along with a "MASK-ON" or "MASK-OFF" command. The command source to "MASK-ON" bits 6 or 7 must match the station mode (i.e. CONSOLE/COMPUTER) while a command to "MASK-OFF" bits 11, 12, 13 or 14 is not required to match the station mode.

STATION ERROR CODE - SEC
CHANNEL 4, PARAMETER 1 - The code defining an error in the Model 385. It is transmitted as a number from $0 to $12B. (See Section 2.4 for further information on error messages.)

PARAMETER CHANGES - The error code can be cleared by sending a 16-bit absolute command of $0000, provided the code represents a previous error and not a current one. The command source must match the station mode (CONSOLE/COMPUTER).

STATUS WORD 03 - FUNCTION BLOCK STATUS
CHANNEL 5, PARAMETER 1

BIT 15 4 13 12 11 10 09 08 07 06 05 04 03 02 01 00
*1* E NA CC -- -- -- -- -- -- -- -- -- -- -- -- -- --
*0* -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

BIT 0 ------------------- Not Used - Set to "0"

BIT 1: LOCAL (L) ------- This bit indicates the source of operational control for the station "S display" (i.e. the position of the C/L switch on the operator's panel). It can be changed by the operator by pushing the C/L pushbutton. A similar action can take place over the LINK. (Note: a logic "0" indicates non-local control and bits 4 & 5 indicate the exact source.)

*1* ...... LOCAL
*0* ...... Not Local

BIT 2 ------------------- Not Used - Set to "0"

BIT 3: FLASHING BARGRAPH (FB) - This bit indicates the alarm light in one or more loops is flashing.

*1* ...... FLASHING BARGRAPH
*0* ...... Not Flashing

BIT 4: CONSOLE (CN) --- This bit indicates that the source of operational control for the station "S display" is a console. This bit will always be set when the station is put into LOCAL (L). The station, therefore, will always go to CONSOLE (C) when using the C/L button on the station's operator panel.

*1* ...... CONSOLE
*0* ...... Not Console

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BIT 5: COMPUTER (CM) - This bit indicates that the source of operational control is a computer.

    *1* ........ COMPUTER
    *0* ........ Not Computer

BITS 6 & 7 ------------------Not Used - Set to *0*

BIT 8: EMERGENCY LOCAL (EL) - This bit indicates that FB98 is in Emergency Local.

    *1* ....... EMERGENCY LOCAL
    *0* ....... Not Emergency Local

BIT 9: NON-UPDATING (NU) - This bit indicates that the NU status exists. This status exists whenever one of the FB98 outputs (100-109) is not receiving its data value from the LINK. NU status also requires that the output has been selected during configuration to trigger it.

    *1* ....... NON-UPDATING
    *0* ....... Normal

BITS 10-12 ------------------Not Used - Set to *0*

BIT 13: CONFIGURATION CHANGE (CC) - This bit is set if the station's configuration is changed. It will remain set until a *MASK-OFF* command is received over the LINK. This bit is set after a power-up.

    *1* ....... CONFIGURATION CHANGE
    *0* ....... No Configuration Change

BIT 14: ERROR NOT ACKNOWLEDGED (NA) - This bit is set if the station develops an error. It will remain set until a *MASK-OFF* command is received over the LINK.

    *1* ....... ERROR NOT ACKNOWLEDGED
    *0* ....... Acknowledged

BIT 15: ERROR (E) -------This bit is set if the station develops an error. It will remain set until the error condition has cleared.

    *1* ....... ERROR
    *0* ....... No Error

PARAMETER CHANGES - All loops with flashing bargraph can be made to stop flashing by sending a $0008 along with a *MASK-OFF* command to this parameter. The command source is not required to match the station mode.

BIT 0: Changes to this bit will be ignored.
BIT 1: A *MASK-ON* will set the operational source as LOCAL (L).
BIT 2: Changes to this bit will be ignored.
BIT 3: A *MASK-OFF" to this bit will stop all flashing bargraphs.
BIT 4: A *MASK-ON* will set the operational source as CONSOLE (CN).
BIT 5: A *MASK-ON* will set the operational source as COMPUTER (CM).
BIT 6 - 12: Changes to these bits will be ignored.
BIT 13: A *MASK-OFF" will clear the Configuration Change bit.
BIT 14: A *MASK-OFF" will acknowledge the error.
BIT 15: Changes to this bit will be ignored.

XO COORDINATE - XO
CHANNEL 5, PARAMETER 16 - The X0 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X0 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) #$080 - #$F80 (X0 = 0.0 to 100.0%)

X1 COORDINATE - X1
CHANNEL 5, PARAMETER 17 - The X1 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X1 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) #$080 - #$F80 (X1 = 0.0 to 100.0%)

X2 COORDINATE - X2
CHANNEL 5, PARAMETER 18 - The X2 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X2 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) #$080 - #$F80 (X2 = 0.0 to 100.0%)

X3 COORDINATE - X3
CHANNEL 5, PARAMETER 19 - The X3 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X3 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) #$080 - #$F80 (X3 = 0.0 to 100.0%)

X4 COORDINATE - X4
CHANNEL 5, PARAMETER 20 - The X4 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X4 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) #$080 - #$F80 (X4 = 0.0 to 100.0%)

X5 COORDINATE - X5
CHANNEL 5, PARAMETER 21 - The X5 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X5 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $O80 - $F80 (X5 = 0.0 to 100.0%)

X6 COORDINATE - X6
CHANNEL 5, PARAMETER 22 - The X6 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $O80 - $F80 (X6 = 0.0 to 100.0%)

X7 COORDINATE - X7
CHANNEL 5, PARAMETER 23 - The X7 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X7 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $O80 - $F80 (X7 = 0.0 to 100.0%)

X8 COORDINATE - X8
CHANNEL 5, PARAMETER 24 - The X8 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $O80 - $F80 (X8 = 0.0 to 100.0%)

X9 COORDINATE - X9
CHANNEL 5, PARAMETER 25 - The X9 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $O80 - $F80 (X9 = 0.0 to 100.0%)

X10 COORDINATE - X10
CHANNEL 5, PARAMETER 26 - The X10 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The X10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^0\text{80} - $^F\text{80} \ (X_0 = 0.0 \text{ to } 100.0\%)

X0 COORDINATE - X0
CHANNEL 5, PARAMETER 27 - The X0 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X0 value is transmitted as follows:

1) 0.0 to 100.0% \ ($0\text{080} \text{ to } $0\text{F80})

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^0\text{80} - $^F\text{80} \ (X_0 = 0.0 \text{ to } 100.0\%)

X1 COORDINATE - X1
CHANNEL 5, PARAMETER 28 - The X1 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X1 value is transmitted as follows:

1) 0.0 to 100.0% \ ($0\text{080} \text{ to } $0\text{F80})

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^0\text{80} - $^F\text{80} \ (X_1 = 0.0 \text{ to } 100.0\%)

X2 COORDINATE - X2
CHANNEL 5, PARAMETER 29 - The X2 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X2 value is transmitted as follows:

1) 0.0 to 100.0% \ ($0\text{080} \text{ to } $0\text{F80})

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^0\text{80} - $^F\text{80} \ (X_2 = 0.0 \text{ to } 100.0\%)

X3 COORDINATE - X3
CHANNEL 5, PARAMETER 30 - The X3 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X3 value is transmitted as follows:

1) 0.0 to 100.0% \ ($0\text{080} \text{ to } $0\text{F80})

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^0\text{80} - $^F\text{80} \ (X_3 = 0.0 \text{ to } 100.0\%)

X4 COORDINATE - X4
CHANNEL 5, PARAMETER 31 - The X4 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X4 value is transmitted as follows:

1) 0.0 to 100.0% \ ($0\text{080} \text{ to } $0\text{F80})
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (X4 = 0.0 to 100.0%)

X6 COORDINATE - X6
CHANNEL 5, PARAMETER 32 - The X6 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (X5 = 0.0 to 100.0%)

X7 COORDINATE - X7
CHANNEL 5, PARAMETER 33 - The X7 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X7 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (X6 = 0.0 to 100.0%)

X8 COORDINATE - X8
CHANNEL 5, PARAMETER 34 - The X8 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (X7 = 0.0 to 100.0%)

X9 COORDINATE - X9
CHANNEL 5, PARAMETER 35 - The X9 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (X9 = 0.0 to 100.0%)

X10 COORDINATE - X10
CHANNEL 5, PARAMETER 37 - The X10 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The X10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (X10 = 0.0 to 100.0%)

X0 COORDINATE - X0
CHANNEL 5, PARAMETER 38 - The X0 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X0 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (X0 = 0.0 to 100.0%)

X1 COORDINATE - X1
CHANNEL 5, PARAMETER 39 - The X1 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X1 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (X1 = 0.0 to 100.0%)

X2 COORDINATE - X2
CHANNEL 5, PARAMETER 40 - The X2 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X2 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (X2 = 0.0 to 100.0%)

X3 COORDINATE - X3
CHANNEL 5, PARAMETER 41 - The X3 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X3 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE(COMPUTER)). Changes will be entered as follows:

1) $'080 - $'F80 (X3 = 0.0 to 100.0%)

X4 COORDINATE - X4

CHANNEL 5, PARAMETER 42 - The X4 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X4 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE(COMPUTER)). Changes will be entered as follows:

1) $'080 - $'F80 (X4 = 0.0 to 100.0%)

X5 COORDINATE - X5

CHANNEL 5, PARAMETER 43 - The X5 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X5 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE(COMPUTER)). Changes will be entered as follows:

1) $'080 - $'F80 (X5 = 0.0 to 100.0%)

X6 COORDINATE - X6

CHANNEL 5, PARAMETER 44 - The X6 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE(COMPUTER)). Changes will be entered as follows:

1) $'080 - $'F80 (X6 = 0.0 to 100.0%)

X7 COORDINATE - X7

CHANNEL 5, PARAMETER 45 - The X7 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X7 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE(COMPUTER)). Changes will be entered as follows:

1) $'080 - $'F80 (X7 = 0.0 to 100.0%)

X8 COORDINATE - X8

CHANNEL 5, PARAMETER 46 - The X8 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

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PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^080 - $^F80 (X9 = 0.0 to 100.0%)

X9 COORDINATE - X9
CHANNEL 5, PARAMETER 47 - The X9 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^080 - $^F80 (X9 = 0.0 to 100.0%)

X10 COORDINATE - X10
CHANNEL 5, PARAMETER 48 - The X10 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The X10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^080 - $^F80 (X10 = 0.0 to 100.0%)

STATUS WORD 04 - TRENDING STATUS
CHANNEL 6, PARAMETER 1 - These bits indicate which loop is selected for trending. A "1" indicates the loop is selected for trending. Only one bit may be set to "1" at any time.

<table>
<thead>
<tr>
<th>BIT</th>
<th>9</th>
<th>08</th>
<th>07</th>
<th>06</th>
<th>05</th>
<th>04</th>
<th>03</th>
<th>02</th>
<th>01</th>
<th>00</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOOP#</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

PARAMETER CHANGES - Changes to this parameter can only be made by sending a 16-bit word with a "1" ONLY in the Bit position to be changed, along with a "MASK-ON" or "MASK-OFF" command. The command source is not required to match the loop mode.

BITS 10-15:-------------------Changes to these bits will be ignored.
Bits 0-9:-----------------------A "MASK-ON" to one of these bits will cause the associated loop to be trended. A "MASK-OFF" will stop the associated loop from being trended

Note: When any bit is set to "1", Ch. 3, Parm. 1, Bit 8 is also "1".

YO COORDINATE - Y0
CHANNEL 6, PARAMETER 16 - The Y0 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y0 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $^080 - $^F80 (Y0 = 0.0 to 100.0%)
Y1 COORDINATE - Y1
CHANNEL 6, PARAMETER 17 - The Y1 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y1 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (Y1 = 0.0 to 100.0%)

Y2 COORDINATE - Y2
CHANNEL 6, PARAMETER 18 - The Y2 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y2 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (Y2 = 0.0 to 100.0%)

Y3 COORDINATE - Y3
CHANNEL 6, PARAMETER 19 - The Y3 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y3 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (Y3 = 0.0 to 100.0%)

Y4 COORDINATE - Y4
CHANNEL 6, PARAMETER 20 - The Y4 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y4 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (Y4 = 0.0 to 100.0%)

Y5 COORDINATE - Y5
CHANNEL 6, PARAMETER 21 - The Y5 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y5 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $'080 - $'F80 (Y5 = 0.0 to 100.0%)
Y6 COORDINATE - Y6
CHANNEL 6, PARAMETER 22 - The Y6 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $FD0 (Y6 = 0.0 to 100.0%)

Y7 COORDINATE - Y7
CHANNEL 6, PARAMETER 23 - The Y7 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $FD0 (Y7 = 0.0 to 100.0%)

Y8 COORDINATE - Y8
CHANNEL 6, PARAMETER 24 - The Y8 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $FD0 (Y8 = 0.0 to 100.0%)

Y9 COORDINATE - Y9
CHANNEL 6, PARAMETER 25 - The Y9 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $FD0 (Y9 = 0.0 to 100.0%)

Y10 COORDINATE - Y10
CHANNEL 6, PARAMETER 26 - The Y10 Coordinate of the 10-Segment Characterizer (FB51) with a valid range of 0.0 to 100.0%. The Y10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $FD0 (Y10 = 0.0 to 100.0%)

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Y0 COORDINATE - Y0
CHANNEL 6, PARAMETER 27 - The Y0 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y0 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y0 = 0.0 to 100.0%)

Y1 COORDINATE - Y1
CHANNEL 6, PARAMETER 28 - The Y1 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y1 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y1 = 0.0 to 100.0%)

Y2 COORDINATE - Y2
CHANNEL 6, PARAMETER 29 - The Y2 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y2 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y2 = 0.0 to 100.0%)

Y3 COORDINATE - Y3
CHANNEL 6, PARAMETER 30 - The Y3 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y3 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y3 = 0.0 to 100.0%)

Y4 COORDINATE - Y4
CHANNEL 6, PARAMETER 31 - The Y4 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y4 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y4 = 0.0 to 100.0%)

2-18
Y5 COORDINATE - Y5
CHANNEL 6, PARAMETER 32 - The Y5 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y5 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y5 = 0.0 to 100.0%)

Y6 COORDINATE - Y6
CHANNEL 6, PARAMETER 33 - The Y6 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y6 = 0.0 to 100.0%)

Y7 COORDINATE - Y7
CHANNEL 6, PARAMETER 34 - The Y7 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y7 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y7 = 0.0 to 100.0%)

Y8 COORDINATE - Y8
CHANNEL 6, PARAMETER 35 - The Y8 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y8 = 0.0 to 100.0%)

Y9 COORDINATE - Y9
CHANNEL 6, PARAMETER 36 - The Y9 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y9 = 0.0 to 100.0%)

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Y10 COORDINATE - Y10
CHANNEL 6, PARAMETER 37 - The Y10 Coordinate of the 10-Segment Characterizer (FB52) with a valid range of 0.0 to 100.0%. The Y10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y10 = 0.0 to 100.0%)

Y0 COORDINATE - Y0
CHANNEL 6, PARAMETER 38 - The Y0 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y0 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y0 = 0.0 to 100.0%)

Y1 COORDINATE - Y1
CHANNEL 6, PARAMETER 39 - The Y1 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y1 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y1 = 0.0 to 100.0%)

Y2 COORDINATE - Y2
CHANNEL 6, PARAMETER 40 - The Y2 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y2 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y2 = 0.0 to 100.0%)

Y3 COORDINATE - Y3
CHANNEL 6, PARAMETER 41 - The Y3 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y3 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y3 = 0.0 to 100.0%)

2-20
Y4 COORDINATE - Y4
CHANNEL 6, PARAMETER 42 - The Y4 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y4 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y4 = 0.0 to 100.0%)

Y5 COORDINATE - Y5
CHANNEL 6, PARAMETER 43 - The Y5 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y5 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y5 = 0.0 to 100.0%)

Y6 COORDINATE - Y6
CHANNEL 6, PARAMETER 44 - The Y6 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y6 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y6 = 0.0 to 100.0%)

Y7 COORDINATE - Y7
CHANNEL 6, PARAMETER 45 - The Y7 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y7 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y7 = 0.0 to 100.0%)

Y8 COORDINATE - Y8
CHANNEL 6, PARAMETER 46 - The Y8 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y8 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $*080 - $*F80 (Y8 = 0.0 to 100.0%)
Y9 COORDINATE - Y9
CHANNEL 6, PARAMETER 47 - The Y9 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y9 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y9 = 0.0 to 100.0%)

Y10 COORDINATE - Y10
CHANNEL 6, PARAMETER 48 - The Y10 Coordinate of the 10-Segment Characterizer (FB53) with a valid range of 0.0 to 100.0%. The Y10 value is transmitted as follows:

1) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes will be entered as follows:

1) $080 - $F80 (Y10 = 0.0 to 100.0%)

STATUS WORD 05 - BARGRAPH STATUS
CHANNEL 7, PARAMETER 1 - These bits indicate which loops have flashing bargraphs.

BIT 09 08 07 06 05 04 03 02 01 00
LOOP# 10 9 8 7 6 5 4 3 2 1

BITS 10-15:----------------Not Used - Set to "0".

PARAMETER CHANGES - The bargraph for any loop can be made to stop flashing by sending a "MASK-OFF" command to the bit for the particular loop. The command source is not required to match the station mode.

STATUS WORD 06 - VALVE BAR DIRECT
CHANNEL 7, PARAMETER 2 - These bits indicate the direction of the valve bargraph as defined in the loop display blocks.

1* ...... HVBD selected as YES
0* ...... HVBD selected as NO

BIT 09 08 07 06 05 04 03 02 01 00
LOOP# 10 9 8 7 6 5 4 3 2 1

BITS 10-15:----------------Not Used - Set to "0".

MATH BLOCK #1 - GAIN OUTPUT
CHANNEL 7, PARAMETER 16 - The Gain-Output value of FB35 with a valid range of 0.03 to 3.00. The Gain-Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)
MATH BLOCK #1 - GAIN-A OUTPUT
CHANNEL 7, PARAMETER 17 - The Gain-A Output value of FB35 with a valid range of 0.03 to 3.00. The Gain-A Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #1 - GAIN-B OUTPUT
CHANNEL 7, PARAMETER 18 - The Gain-B Output value of FB35 with a valid range of 0.03 to 3.00. The Gain-B Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #1 - GAIN-C OUTPUT
CHANNEL 7, PARAMETER 19 - The Gain-C Output value of FB35 with a valid range of 0.03 to 3.00. The Gain-C Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #1 - BIAS OUTPUT
CHANNEL 7, PARAMETER 20 - The Bias-Output value of FB35 with a valid range of 0.03 to 3.00. The Bias-Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #1 - BIAS-A OUTPUT
CHANNEL 7, PARAMETER 21 - The Bias-A Output value of FB35 with a valid range of 0.03 to 3.00. The Bias-A Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #1 - BIAS-B OUTPUT

CHANNEL 7, PARAMETER 22 - The Bias-B Output value of FB35 with a valid range of 0.03 to 3.00. The Bias-B Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #1 - BIAS-C OUTPUT

CHANNEL 7, PARAMETER 23 - The Bias-C Output value of FB35 with a valid range of 0.03 to 3.00. The Bias-C Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #2 - GAIN OUTPUT

CHANNEL 7, PARAMETER 24 - The Gain-Output value of FB36 with a valid range of 0.03 to 3.00. The Gain-Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #2 - GAIN-A OUTPUT

CHANNEL 7, PARAMETER 25 - The Gain-A Output value of FB36 with a valid range of 0.03 to 3.00. The Gain-A Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)
MATH BLOCK #2 - GAIN-B OUTPUT
CHANNEL 7, PARAMETER 26 - The Gain-B Output value of FB36 with a valid range of 0.03 to 3.00. The Gain-B Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #2 - GAIN-C OUTPUT
CHANNEL 7, PARAMETER 27 - The Gain-C Output value of FB36 with a valid range of 0.03 to 3.00. The Gain-C Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C (0.03 to 3.00)

MATH BLOCK #2 - BIAS OUTPUT
CHANNEL 7, PARAMETER 28 - The Bias-Output value of FB36 with a valid range of 0.03 to 3.00. The Bias-Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #2 - BIAS-A OUTPUT
CHANNEL 7, PARAMETER 29 - The Bias-A Output value of FB36 with a valid range of 0.03 to 3.00. The Bias-A Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C (-3.00 to 3.00)

MATH BLOCK #2 - BIAS-B OUTPUT
CHANNEL 7, PARAMETER 30 - The Bias-B Output value of FB36 with a valid range of 0.03 to 3.00. The Bias-B Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)
PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)

MATH BLOCK #2 - BIAS-C OUTPUT
CHANNEL 7, PARAMETER 31 - The Bias-C Output value of FB36 with a valid range of 0.03 to 3.00. The Bias-C Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)

MATH BLOCK #3 - GAIN OUTPUT
CHANNEL 7, PARAMETER 32 - The Gain-Output value of FB37 with a valid range of 0.03 to 3.00. The Gain-Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C  (0.03 to 3.00)

MATH BLOCK #3 - GAIN-A OUTPUT
CHANNEL 7, PARAMETER 33 - The Gain-A Output value of FB37 with a valid range of 0.03 to 3.00. The Gain-A Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C  (0.03 to 3.00)

MATH BLOCK #3 - GAIN-B OUTPUT
CHANNEL 7, PARAMETER 34 - The Gain-B Output value of FB37 with a valid range of 0.03 to 3.00. The Gain-B Output is transmitted as follows:

1) 0.03 to 3.00 ($1803 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $1803 - $192C  (0.03 to 3.00)
MATH BLOCK #3 - GAIN-C OUTPUT
CHANNEL 7, PARAMETER 35 - The Gain-C Output value of FB37 with a valid range of 0.03 to 3.00. The Gain-C Output is transmitted as follows:

1) 0.03 to 3.00 ($1603 - $192C)

MATH BLOCK #3 - BIAS OUTPUT
CHANNEL 7, PARAMETER 36 - The Bias-Output value of FB37 with a valid range of 0.03 to 3.00. The Bias-Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)

MATH BLOCK #3 - BIAS-A OUTPUT
CHANNEL 7, PARAMETER 37 - The Bias-A Output value of FB37 with a valid range of 0.03 to 3.00. The Bias-A Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)

MATH BLOCK #3 - BIAS-B OUTPUT
CHANNEL 7, PARAMETER 38 - The Bias-B Output value of FB37 with a valid range of 0.03 to 3.00. The Bias-B Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)

MATH BLOCK #3 - BIAS-C OUTPUT
CHANNEL 7, PARAMETER 39 - The Bias-C Output value of FB37 with a valid range of 0.03 to 3.00. The Bias-C Output is transmitted as follows:

1) -3.00 to 3.00 ($16D4 - $192C)

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). Changes can be made by using a 12-bit integer absolute with range bits command type. Values will be entered as follows:

1) $16D4 - $192C  (-3.00 to 3.00)
CHANNEL A
CHANNEL 8, PARAMETER 1 - The variable defined during hard configuration of FB98 by selecting a source for HINA.

OUTPUT 100 - (FB98)
CHANNEL 8, PARAMETER 16 - Retransmission of FB98 output 100. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 100. However, if the station address parameter "HA0" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 101 - (FB98)
CHANNEL 8, PARAMETER 17 - Retransmission of FB98 output 101. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 101. However, if the station address parameter "HA1" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 102 - (FB98)
CHANNEL 8, PARAMETER 18 - Retransmission of FB98 output 102. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 102. However, if the station address parameter "HA2" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.
OUTPUT 103 - (FB98)
CHANNEL 8, PARAMETER 19 - Retransmission of FB98 output 103. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 103. However, if the station address parameter "HA3" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 104 - (FB98)
CHANNEL 8, PARAMETER 20 - Retransmission of FB98 output 104. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 104. However, if the station address parameter "HA4" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 105 - (FB98)
CHANNEL 8, PARAMETER 21 - Retransmission of FB98 output 105. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 105. However, if the station address parameter "HA5" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 106 - (FB98)
CHANNEL 8, PARAMETER 22 - Retransmission of FB98 output 106. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 106. However, if the station address parameter "HA6" is set to
"0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 107 - (FB98)
CHANNEL 8, PARAMETER 23 - Retransmission of FB98 output 107. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 107. However, if the station address parameter "HA7" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 108 - (FB98)
CHANNEL 8, PARAMETER 24 - Retransmission of FB98 output 108. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 108. However, if the station address parameter "HA8" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).

16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FF -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK ON command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

OUTPUT 109 - (FB98)
CHANNEL 8, PARAMETER 25 - Retransmission of FB98 output 109. This parameter is generally configured to receive GLOBAL data from the Local Instrument Link and send it on to other function blocks in the Model 385 as outputs arrow no. 109. However, if the station address parameter "HA9" is set to "0", the value of the output arrow can be changed by using one of the following commands. The station must be in the "C" mode (i.e. command source matches station mode CONSOLE/COMPUTER).
16-bit INTEGER ABSOLUTE command - will change value as follows:

$0000 to $0FFF  -3.3% to 103.3%

MASK ON command with a "1" only in bit position 11 - will set output to 0% if not already there, then set it to 100% for approximately 1s, and finally return to 0%.

MASK OFF command with a "1" in bit position 10 - will set output to 100%.

MASK OFF command with a "1" in bit position 10 - will set output to 0%.

**STATUS WORD 07 - CHANNEL A ALARM STATUS**

**CHANNEL 9, PARAMETER 1**

<table>
<thead>
<tr>
<th>BIT</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>09</th>
<th>08</th>
<th>07</th>
<th>06</th>
<th>05</th>
<th>04</th>
<th>03</th>
<th>02</th>
<th>01</th>
<th>00</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;1&quot;</td>
<td>--</td>
<td>--</td>
<td>OS</td>
<td>E4</td>
<td>N4</td>
<td>A4</td>
<td>E3</td>
<td>N3</td>
<td>A3</td>
<td>E2</td>
<td>N2</td>
<td>A2</td>
<td>E1</td>
<td>N1</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>&quot;0&quot;</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
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<td></td>
</tr>
</tbody>
</table>

BIT 0: ALARM #1 (A1) - This bit indicates the status of CHANNEL A - LINK ALARM #1.

"1" ....... ALARM
"0" ....... No Alarm

BIT 1: NAK #1 (N1) - This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ....... NOT ACKNOWLEDGED
"0" ....... Acknowledged

BIT 2: ENABLED #1 (E1) - This bit indicates that CHANNEL A - LINK ALARM #1, has been enabled.

"1" ....... ENABLED
"0" ....... Not Enabled

BIT 3: ALARM #2 (A2) - This bit indicates the status of CHANNEL A - LINK ALARM #2.

"1" ....... ALARM
"0" ....... No Alarm

BIT 4: NAK #2 (N2) - This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ....... NOT ACKNOWLEDGED
"0" ....... Acknowledged

BIT 5: ENABLED #2 (E2) - This bit indicates that CHANNEL A - LINK ALARM #2, has been enabled.

"1" ....... ENABLED
"0" ....... Not Enabled

BIT 6: ALARM #3 (A3) - This bit indicates the status of CHANNEL A - LINK ALARM #3.

"1" ....... ALARM
"0" ....... No Alarm

BIT 7: NAK #3 (N3) - This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.
BIT 8: ENABLED #3 (E3) - This bit indicates that CHANNEL A - LINK ALARM #3, has been enabled.

*1* ...... ENABLED
*0* ...... Not Enabled

BIT 9: ALARM #4 (A4) - This bit indicates the status of CHANNEL A - LINK ALARM #4.

*1* ...... ALARM
*0* ...... No Alarm

BIT 10: NAK #4 (N4)------This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

*1* ...... NOT ACKNOWLEDGED
*0* ...... Acknowledged

BIT 11: ENABLED #4 (E4) - This bit indicates that CHANNEL A - LINK ALARM #4, has been enabled.

*1* ...... ENABLED
*0* ...... Not Enabled

BIT 12: OUT OF SERVICE (OS) - This bit indicates that all the CHANNEL A - LINK ALARMS are OUT OF SERVICE.

*1* ...... OUT OF SERVICE
*0* ...... Normal

BITS 13-15: -------------------Not Used - Set to "0".

Changes can be made to status word 07 by sending a 16-bit word with a "1" in the BIT position(s) to be changed along with a "MASK-ON" or "MASK-OFF" command. Changes can be made while the station is in LOCAL, but the command source must match the CONSOLE/COMPUTER status bits (e.g. ref. status word 03).

BIT 0: Changes to this bit will be ignored.
BIT 1: A "MASK-OFF" will ACKNOWLEDGE Alarm #1.
BIT 2: A "MASK-ON" will ENABLE Alarm #1 and a "MASK-OFF" will DISABLE it.
BIT 3: Changes to this bit will be ignored.
BIT 4: A "MASK-OFF" will ACKNOWLEDGE Alarm #2.
BIT 5: A "MASK-ON" will ENABLE Alarm #2 and a "MASK-OFF" will DISABLE it.
BIT 6: Changes to this bit will be ignored.
BIT 7: A "MASK-OFF" will ACKNOWLEDGE Alarm #3.
BIT 8: A "MASK-ON" will ENABLE Alarm #3 and a "MASK-OFF" will DISABLE it.
BIT 9: Changes to this bit will be ignored.
BIT 10: A "MASK-OFF" will ACKNOWLEDGE Alarm #4.
BIT 11: A "MASK-ON" will ENABLE Alarm #4 and a "MASK-OFF" will DISABLE it.
BIT 12: A "MASK-ON" puts all Channel A LINK ALARMS "OUT OF SERVICE" and a "MASK-OFF" puts them into normal operation.
BITS 13-15: Changes to these bits will be ignored.

INPUT A1 LIMIT
CHANNEL 9, PARAMETER 2 - The A1 alarm limit has a valid range of -3.3% to 103.3%. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 2 thru 5.

1) $0000 - $0FFF (A1 = -3.3% to 103.3%)
Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT A A2 LIMIT**
CHANNEL 9, PARAMETER 3 - The A2 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A2 = -3.3% to 103.3%)

Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT A A3 LIMIT**
CHANNEL 9, PARAMETER 4 - The A3 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A3 = -3.3% to 103.3%)

Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT A A4 LIMIT**
CHANNEL 9, PARAMETER 5 - The A4 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A4 = -3.3% to 103.3%)

Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT A A1 TYPE WORD**
CHANNEL 9, PARAMETER 6 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A1. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 6 thru 9.

Changes can be made to Alarm #1 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

**BITS:**
2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

**BITS:**
4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband
LINK INTERFACE OPTION

BITS:  7 6 5  
0 0 0 - 0.0 seconds - delay time IN  
0 0 1 - 0.4 seconds - delay time IN  
0 1 0 - 1.0 seconds - delay time IN  
0 1 1 - 2.0 seconds - delay time IN  
1 0 0 - 5.0 seconds - delay time IN  
1 0 1 - 15.0 seconds - delay time IN  
1 1 0 - 30.0 seconds - delay time IN  
1 1 1 - 60.0 seconds - delay time IN  

BITS:  10 9 8  
0 0 0 - 0.0 seconds - delay time OUT  
0 0 1 - 0.4 seconds - delay time OUT  
0 1 0 - 1.0 seconds - delay time OUT  
0 1 1 - 2.0 seconds - delay time OUT  
1 0 0 - 5.0 seconds - delay time OUT  
1 0 1 - 15.0 seconds - delay time OUT  
1 1 0 - 30.0 seconds - delay time OUT  
1 1 1 - 60.0 seconds - delay time OUT  

BIT:  11  
0 - (ring back option not required)  
1 - RING BACK!  

BITS:  12 thru 15 - changes to these bits will be ignored

INPUT A2 TYPE WORD
CHANNEL 9, PARAMETER 7 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A2. Changes can be made to Alarm #2 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

BITS:  2 1 0  
0 0 0 - no alarm action required  
0 0 1 - HIGH alarm  
0 1 0 - LOW alarm  
0 1 1 - no alarm action required  
1 0 0 - no alarm action required  
1 0 1 - no alarm action required  
1 1 0 - OUT OF RANGE alarm  
1 1 1 - no alarm action required

BITS:  4 3  
0 0 - 0.1% alarm deadband  
0 1 - 0.5% alarm deadband  
1 0 - 1.0% alarm deadband  
1 1 - 5.0% alarm deadband

BITS:  7 6 5  
0 0 0 - 0.0 seconds - delay time IN  
0 0 1 - 0.4 seconds - delay time IN  
0 1 0 - 1.0 seconds - delay time IN  
0 1 1 - 2.0 seconds - delay time IN  
1 0 0 - 5.0 seconds - delay time IN  
1 0 1 - 15.0 seconds - delay time IN  
1 1 0 - 30.0 seconds - delay time IN  
1 1 1 - 60.0 seconds - delay time IN
BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

BIT: 11
0 - (ring back option not required)
1 - RING BACK!

BITS: 12 thru 15 - changes to these bits will be ignored

INPUT A A3 TYPE WORD
CHANNEL 9, PARAMETER 8 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A3.

Changes can be made to Alarm #3 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter.
Words will be decoded as:

BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

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LINK INTERFACE OPTION

BIT: 11
0 - (ring back option not required)
1 - RING BACK!

BITS: 12 thru 15 - changes to these bits will be ignored

INPUT A A4 TYPE WORD
CHANNEL 9, PARAMETER 9 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A4.

Changes can be made to Alarm #4 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

BIT: 11
0 - (ring back option not required)
1 - RING BACK!

BITS: 12 thru 15 - changes to these bits will be ignored

CHANNEL B
CHANNEL 10, PARAMETER 1 - The variable defined during hard configuration of FB98 by selecting a source for HINB.

June 1994
SOURCE FOR FB98 OUTPUT 100
CHANNEL 10, PARAMETER 16 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 101
CHANNEL 10, PARAMETER 17 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 102
CHANNEL 10, PARAMETER 18 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 103
CHANNEL 10, PARAMETER 19 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 104
CHANNEL 10, PARAMETER 20 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 105
CHANNEL 10, PARAMETER 21 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 106
CHANNEL 10, PARAMETER 22 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 107
CHANNEL 10, PARAMETER 23 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 108
CHANNEL 10, PARAMETER 24 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

SOURCE FOR FB98 OUTPUT 109
CHANNEL 10, PARAMETER 25 - This is a 16 bit multi-discrete word that defines the source of this output. Bits 8 through 15 identify the station no. ($00** to $3F** represents stations 1 to 64) and bits 0 through 7 the channel no. ($**00 to $**FF represents channels 1 to 256).

STATUS WORD 08 - CHANNEL B ALARM STATUS
CHANNEL 11, PARAMETER 1

BIT 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
"1" -- -- -- OS E4 N4 A4 E3 N3 A3 E2 N2 A2 E1 N1 A1
"0" -- -- -- -- -- -- -- -- -- -- -- -- -- --

BIT 0: ALARM #1 (A1)------ This bit indicates the status of CHANNEL B - LINK ALARM #1.

"1"....... ALARM
"0"....... No Alarm
BIT 1: NAK #1 (N1)------- This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be
SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged

BIT 2: ENABLED #1 (E1) This bit indicates that CHANNEL B - LINK ALARM #1, has been enabled.

"1" ...... ENABLED
"0" ...... Not Enabled

BIT 3: ALARM #2 (A2)---- This bit indicates the status of CHANNEL B - LINK ALARM #2.

"1" ...... ALARM
"0" ...... No Alarm

BIT 4: NAK #2 (N2)------- This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be
SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged

BIT 5: ENABLED #2 (E2) This bit indicates that CHANNEL B - LINK ALARM #2, has been enabled.

"1" ...... ENABLED
"0" ...... Not Enabled

BIT 6: ALARM #3 (A3)---- This bit indicates the status of CHANNEL B - LINK ALARM #3.

"1" ...... ALARM
"0" ...... No Alarm

BIT 7: NAK #3 (N3)------- This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be
SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged

BIT 8: ENABLED #3 (E3) This bit indicates that CHANNEL B - LINK ALARM #3, has been enabled.

"1" ...... ENABLED
"0" ...... Not Enabled

BIT 9: ALARM #4 (A4)----This bit indicates the status of CHANNEL B - LINK ALARM #4.

"1" ...... ALARM
"0" ...... No Alarm

BIT 10: NAK #4 (N4)------ This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be
SET when the alarm goes to a no-alarm condition if RING BACK was selected in configuration. It can be RESET over the LINK.

"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged
BIT 11: ENABLED #4 (E4)- This bit indicates that CHANNEL B - LINK ALARM #4, has been enabled.

*1* ...... ENABLED
*0* ...... Not Enabled

BIT 12: OUT OF SERVICE (OS)- This bit indicates that all the CHANNEL B - LINK ALARMS are OUT OF SERVICE.

*1* ...... OUT OF SERVICE
*0* ...... Normal

BITS 13-15: Not Used - Set to "0".

Changes can be made to status word 07 by sending a 16-bit word with a "1" in the BIT position(s) to be changed along with a "*MASK-ON*" or "*MASK-OFF*" command. Changes can be made while the station is in LOCAL, but the command source must match the CONSOLE/COMPUTER status bits (e.g. ref. status word 03).

BIT 0: Changes to this bit will be ignored.
BIT 1: A "*MASK-OFF*" will ACKNOWLEDGE Alarm #1.
BIT 2: A "*MASK-ON*" will ENABLE Alarm #1 and a "*MASK-OFF*" will DISABLE it.
BIT 3: Changes to this bit will be ignored.
BIT 4: A "*MASK-OFF*" will ACKNOWLEDGE Alarm #2.
BIT 5: A "*MASK-ON*" will ENABLE Alarm #2 and a "*MASK-OFF*" will DISABLE it.
BIT 6: Changes to this bit will be ignored.
BIT 7: A "*MASK-OFF*" will ACKNOWLEDGE Alarm #3.
BIT 8: A "*MASK-ON*" will ENABLE Alarm #3 and a "*MASK-OFF*" will DISABLE it.
BIT 9: Changes to this bit will be ignored.
BIT 10: A "*MASK-OFF*" will ACKNOWLEDGE Alarm #4.
BIT 11: A "*MASK-ON*" will ENABLE Alarm #4 and a "*MASK-OFF*" will DISABLE it.
BIT 12: A "*MASK-ON*" puts all Channel B LINK ALARMS "OUT OF SERVICE" and a "*MASK-OFF*" puts them into normal operation.

BITS 13-15: Changes to these bits will be ignored.

**INPUT B A1 LIMIT**
 CHANNEL 11, PARAMETER 2 - The A1 alarm limit has a valid range of -3.3% to 103.3%. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 2 thru 5.

1) $0000 - $0FFF (A1 = -3.3% to 103.3%)

**PARAMETER CHANGES** - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT B A2 LIMIT**
 CHANNEL 11, PARAMETER 3 - The A2 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A2 = -3.3% to 103.3%)

**PARAMETER CHANGES** - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

**INPUT B A3 LIMIT**
 CHANNEL 11, PARAMETER 4 - The A3 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A3 = -3.3% to 103.3%)

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PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

INPUT B A4 LIMIT
CHANNEL 11, PARAMETER 5 - The A4 alarm limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FFF (A4 = -3.3% to 103.3%)

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)] and will be entered as:

1) *000 - *FFF (-3.3% - 103.3%)

INPUT B A1 TYPE WORD
CHANNEL 11, PARAMETER 6 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A1. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 8 thru 9.

Changes can be made to Alarm #1 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT
BIT:  
11
0  - (ring back option not required)
1  - RING BACK!

BITS:  12 thru 15 - changes to these bits will be ignored

INPUT R A2 TYPE WORD
CHANNEL 11, PARAMETER 7 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A2.

Changes can be made to Alarm #2 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

BITS:  2 1 0
0 0 0  - no alarm action required
0 0 1  - HIGH alarm
0 1 0  - LOW alarm
0 1 1  - no alarm action required
1 0 0  - no alarm action required
1 0 1  - no alarm action required
1 1 0  - OUT OF RANGE alarm
1 1 1  - no alarm action required

BITS:  4 3
0 0  - 0.1% alarm deadband
0 1  - 0.5% alarm deadband
1 0  - 1.0% alarm deadband
1 1  - 5.0% alarm deadband

BITS:  7 6 5
0 0 0  - 0.0 seconds - delay time IN
0 0 1  - 0.4 seconds - delay time IN
0 1 0  - 1.0 seconds - delay time IN
0 1 1  - 2.0 seconds - delay time IN
1 0 0  - 5.0 seconds - delay time IN
1 0 1  - 15.0 seconds - delay time IN
1 1 0  - 30.0 seconds - delay time IN
1 1 1  - 60.0 seconds - delay time IN

BITS:  10 9 8
0 0 0  - 0.0 seconds - delay time OUT
0 0 1  - 0.4 seconds - delay time OUT
0 1 0  - 1.0 seconds - delay time OUT
0 1 1  - 2.0 seconds - delay time OUT
1 0 0  - 5.0 seconds - delay time OUT
1 0 1  - 15.0 seconds - delay time OUT
1 1 0  - 30.0 seconds - delay time OUT
1 1 1  - 60.0 seconds - delay time OUT

BIT:  
11
0  - (ring back option not required)
1  - RING BACK!

BITS:  12 thru 15 - changes to these bits will be ignored

INPUT R A3 TYPE WORD
CHANNEL 11, PARAMETER 8 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A3.

Changes can be made to Alarm #3 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

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BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

BIT: 11
0 - (ring back option not required)
1 - RING BACK!

BITS: 12 thru 15 - changes to these bits will be ignored

INPUT B A4 TYPE WORD
CHANNEL 11, PARAMETER 9 - This is a 16 bit multi-discrete word that defines the operations to be performed by alarm A4.

Changes can be made to Alarm #4 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit word to this parameter. Words will be decoded as:

BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required
1 0 0 - no alarm action required
1 0 1 - no alarm action required
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required
<table>
<thead>
<tr>
<th>BITS:</th>
<th>4 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0</td>
<td>0.1% alarm deadband</td>
</tr>
<tr>
<td>0 1</td>
<td>0.5% alarm deadband</td>
</tr>
<tr>
<td>1 0</td>
<td>1.0% alarm deadband</td>
</tr>
<tr>
<td>1 1</td>
<td>5.0% alarm deadband</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BITS:</th>
<th>7 6 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0</td>
<td>0.0 seconds - delay time IN</td>
</tr>
<tr>
<td>0 0</td>
<td>0.4 seconds - delay time IN</td>
</tr>
<tr>
<td>0 0</td>
<td>1.0 seconds - delay time IN</td>
</tr>
<tr>
<td>0 1</td>
<td>2.0 seconds - delay time IN</td>
</tr>
<tr>
<td>0 0</td>
<td>5.0 seconds - delay time IN</td>
</tr>
<tr>
<td>0 1</td>
<td>15.0 seconds - delay time IN</td>
</tr>
<tr>
<td>1 0</td>
<td>30.0 seconds - delay time IN</td>
</tr>
<tr>
<td>1 1</td>
<td>60.0 seconds - delay time IN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BITS:</th>
<th>10 9 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0</td>
<td>0.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>0 0</td>
<td>0.4 seconds - delay time OUT</td>
</tr>
<tr>
<td>0 0</td>
<td>1.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>0 1</td>
<td>2.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>0 0</td>
<td>5.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>0 1</td>
<td>15.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>1 0</td>
<td>30.0 seconds - delay time OUT</td>
</tr>
<tr>
<td>1 1</td>
<td>60.0 seconds - delay time OUT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BIT:</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(ring back option not required)</td>
</tr>
<tr>
<td>1</td>
<td>RING BACK!</td>
</tr>
</tbody>
</table>

| BITS: | 12 thru 15 - changes to these bits will be ignored |

The following parameters are common for LOOP DISPLAY No. 1 through LOOP DISPLAY No. 10. Therefore, parameters are only listed once with items that change with each loop and display no. identified with a [L] (e.g. CHANNEL 5XL+7 = CHANNEL 12 FOR LOOP DISPLAY NO. 1). The Model 385 is designed to interface with the controller in the Model 340 and 344 XTC line of transmitters and the Model 348 Field Mounted Controller (FIELDPAC).

**PROCESS**

**CHANNEL [5XL+7], PARAMETER 1** - The process value has a valid range of -3.3 to 103.3%. When interfacing with a Model 348, this parameter is FB96 input H1P 'HART 1 Process' when it represents LOOP 1, or H2P 'HART 2 Process', when it represents LOOP 2.

($0000$ - $0FFF$)

**PROPORTIONAL GAIN** (Moore Products Co. w/Controller only)

**CHANNEL [5XL+7], PARAMETER 2** - The Proportional Gain for the transmitter with PID with a range of:

| a) | -9.99 to -0.01 ($\$1419$ to $\$17FF$) |
| b) | +0.01 to +9.99 ($\$1801$ to $\$1BE7$) |
| c) | -10.0 to -10.0 ($\$2418$ to $\$279C$) |
| d) | +10.0 to +100.0 ($\$2864$ to $\$2BE8$) |

**PARAMETER CHANGES** - Changes to this parameter affect the PG and A (action) of the Controller and can only be made while in the "C" mode [i.e. command source matches the loop mode (CONSOLE/COMPUTER)]. This parameter is derived from the tuning value in FB13 in a Model 348 when associated with LOOP 1 and FB45 when associated with LOOP 2. Command processing depends either on the current range (bits 12 & 13) of the range value when included in the command. It is suggested that the command include both the range and value. This will cause parameter changes that match the command. Values will be entered as follows:
CURRENT OR COMMAND RANGE - $1*** (with *** defined below)

1) $._080 - $._418 (PG = -19.20 to -10.00) will be entered as:
   $2740 - $279C (PG = -19.2 to -10.0)

2) $._BE8 - $._F80 (PG = +10.00 to +19.20) will be entered as:
   $2864 - $28C0 (PG = +10.0 to +19.2)

3) $._419 - $._7FF (PG = -9.99 to -0.01) will be entered as:
   $1419 - $17FF (PG = -9.99 to -0.01)

4) $._801 - $._BE7 (PG = +0.01 to +9.99) will be entered as:
   $1801 - $1BE7 (PG = +0.01 to +9.99)

CURRENT OR COMMAND RANGE - $2*** (with *** defined below)

1) $._418 - $._79C (PG = -100.0 to -10.0) will be entered as:
   $2418 - $279C (PG = -100.0 to -10.0)

2) $._864 - $._BE8 (PG = +10.0 to +100.0) will be entered as:
   $2864 - $2BE8 (PG = +10.0 to +100.0)

3) $._79D - $._7FF (PG = -9.9 to -0.1) will be entered as:
   $1422 - $17F6 (PG = -9.90 to -0.10)

4) $._801 - $._863 (PG = +0.1 to +9.9) will be entered as:
   $180A - $1BDE (PG = +0.10 to +9.90)

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter with PID or a Model 348. Otherwise, a value of $0000 will be returned.

INTEGRAL TIME (Moore Products Co. w/Controller only)
CHANNEL [5XL+7], PARAMETER 3 - The Integral Time for the transmitter with PID with a range of:

- a) 0.01 to 9.99 ($2081 to $2467)
- b) 10.0 to 99.9 ($10E4 to $1467)
- c) 100 to 1000 ($30E4 to $3468)

PARAMETER CHANGES - Changes to this parameter affect the TI of the Controller and can only be made while in the "C" mode (i.e. command source matches the loop mode (CONSOLE/COMPUTER)). This parameter is derived from the tuning value in FB13 in a Model 348 when associated with LOOP 1 and FB45 when associated with LOOP 2. Command processing depends either on the current range (bits 12 & 13) of the range value when included in the command. It is suggested that the command include both the range and value. This will cause parameter changes that match the command. Values will be entered as follows:

CURRENT OR COMMAND RANGE - $2*** (with *** defined below)

1) $._081 - $._467 (TI = 0.01 to 9.99) will be entered as:
   $2081 - $2467 (TI = 0.01 to 9.99)

2) $._468 - $._F80 (TI = 10.00 to 38.40) will be entered as:
   $10E4 - $1200 (TI = 10.0 to 38.4)

CURRENT OR COMMAND RANGE - $1*** (with *** defined below)

1) $._081 - $._089 (TI = -0.1 to 9.9) will be entered as:
   $208A - $20E3 (TI = 0.10 to 9.90)
2) $._E4 - $._6E7 (T1 = 10.0 to 99.9) will be entered as:
   $10E4 - $1467 (T1 = 10.0 to 99.9)

3) $._6E8 - $._F80 (T1 = 100.0 to 384.0) will be entered as:
   $30E4 - $3200 (T1 = 100 to 384)

CURRENT OR COMMAND RANGE - $3*** (with *** defined below)

1) $._081 - $._089 (T1 = 1 to 9) will be entered as:
   $20E4 - $2404 (T1 = 1.00 to 9.00)

2) $._08A - $._0E3 (T1 = 10 to 99) will be entered as:
   $10E4 - $145E (T1 = 10.0 to 99.0)

3) $._0E4 - $._6E8 (T1 = 100 to 1000) will be entered as:
   $30E4 - $3468 (T1 = 100 to 1000)

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter with PID or a Model 348. Otherwise, a value of $0000 will be returned.

**DERIVATIVE TIME** (Moore Products Co. w/Controller only)

CHANNEL [5XL+7], PARAMETER 4 - The Derivative Time for the controller with PID with a range of:

a) 0.00 to 9.99 ($2080 to $2467)
b) 10.0 to 100 ($10E4 to $1468)

**PARAMETER CHANGES** - Changes to this parameter affect the TD of the Controller and can only be made while in the "C" mode i.e. command source matches the loop mode (CONSOLE/COMPUTER). This parameter is derived from the tuning value in FB13 in a Model 348 when associated with LOOP 1 and FB45 when associated with LOOP 2. Command processing depends either on the current range (bits 12 & 13) of the range value when included in the command. It is suggested that the command include both the range and value. This will cause parameter changes that match the command. Values will be entered as follows:

CURRENT OR COMMAND RANGE - $2*** (with *** defined below)

1) $._080 - $._6E7 (TD = 0.00 to 9.99) will be entered as:
   $2080 - $2467 (TD = 0.00 to 9.99)

2) $._6E8 - $._F80 (TD = 10.00 to 384.00) will be entered as:
   $10E4 - $1200 (TD = 10.0 to 38.4)

CURRENT OR COMMAND RANGE - $1*** (with *** defined below)

1) $._080 - $._0E3 (TD = 0.0 to 9.9) will be entered as:
   $208A - $245E (TD = 0.10 to 9.90)

2) $._0E4 - $._6E8 (TD = 10.0 to 100.0) will be entered as:
   $10E4 - $1468 (TD = 10.0 to 100.0)

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter with PID. Otherwise, a value of $0000 will be returned.

**DERIVATIVE GAIN** (Moore Products Co. w/Controller only)

CHANNEL [5XL+7], PARAMETER 5 - The Derivative Gain for the controller with PID with a range of $20E4 to $2C38 representing 1.00 to 30.00.

**PARAMETER CHANGES** - Changes to this parameter affect the DG of the controller and can only be made while in the "C" mode i.e. command source matches the loop mode (CONSOLE/COMPUTER). This parameter is derived from the tuning value in FB13 in a Model 348 when associated with LOOP 1 and FB45 when associated with LOOP 2. Command processing depends either on the
current range (bits 12 & 13) of the range value when included in the command. It is suggested that the command include both the range and value. This will cause parameter changes that match the command. Values will be entered as follows:

CURRENT OR COMMAND RANGE - $2** (with ** defined below)

1) $0E4 - $C38 (DG = 1.00 to 30.00) will be entered as:
   $20E4 - $2C38 (DG = 1.00 to 30.00)

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter with PID. Otherwise, a value of $0000 will be returned.

MANUAL RESET (Moore Products Co. w/Controller only)
CHANNEL [5XL+7], PARAMETER 6 - The Manual Reset for the controller with a range of $0080 to $0F80 representing 0 to 100%.

   a) 0.0 to 100.0 ($0080 to $0F80

PARAMETER CHANGES - Changes to this parameter affect the MR of the Controller and can only be made in the "C" mode [i.e. command source matches the loop mode (CONSOLE/COMPUTER)]. This parameter is derived from the tuning value in FB13 in a Model 348 when associated with LOOP 1 and FB45 when associated with LOOP 2. Command must be 16-bit integer absolute and changes will be entered as follows:

1) $080 - $F80 (MR = 0.0% to 100.0%)  

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter with PID or a Model 348. Otherwise, a value of $0000 will be returned.

RATIO (Moore Products Co. Model 348 only)
CHANNEL [5XL+7], PARAMETER 7 - The Ratio value of FB07 in the Model 348 with a valid range of $0080 to $0C38 representing 0.00 to 30.00.

   a) 0.00 to 30.00 ($0080 to $0C38

PARAMETER CHANGES - Changes to this parameter affect the R of FB07 in the Model 348 and can only be made in the "C" mode [i.e. command source matches the loop mode (CONSOLE/COMPUTER)]. Command must be 16-bit integer absolute and changes will be entered as follows:

1) $080 - $C38 (R = 0.00 to 30.00)

BIAS (Moore Products Co. Model 348 only)
CHANNEL [5XL+7], PARAMETER 8 - The Bias value of FB08 in the Model 348 with a valid range of $0080 to $0F80 representing -100.0% -0 +100.0%.

   a) -100 to 0 to 100 ($0080 to $0B80 to $0F80

PARAMETER CHANGES - Changes to this parameter affect the B of FB08 in the Model 348 and can only be made in the "C" mode [i.e. command source matches the loop mode (CONSOLE/COMPUTER)]. Command must be 16-bit integer absolute and changes will be entered as follows:

1) $080 - $F80 (B = -100.0 to +100.0%)

PROCESS VARIABLE (Moore Products Co. only)
CHANNEL [5XL+7], PARAMETER 9 - The most significant word of the 32-bit IEEE floating point representation of the Process Variable. When interfacing with the Model 348, this parameter is FB98 input H1P 'HART 1 Process' scaled to the Engineering Units P1 in FB15 when it represents LOOP 1, or H2P 'HART 2 Process' scaled to the Engineering Units P2 in FB15, when it represents LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 9 and 10.
CHANNEL [5XL+7], PARAMETER 10 - The least significant word of the Process Variable.

These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter or a Model 348. Otherwise, a value of $0000 will be returned. These parameters are identical to channel [5XL+7], parameters 16 & 17.

PROCESS VARIABLE (Moore Products Co. only)
CHANNEL [5XL+7], PARAMETER 16 - The most significant word of the 32-bit IEEE floating point representation of the Process Variable. When interfacing with the Model 348, this parameter is FB98 input H1P 'HART 1 Process' scaled to the Engineering Units P1 in FB15 when it represents LOOP 1, or H2P 'HART 2 Process' scaled to the Engineering Units P2 in FB15, when it represents LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 16 and 17.

CHANNEL [5XL+7], PARAMETER 17 - The least significant word of the Process Variable.

These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter or Model 348. Otherwise, a value of $0000 will be returned. These parameters are identical to channel [5XL+7], parameters 9 and 10.

PROCESS VARIABLE RANGE HI (Moore Products Co. only)
CHANNEL [5XL+7], PARAMETER 18 - The most significant word of the 32-bit IEEE floating point representation of the Process Variable Range Hi. When interfacing with a Model 348, this parameter is 'SPH1' in FB15 when it represents LOOP 1, or 'SPH2' when it represents LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 18 and 19.

CHANNEL [5XL+7], PARAMETER 19 - The least significant word of the Process Variable Range Hi.

These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter or Model 348. Otherwise, a value of $0000 will be returned. These parameters represent the same parameters as channel [5XL+10], parameters 10 and 12. This format is different so as to conform to HART.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 18 with a data type of 32-bit floating point, absolute.

PROCESS VARIABLE RANGE LO (Moore Products Co. only)
CHANNEL [5XL+7], PARAMETER 20 - The most significant word of the 32-bit IEEE floating point representation of the Process Variable Range Lo. When interfacing with a Model 348, this parameter is 'SPL1' in FB15 when it represents LOOP 1, or 'SPL2' when it represents LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 20 and 21.

CHANNEL [5XL+7], PARAMETER 21 - The least significant word of the Process Variable Range Lo.

These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter or Model 348. Otherwise, a value of $0000 will be returned. These parameters represent the same parameters as channel [5XL+10], parameters 11 and 12. This format is different so as to conform to HART.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 20 with a data type of 32-bit floating point, absolute.

MEASURED VARIABLE (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 22 - The most significant word of the 32-bit IEEE floating point representation of the Measured Variable. When interfacing with a Model 348, this parameter is the measured variable as specified by 'HVC1' in FB98 for Loop 1, and 'HVC2' for Loop 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 22 and 23.

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CHANNEL [5XL+7], PARAMETER 23 - The least significant word of the Measured Variable.

MEASURED VARIABLE RANGE HI (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 24 - The most significant word of the 32-bit IEEE floating point representation of the Measured Variable Range Hi. When Interfacing with a Model 348, this parameter is the Range Hi value of the measured variable as specified by 'HVC1' in FB98 for Loop 1, and 'HVC2' for Loop 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 24 and 25.

CHANNEL [5XL+7], PARAMETER 25 - The least significant word of the Measured Variable Range Hi.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 24 with a data type of 32-bit floating point, absolute.

MEASURED VARIABLE RANGE LO (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 26 - The most significant word of the 32-bit IEEE floating point representation of the Measured Variable Range Lo. When Interfacing with a Model 348, this parameter is the Range Lo value of the measured variable as specified by 'HVC1' in FB98 for Loop 1, and 'HVC2' for Loop 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 26 and 27.

CHANNEL [5XL+7], PARAMETER 27 - The least significant word of the Measured Variable Range Lo.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 26 with a data type of 32-bit floating point, absolute.

MEASURED VARIABLE UNITS (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 28 - The numeric code for the units of the Measured Variable specified by HART, Common Tables, Rev. 5.1. When Interfacing with a Model 348, this parameter is the units of the measured variable as specified by 'HVC1' in FB98 for Loop 1, and 'HVC2' for Loop 2. The most significant byte will be set to $02. This represents Console Look-up Table #2. The least significant byte will range from $00 to $FF. This represents the number of the item in the look-up table (see Table #3).

PARAMETER CHANGES - Command must be 16-bit integer absolute with a range of $**00 to $**FF.

UPPER RANGE LIMIT (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 29 - The most significant word of the 32-bit IEEE floating point representation of the Upper Range Limit. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 29 and 30.

CHANNEL [5XL+7], PARAMETER 30 - The least significant word of the Upper Range Limit.

LOWER RANGE (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 31 - The most significant word of the 32-bit IEEE floating point representation of the Lower Range Limit. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 31 and 32.

CHANNEL [5XL+7], PARAMETER 32 - The least significant word of the Lower Range Limit.

MINIMUM SPAN (not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 33 - The most significant word of the 32-bit IEEE floating point representation of the Minimum Span. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 33 and 34.

CHANNEL [5XL+7], PARAMETER 34 - The least significant word of the Minimum Span.

DATABASE REVISION NUMBER (Moore Products Co. only)
CHANNEL [5XL+7], PARAMETER 35 - The numeric code for the Database Revision Number of the transmitter. Range of $00 to $FFFF. This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

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TAG
CHANNEL [5XL+7], PARAMETER 36 - Characters 1 and 2 of the Tag. When interfacing with a Model 348, this parameter is 'HHTN' in FB98. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 4 words will cause the 385 to respond with parameters 36 thru 39.

CHANNEL [5XL+7], PARAMETER 37 - Characters 3 and 4 of the Tag.

CHANNEL [5XL+7], PARAMETER 38 - Characters 5 and 6 of the Tag.

CHANNEL [5XL+7], PARAMETER 39 - Characters 7 and 8 of the Tag.

PROCESS VARIABLE UNITS (Moore Products Co. only/Not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+7], PARAMETER 40 - Characters 1 and 2 of the Process Variable Units. When interfacing with a Model 348, this parameter is 'HEU1' in FB15 when it represents LOOP 1 or 'HEU2' in FB15 when it represents LOOP 2. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 words will cause the 385 to respond with parameters 40 and 41.

CHANNEL [5XL+7], PARAMETER 41 - Characters 3 and 4 of the Process Variable Units.

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 40 with a data type of ASCII.

DESCRIPTOR
CHANNEL [5XL+7], PARAMETER 42 - Characters 1 and 2 of the Descriptor. When interfacing with a Model 348, this parameter is 'HDES' in FB98. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 8 words will cause the 385 to respond with parameters 42 thru 49.

CHANNEL [5XL+7], PARAMETER 43 - Characters 3 and 4 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 44 - Characters 5 and 6 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 45 - Characters 7 and 8 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 46 - Characters 9 and 10 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 47 - Characters 11 and 12 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 48 - Characters 13 and 14 of the Descriptor.

CHANNEL [5XL+7], PARAMETER 49 - Characters 15 and 16 of the Descriptor.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 8 words should be sent to parameter 42 with a data type of ASCII.

DATE - MONTH
CHANNEL [5XL+7], PARAMETER 50 - The numeric code for the Month. When interfacing with a Model 348, this parameter represents the month associated with 'HDAT' in FB98. The most significant byte will be set to $05. This represents Console Look-up Table #5. The least significant byte will range from $01 to $0C.
$0501 - JAN
$0502 - FEB
$0503 - MAR
$0504 - APR
$0505 - MAY
$0506 - JUN
$0507 - JUL
$0508 - AUG
$0509 - SEP
$050A - OCT
$050B - NOV
$050C - DEC

PARAMETER CHANGES - Command must be 16-bit integer absolute with a range of $**01 to $**0C.

DATE - DAY
CHANNEL [SXL+7], PARAMETER 51 - The numeric code for the Day with a range of $0001 to $001F. When interfacing with a Model 348, this parameter represents the day associated with 'HDAT' in FB98.

PARAMETER CHANGES - Command must be 16-bit integer absolute with a range of $**01 to $**1F.

DATE - YEAR
CHANNEL [SXL+7], PARAMETER 52 - The numeric code for the Year with a range of $0000 to $0063. When interfacing with a Model 348, this parameter represents the year associated with 'HDAT' in FB98.

PARAMETER CHANGES - Command must be 16-bit integer absolute with a range of $**00 to $**63.

DEVICE S/N
CHANNEL [SXL+7], PARAMETER 53 - The most significant word of the 32-bit integer representation of the Device Serial Number. When interfacing with a Model 348, this parameter is 'HDSN' in FB98. The most significant byte will be set to $00 since the Device Serial Number is only a 24-bit quantity. A MULTI-BYTE PARAMETER REQUEST sent to this with a length of 2 data words parameter will cause the 385 to respond with both parameters 53 and 54.

CHANNEL [SXL+7], PARAMETER 54 - The least significant word of the Device Serial Number.

PARAMETER CHANGES - Command must be 32-bit integer absolute with a range of $**00 0000 to $**FF FFFF.

CURRENT OUTPUT (not available with the Model 348)
CHANNEL [SXL+7], PARAMETER 55 - The most significant word of the 32-bit IEEE floating point representation of the Current Output.

CHANNEL [SXL+7], PARAMETER 56 - The least significant word of the Current Output.

PERCENT OF RANGE (not available with the Model 348)
CHANNEL [SXL+7], PARAMETER 57 - The most significant word of the 32-bit IEEE floating point representation of the Percent of Range of the Primary Variable.

CHANNEL [SXL+7], PARAMETER 58 - The least significant word of the Percent of Range of the Primary Variable.

SECONDARY VARIABLE (Moore Products Co. Models 341 and 348 only)
CHANNEL [SXL+7], PARAMETER 60 - The most significant word of the 32-bit IEEE floating point representation of the secondary variable. When communicating with the Model 348, the secondary variable is specified by parameter HVC2 in FB98 of the 348.

CHANNEL [SXL+7], PARAMETER 61 - The least significant word of the secondary variable.

SECONDARY VARIABLE UNITS (Moore Products Co. Models 341 and 348 only)
CHANNEL [SXL+7], PARAMETER 62 - The numeric code for the units of the Secondary Variable specified by HART, Common Tables, Rev. 5.1. The most significant byte will be set to $02. This represents Console Look-up Table #2. The least significant byte will range from $00 to $FF. This
represents the number of the item in the look-up table (see Table #3). When communicating
with the Model 348, the secondary variable is specified by parameter HVC2 in FB98 of the 348.

**SETPOINT** (Moore Products Co. w/Controller only)
CHANNEL [5XL+8], PARAMETER 1 - The Setpoint of the controller transmitted as follows:

a) -3.3 to 103.3% ($0000 to $0FFF)

This parameter valid only if the LOOP is configured for a Moore Products Co. controller. When
interfacing with the Model 348, this parameter is FB98 input H1S 'HART 1 Setpoint' when it
represents LOOP 1, or H2S 'HART 2 Setpoint', when it represents LOOP 2. Otherwise, a
value of $0000 will be returned.

**PARAMETER CHANGES** - Changes to this parameter affect the SETPOINT of the loop display block (in the model 348
setpoint changes are made to FB17 when associated with LOOP 1 and FB46 when associated
with LOOP 2) and can only be made in the "C" mode [i.e. command source matches the loop
mode (CONSOLE/COMPUTER)] and provided the setpoint is not tracking. Changes can either
be relative or absolute.

**ABSOLUTE**
1) $F000 - $FFFF (S1 = -3.3% to +103.3%)

**RELATIVE**
1) $F000 - $F7FF (dS1 = 0.0% to +50.0%)
2) $F800 - $FFF (dS1 = -50.0% to 1 bit)

**TARGET SETPOINT - TSP** (Moore Products Co. w/Controller only)
CHANNEL [5XL+8], PARAMETER 2 - The Target Setpoint with a valid range of -3.3% to 103.3%. The TSP is transmitted as
follows:

a) -3.3 to 103.3% ($0000 to $0FFF)

**PARAMETER CHANGES** - Changes to this parameter affect the TSP and can only be made if the loop is not in local or
emergency local and the command source matches the loop mode (CONSOLE/COMPUTER)
and if the station is not already ramping the setpoint for loop "L". In the Model 348 this
parameter resides in FB17 for LOOP 1 and FB46 for LOOP 2. Changes will be entered as
follows:

1) $F000 - $FFF (TSP = 3.3% to 103.3%)

**RAMP TIME - RT** (Moore Products Co. w/Controller only)
CHANNEL [5XL+8], PARAMETER 3 - The Setpoint Ramp Time with a valid range of 0 TO 3840 min. The RT is transmitted
as follows:

a) 0 to 3840 ($0080 to $0F80)

**PARAMETER CHANGES** - Changes to this parameter affect the RT and can only be made if the loop is not in local or
emergency local and the command source matches the loop mode (CONSOLE/COMPUTER)
and if the station is not already ramping the setpoint for loop "L". In the Model 348 this
parameter resides in FB17 for LOOP 1 and FB46 for LOOP 2. Changes will be entered as
follows:

1) $F080 - $F80 (RT = 0 to 3840)

**HI-LIMIT SETPOINT** (Model 348 only)
CHANNEL [5XL+8], PARAMETER 4 - The Hi-Limit Setting 'HS1' for FB09 in the Model 348 when this parameter is
associated with LOOP 1 and 'HS2' for FB51 when associated with LOOP 2. It has a valid range
of -3.3 to 103.3% and changes can be entered as follows:

a) -3.3 to 103.3% ($0000 to $0FFF)

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PARAMETER CHANGES - Changes will be entered as follows:

1) $000 - $FFF (HS_ = -3.3 to 103.3%)

LO-LIMIT SETPOINT (Model 348 only)
CHANNEL [5XL+8], PARAMETER 5 - The Lo-Limit Setting 'LS1' for FB09 in the Model 348 when this parameter is associated with LOOP 1 and 'LS2' for FB51 when associated with LOOP 2. It has a valid range of -3.3 to 103.3% and changes can be entered as follows:

a) -3.3 to 103.3% ($0000 to #0FFF)

PARAMETER CHANGES - Changes will be entered as follows:

1) $000 - $FFF (LS_ = -3.3 to 103.3%)

RAMP RATE - RR (Moore Products Co. w/Controller only)
CHANNEL [5XL+8], PARAMETER 6 - The Ramp Rate set in % per minute for setpoint with a valid range of 0.0 to 100.0%.
The RR is transmitted as follows:

a) 0.0 to 100.0% ($0080 to $0F80)

PARAMETER CHANGES - Changes to this parameter affect the RR and can only be made if the loop is not in local or emergency local and the command source matches the loop mode (CONSOLE/COMPUTER) and if the station is not already ramping the setpoint for loop "L". In the Model 348 this parameter resides in FB17 for LOOP 1 and FB46 for LOOP 2. Changes will be entered as follows:

1) $080 - $F80 (RR = 0.0% to 100.0%)

SETPOINT (Moore Products Co. w/Controller only)
CHANNEL [5XL+8], PARAMETER 9 - The most significant word of the 32-bit IEEE floating point representation of the Setpoint. When interfacing with the Model 348, this is FB98 input H1S 'HART 1 Setpoint' scaled to the Engineering Units P1 in FB15 when this parameter represents LOOP 1, or H2S 'HART 2 Setpoint' scaled to the Engineering Units P2 in FB15, when it represents LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 9 and 10.

CHANNEL [5XL+8], PARAMETER 10 - The least significant word of the Setpoint. These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter with PID or a Model 348. Otherwise, a value of $0000 will be returned.

DAMPING
CHANNEL [5XL+8], PARAMETER 16 - The most significant word of the 32-bit IEEE floating point representation of the Damping. When interfacing with a Model 348, this parameter is the Damping of the Primary Variable as specified by 'HVC1' in FB98. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 16 and 17.

CHANNEL [5XL+8], PARAMETER 17 - The least significant word of the Damping.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 2 words should be sent to parameter 16 with a data type of 32-bit floating point, absolute.

HART STATUS WORD
CHANNEL [5XL+8], PARAMETER 18 - This status word will not be found in HART Smart Transmitters in this format. It has been created to concisely represent several pieces of information in a format consistent with Moore Products Co. LIL products.
BIT 0: Primary variable out of limits.
BIT 1: Non-primary variable out of limits
BIT 2: Output saturated
BIT 3: Output in fixed current mode - (not available with the Model 348)
BIT 4: (Reserved for future use)
BIT 5: Cold start
BIT 6: Configuration change
BIT 7: Error
BIT 8: Transmitter not communicating
BIT 9: (Reserved for future use)
BIT 10: Square root enabled - (not available with the Model 348)
BIT 11: Not used, set to 0
BIT 12: Smart transmitter attached
BITS 13-15: Not used, set to 0

PARAMETER CHANGES - Changes can be made to bit 10 if the loop is not in local or emergency local and the command source matches the station mode (CONSOLE/COMPUTER). The Square Root Extractor for Loop L can be enabled or disabled by sending a $0400 along with a "MASK-ON" or "MASK-OFF" command to this parameter.

BITS 0-9: Changes to these bits will be ignored.
BIT 10: A "MASK-ON" will ENABLE the Square Root Extractor and a "MASK-OFF" will DISABLE it.
BITS 11-15: Changes to these bits will be ignored.

MOORE PRODUCTS STATUS WORD (Moore Products Co. only)
CHANNEL [5XL+8], PARAMETER 19 - This status word will not be found in Moore Products Co. Smart Transmitters in this format. It has been created to concisely represent several pieces of information in a format consistent with Moore Products Co. LIL products.

BIT 0: Auto re-range enabled - (not available with the Model 348)
BIT 1: Local pushbuttons enabled - (not available with the Model 348)
BIT 2: Write protect enabled - (available with the Model 348)
BIT 3: Indicates if the XTC or Model 348 is in configuration hold.
BIT 4: (Model 348 Only) - This bit indicates if this Loop in the Model 385 is physically connected to the Model 348.

"1" Logical Connection
"0" Physical Connection

BITS 5-15: Not used, set to 0

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

PARAMETER CHANGES - Changes can be made to this status word if the station is not in local or emergency local by sending a 16-bit word with a "1" ONLY in the bit position to be changed along with a "MASK-ON" or "MASK-OFF" command. The command source must match the station mode (CONSOLE/COMPUTER).

BIT 0: A "MASK-ON" will ENABLE Auto Re-Range and a "MASK-OFF" will DISABLE it.
BIT 1: Changes to this bit will be ignored.
BIT 2: A "MASK-ON" will ENABLE Write Protection and a "MASK-OFF" will DISABLE it.
BITS 3-15: Changes to these bits will be ignored.

ERROR (Moore Products Co. only)
CHANNEL [5XL+8], PARAMETER 20 - The numeric code of the transmitter. The most significant byte will be set to $00. This represents Console Lock-up Table #0. The least significant byte will range from $00 to $06. This represents the number of the item in the look-up table.

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$0000 - No Errors
$0001 - Comm Error
$0002 - ROM Error
$0003 - RAM Error
$0004 - EEPROM Error
$0005 - Watchdog Error
$0006 - Sensor Error

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter or a Model 348. Otherwise, a value of $0000 will be returned.

**SUPPLIER**

CHANNEL [5XL+8], PARAMETER 21 - The numeric code of the Supplier as specified by HART, Common Tables, Rev. 4 (D8700051). The most significant byte will be set to $01. This represents Console Look-up Table #1. The least significant byte will range from $00 to $FF. This represents the number of the item in the look-up table (see Table #2).

**TRANSMITTER TYPE**

CHANNEL [5XL+8], PARAMETER 22 - The numeric code for the Transmitter Type. For Moore Products Co. SMART Transmitters, the most significant byte will be set to $03, representing Console Look-up Table #3, and the least significant byte will range from $00 to $FF. Moore Products Co. Transmitter types are represented as follows:

- $0301 - Pressure
- $0302 - Pressure - PID
- $0303 - Temperature
- $0304 - Temperature - PID
- $0305 - Mag Flow
- $0306 - Mag Flow - PID
- $0307 - Fluidic Flow
- $0308 - Fluidic Flow - PID
- $0309 - Mass Flow
- $030A - Mass Flow - PID
- $030B - Model 348 FIELDPAAC Loop #1
- $030C - Model 348 FIELDPAAC Loop #2

Refer to manufacturer's device type for non-Moore Products Co. Transmitters.

**SENSOR SERIAL NUMBER**

CHANNEL [5XL+8], PARAMETER 23 - The most significant word of the 32-bit integer representation of the Sensor Serial Number (also known as Device ID). The most significant byte will be set to $00 since the Sensor Serial Number is only a 24-bit quantity. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 23 and 24.

CHANNEL [5XL+8], PARAMETER 24 - The least significant word of the Sensor Serial Number.

**MODEL NUMBER** (Moore Products Co. only)

CHANNEL [5XL+8], PARAMETER 25 - Characters 1 and 2 of the Model Number. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 8 words will cause the 385 to respond with parameters 25 thru 32.

CHANNEL [5XL+8], PARAMETER 26 - Characters 3 and 4 of the Model Number.

CHANNEL [5XL+8], PARAMETER 27 - Characters 5 and 6 of the Model Number.

CHANNEL [5XL+8], PARAMETER 28 - Characters 7 and 8 of the Model Number.

CHANNEL [5XL+8], PARAMETER 29 - Characters 9 and 10 of the Model Number.
CHANNEL [5XL+8], PARAMETER 30 - Characters 11 and 12 of the Model Number.

CHANNEL [5XL+8], PARAMETER 31 - Characters 13 and 14 of the Model Number.

CHANNEL [5XL+8], PARAMETER 32 - Characters 15 and 16 of the Model Number.

These parameters are valid only if the LOOP is configured for a Moore Products Co. transmitter or a Model 348. Otherwise, a value of $0000 will be returned.

SOFTWARE REVISION NUMBER (Moore Products Co. only)
CHANNEL [5XL+8], PARAMETER 33 - The numeric code for the Software Revision of the transmitter. Range of 0 to 65535 ($0000-$FFFF).

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

TRANSMITTER INPUT TYPE (Moore Products Co. Temp Transmitter only) - (not available with the Model 348)
CHANNEL [5XL+8], PARAMETER 34 - The numeric code of the Moore Products Co. Temperature Transmitter Input Type. The most significant byte will be set to $07. This represents Console Look-up Table #07. The least significant byte will range from $00 to $1F. This represents the number of the item in the look-up table.

Input type code as defined in the following chart:

$00 - Narrow Millivolt  $10 - Narrow Ohm
$01 - R Thermocouple  $11 - DIN 100
$02 - S Thermocouple  $12 - US 100
$03 - T Thermocouple  $13 - unused
$04 - B Thermocouple  $14 - unused
$05 - unused  $15 - unused
$06 - unused  $16 - unused
$07 - unused  $17 - unused
$08 - Wide Millivolt  $18 - Wide Ohm
$09 - J Thermocouple  $19 - DIN 200
$0A - K Thermocouple  $1A - DIN 500
$0B - E Thermocouple  $1B - US 200
$0C - N Thermocouple  $1C - US 500
$0D - unused  $1D - unused
$0E - unused  $1E - unused
$0F - unused  $1F - unused

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

MESSAGE
CHANNEL [5XL+8], PARAMETER 35 - Characters 1 and 2 of the Message. When interfacing with a Model 348, this associated with parameter 'HMSG' in FB98. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 8 words will cause the 385 to respond with parameters 35 thru 42.

CHANNEL [5XL+8], PARAMETER 36 - Characters 3 and 4 of the Message.

CHANNEL [5XL+8], PARAMETER 37 - Characters 5 and 6 of the Message.

CHANNEL [5XL+8], PARAMETER 38 - Characters 7 and 8 of the Message.

CHANNEL [5XL+8], PARAMETER 39 - Characters 9 and 10 of the Message.

CHANNEL [5XL+8], PARAMETER 40 - Characters 11 and 12 of the Message.

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CHANNEL [5XL+8], PARAMETER 41 - Characters 13 and 14 of the Message.

CHANNEL [5XL+8], PARAMETER 42 - Characters 15 and 16 of the Message.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 8 words should be sent to parameter 35 with a data type of ASCII. The 385, in turn, will combine this new data with the data previously held in parameters 43 thru 50 and write a complete Message of 32 bytes to the Smart Transmitter.

CHANNEL [5XL+8], PARAMETER 43 - Characters 17 and 18 of the Message. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 8 words will cause the 385 to respond with parameters 43 thru 50.

CHANNEL [5XL+8], PARAMETER 44 - Characters 19 and 20 of the Message.

CHANNEL [5XL+8], PARAMETER 45 - Characters 21 and 22 of the Message.

CHANNEL [5XL+8], PARAMETER 46 - Characters 23 and 24 of the Message.

CHANNEL [5XL+8], PARAMETER 47 - Characters 25 and 26 of the Message.

CHANNEL [5XL+8], PARAMETER 48 - Characters 27 and 28 of the Message.

CHANNEL [5XL+8], PARAMETER 49 - Characters 29 and 30 of the Message.

CHANNEL [5XL+8], PARAMETER 50 - Characters 31 and 32 of the Message.

PARAMETER CHANGES - A PARAMETER DATA SEND command of 8 words should be sent to parameter 43 with a data type of ASCII. The 385 in turn will combine this new data with the data previously held in parameters 35 thru 42 and write a complete Message of 32 bytes to the Smart Transmitter.

FAILSAFE LEVEL (Moore Products Co. only) - (not available with the Model 348)
CHANNEL [5XL+8], PARAMETER 51 - The numeric code representing the Failsafe Level. The most significant byte will be set to $06. This represents Console Look-up Table #6. The least significant byte will range from $00 to $03. This represents the number of the item in the look-up table.

$0600 - Not Valid
$0601 - Hi
$0602 - LO
$0603 - LAST

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

BURNOUT DIRECTION (Moore Products Co. Temp Transmitter and Model 348 only)
CHANNEL [5XL+8], PARAMETER 52 - The numeric code representing the Burnout Direction. The most significant byte will be set to $04. This represents Console Look-up Table #4. The least significant byte will range from $00 to $03. This represents the number of the item in the look-up table. When interfacing with a Model 348, this parameter is valid when FB82 is associated with HVC1 in FB98 of the 348 for Loop 1, and HVC2 for Loop 2.

$0400 - Not Valid
$0401 - Upscale
$0402 - Downscale

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter. Otherwise, a value of $0000 will be returned.

MISC. STATUS (Moore Products Co. w/Controller only) - (not available with the Model 348)
CHANNEL [5XL+8], PARAMETER 53 - BIT 7: Controller Enabled

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ZERO DROP OUT (Model 341 only)
CHANNEL [5XL+8], PARAMETER 54 - The most significant word of the 32-bit IEEE floating point representation in percent of the zero drop out of the percent of configured span of the measured variable.

CHANNEL [5XL+8], PARAMETER 55 - The least significant word of the zero drop out.

PARAMETER CHANGES - Changes to this parameter affect the zero drop out and can only be made in the "C" mode (Command source matches the loop mode CONSOLE/COMPUTER). Command must be 32-bit IEEE and changes will be entered as follows:

\[ a) \ 0 \text{ to } 30\% \ (0\% \text{ to } 30\%) \]

TERTIARY VARIABLE (Moore Products Co. Models 341 and 348 only)
CHANNEL [5XL+8], PARAMETER 60 - The most significant word of the 32-bit IEEE floating point representation of the Tertiary variable. When communicating with the Model 348, the tertiary variable is specified by parameter HVC3 in FB98 of the 348.

CHANNEL [5XL+8], PARAMETER 61 - The least significant word of the Tertiary variable.

TERTIARY VARIABLE UNITS (Moore Products Co. Models 341 and 348 only)
CHANNEL [5XL+8], PARAMETER 62 - The numeric code for the units of the Tertiary Variable specified by HART, Common Tables, Rev. 5.1. The most significant byte will be set to $02. This represents Console Look-up Table #2. The least significant byte will range from $00 to $FF. This represents the number of the item in the look-up table (see Table #3). When communicating with the Model 348, the tertiary variable is specified by parameter HVC3 in FB98 of the 348.

VALVE (Moore Products Co. w/Controller only)
CHANNEL [5XL+9], PARAMETER 1 - The Valve of the transmitter with PID with a valid range of -1.0 to 103.3%. When interfacing with a Model 348 this parameter is FB98 input H1V 'HART 1 Valve' when it represents LOOP 1, or H2V 'HART 2 Valve', when it represents LOOP 2 and is transmitted as follows:

\[ a) \ -1.0 \text{ to } 103.3\% \ ($005A \text{ to } $0FFF) \]

This parameter is valid only if the LOOP is configured for a Moore Products Co. transmitter or a Model 348. Otherwise, a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter affect the MANUAL of the loop display block (in the model 348 changes are made to FB14 when associated with LOOP 1 and FB55 when associated with LOOP 2) and can only be made in the "C" mode [i.e. command source matches the loop mode (CONSOLE/COMPUTER)] provided the transmitter-controller is not in a tracking mode (i.e. AUTO or STANDBY SYNC for the 348).

ABSOLUTE
1) $05A - $FFF (S1 = -.1\% to +103.3\%)

RELATIVE
1) $000 - $7FF (dS1 = 0.0\% to +50.0\%)
2) $800 - $FFF (dS1 = -50.0\% to 1 bit)

CHANNEL [5XL+9], PARAMETER 9 - The most significant word of the 32-bit IEEE floating point representation of the Valve. In the Model 348, this is FB98 inputs H1V 'HART 1 Valve' when this parameter represents LOOP 1, or H2V 'HART 2 Valve', when it represents LOOP 2 A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 9 and 10.

CHANNEL [5XL+9], PARAMETER 10 - The least significant word of the Valve.

These parameters are valid only if the LOOP is configured for a Moore Products Co. Transmitter with PID or a Model 348. Otherwise, a value of $0000 will be returned.
VARIABLE 'X' (Model 348 only)
CHANNEL [5XL+9], PARAMETER 16 - The most significant word of the 32-bit IEEE floating point representation of the Variable X in the Model 348. This parameter is input 'INX' of FB15 scaled to the Engineering Units X. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 16 and 17.

CHANNEL [5XL+9], PARAMETER 17 - The least significant word of Variable X.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'X' RANGE HI (Model 348 only)
CHANNEL [5XL+9], PARAMETER 18 - The most significant word of the 32-bit IEEE floating point representation of the Variable X Range Hi in the Model 348. This is parameter 'SXH' of FB15. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 18 and 19.

CHANNEL [5XL+9], PARAMETER 19 - The least significant word of Variable X Range Hi.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'X' RANGE LO (Model 348 only)
CHANNEL [5XL+9], PARAMETER 20 - The most significant word of the 32-bit IEEE floating point representation of the Variable X Range Lo in the Model 348. This is parameter 'SXL' of FB15. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 20 and 21.

CHANNEL [5XL+9], PARAMETER 21 - The least significant word of Variable X Range Lo.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'D' (Model 348 only)
CHANNEL [5XL+9], PARAMETER 28 - The most significant word of the 32-bit IEEE floating point representation of input 'IND' to the HART Interface function block FB98 in the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 28 and 29.

CHANNEL [5XL+9], PARAMETER 29 - The least significant word of Variable D.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'E' (Model 348 only)
CHANNEL [5XL+9], PARAMETER 30 - The most significant word of the 32-bit IEEE floating point representation of input 'INE' to the HART Interface function block FB98 in the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 30 and 31.

CHANNEL [5XL+9], PARAMETER 31 - The least significant word of Variable E.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.
VARIABLE 'F' (Model 348 only)
CHANNEL [5XL+9], PARAMETER 32 - The most significant word of the 32-bit IEEE floating point representation of input 'IF' to the HART Interface function block FB98 in the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 32 and 33.

CHANNEL [5XL+9], PARAMETER 33 - The least significant word of Variable F.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'G' (Model 348 only)
CHANNEL [5XL+9], PARAMETER 34 - The most significant word of the 32-bit IEEE floating point representation of input 'IGN' to the HART Interface function block FB98 in the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 34 and 35.

CHANNEL [5XL+9], PARAMETER 35 - The least significant word of Variable G.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

LOOP STATUS (Moore Products Co. w/Controller only)
CHANNEL [5XL+10], PARAMETER 1

BIT 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
*1* CA CE CL OS LL HL CH EM OR RS CM CN E SS L A
*0* -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

BIT 0: AUTO/MANUAL (A/M) - This bit indicates the Auto/Manual operating mode of the Transmitter or the Model 348. It can be changed by the operator by pushing the A/M button. A similar action can take place over the LINK if the station is in the "C" operating mode.

*1* ...... AUTOMATIC
*0* ...... Manual

BIT 1: LOCAL (L)----------This bit indicates the source of operational control (i.e. the position of the C/L switch on the operator's panel). It can be changed by the operator by pushing the C/L button. A similar action can take place over the LINK. (Note: a logic "0" indicates non-local control and bits 4 and 5 will indicate the exact source.)

*1* ...... LOCAL
*0* ...... Not Local

BIT 2: STANDBY SYNC (SS) - (Model 348 only) - This bit indicates that the Auto/Manual block (FB14 in the Model 348 if this status word represents LOOP 1 or FB55 in the Model 348 if this status word represents LOOP 2.) is in standby sync.

BIT 3: EXTERNAL/INTERNAL - This bit indicates if the loop is configured for internal or external setpoint. If configured for internal, the setpoint can be changed by the operator from the front panel provided that the setpoint block in the XTC is not in a tracking mode. A similar action can take place over the LINK if the station has an operating interface and the station is in the "C" mode.

If the setpoint is configured for external, then the setpoint will be the loop display block input. No changes can be made over the LINK.

When interfacing with the Model 348, which can have its own E/I function, this bit will reflect the status of any pushbutton in the Model 348 configured as L1EI when it represents LOOP 1 and L2EI when it represents LOOP 2. E/I configuration is specified in parameters 'HP1F' and 'HP2F' of FB98.

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BIT 4: CONSOLE (CN) -- This bit indicates that the source of operational control is a console. This bit will always be set when the 385 (or 348) is put into LOCAL (L). The station, therefore, will always go to CONSOLE (C0 when using the C/L button on the station's operator panel).

"1" ...... CONSOLE
"0" ...... Not Console

BIT 5: COMPUTER (CM)- This bit indicates that the source of operational control is a computer.

"1" ...... COMPUTER
"0" ...... Not Computer

BIT 6: RAMPING SETPOINT-- This bit indicates that the loop display block (FB17 in the model 348 if this status word is associated with LOOP 1 or FB48 in the model 348 if this status word is associated with LOOP 2) is ramping the setpoint.

"1" ...... RAMPING SETPOINT
"0" ...... Not Ramping

BIT 7: OVERRIDE (OR)- (Model 348 only) - This bit indicates that the output of FB10 in the Model 348 is not Input A. (i.e. input A is overridden by input B or C)

"1" ...... OVERRIDE
"0" ...... No Override

BIT 8: EMERGENCY MANUAL (EM)- (Model 348 only) - This bit indicates that the Auto/Manual block (FB14 in the model 348 if this status word is associated with LOOP 1 or FB55 in the model 348 if this status word is associated with LOOP 2) is in emergency manual.

"1" ...... EMERGENCY MANUAL
"0" ...... Not Emergency Manual

BIT 9: CONFIG. HOLD (CH)- This bit indicates that the station or the model 348 Field Mounted Controller is in Configuration Hold. The station will not accept commands except for RUN when in this mode.

"1" ...... CONFIGURATION HOLD
"0" ...... Not Configuration Hold

BIT 10: HI SP LIMIT (HL)- (Model 348 Only) - This bit indicates the status of FB09 in the Model 348 when associated with LOOP 1, and FB51 when associated with LOOP 2.

"1" ...... HI LIMIT
"0" ...... No Hi Limit

BIT 11: LO SP LIMIT (LL)- (Model 348 Only) - This bit indicates the status of FB09 in the Model 348 when associated with LOOP 1, and FB51 when associated with LOOP 2.

"1" ...... LO LIMIT
"0" ...... No Lo Limit

BIT 12: OUT OF SERVICE (OS)- This bit indicates that all the alarms in this loop (FB12 in the model 348 when this status word is associated with LOOP 1 and FB73 when associated with LOOP 2) are OUT OF SERVICE.

"1" ...... OUT OF SERVICE
"0" ...... Normal

BIT 13: CONFIGURED LOOP (CL)- This bit indicates if the loop display block is configured for an XTC
w/Controller and the controller in the XTC is configured or configured for a model 348 LOOP 1 or LOOP 2.

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*1* ...... CONFIGURED LOOP
*0* ...... Loop Not Configured

BIT 14: CONFIGURED EXTERNAL SETPOINT (CE) (not valid for Model 348) - This bit indicates if the loop is configured for external setpoint.

*1* ...... CONFIGURED
*0* ...... Not Configured

BIT 15: CONFIGURED A/M BLOCK - This bit indicates if the loop display block is configured for an XTC w/Controller and the controller in the XTC is configured or if FB14 is configured when it represents LOOP 1 of a Model 348 or FB55 when it represents LOOP 2.

Changes can only be made to status word by sending a 16-bit word with a "1" ONLY in the BIT position to be changed along with a "MASK-ON" or "MASK-OFF" command. The command source to change BITS 1, 4 or 5 should be identified as ANYSOURCE while for BITS 0, 3, 6 or 12 it must match the loop mode (i.e. CONSOLE/COMPUTER).

BIT 0: A "MASK-ON" will put the A/M switch in "A" and a "MASK-OFF" will put it in "M".

BIT 1: A "MASK-ON" will set the operational control source as LOCAL (L). When a 348 is using the C/L function, this will set the model the model 385 to LOCAL. A "MASK-OFF" will set the operational control source to 'C' Mode. When a 348 is using the C/L function, this will set the model 348 and the model 385 to 'C'.

BIT 2: Changes to this bit will be ignored.

BIT 3: A "MASK-ON" will put the E/I switch in 'E' and a "MASK-OFF" will put it in "I".

BIT 4: A "MASK-ON" will set the operational control source as CONSOLE (C).

BIT 5: A "MASK-ON" will set the operational control source as COMPUTER (C).

BIT 6: A "MASK-ON" will put the setpoint into a ramping mode and a "MASK-OFF" will take it out of this mode.

BITS 7-11: Changes to these bits will be ignored.

BIT 12: A "MASK-ON" puts all Loop L Alarms "OUT OF SERVICE" and a "MASK-OFF" puts them into normal operation.

BITS 13-15: Changes to these bits will be ignored.

TAG (Moore Products Co. only)
CHANNEL [5XL+10], PARAMETER 2 - Characters 1 and 2 of the Tag. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. When interfacing with a model 348 this will represent parameter 'HTN1' IN FB15 when associated with LOOP 1 and 'HTN2' when associated with LOOP 2. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 6 words will cause the 385 to respond with parameters 2 thru 7.

CHANNEL [5XL+10], PARAMETER 3 - Characters 3 and 4 of the Tag.

CHANNEL [5XL+10], PARAMETER 4 - Characters 5 and 6 of the Tag.

CHANNEL [5XL+10], PARAMETER 5 - Characters 7 and 8 of the Tag.

CHANNEL [5XL+10], PARAMETER 6 - Characters 9 and 10 of the Tag.

CHANNEL [5XL+10], PARAMETER 7 - Characters 11 and 12 of the Tag.

These parameters are valid only if the LOOP is configured for a Moore Products Co. Transmitter or a Model 348. Otherwise, a value of $0000 will be returned.

PROCESS VARIABLE UNITS (Moore Products Co. only/Not valid for Loop 2 - Model 348 Release 1.01)
CHANNEL [5XL+10], PARAMETER 8 - Characters 1 and 2 of the Process Variable Units. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. When interfacing with a model 348 this will represent parameter 'HEU1' IN FB15 when

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associated with LOOP 1 and 'HEU2' when associated with LOOP 2. A MULTI-BYTE
PARAMETER REQUEST sent to this parameter with a length of 2 words will cause the 385 to
respond with parameters 8 and 9.

CHANNEL [5XL+10], PARAMETER 9 - Characters 3 and 4 of the Process Variable Units.

These parameters are identical to channel 5XL+7, parameters 40 and 41. These parameters are valid only if the LOOP is
configured for a Moore Products Co. transmitter.

PROCESS VARIABLE RANGE HI, RANGE LO AND DECIMAL POINT (Moore Products Co. only)
CHANNEL [5XL+10], PARAMETER 10 - The 16 bit 2's complement integer of the Process Variable Range Hi. When
interfacing with a model 348 this will represent parameter 'SPH1' in FB15 when associated
with LOOP 1 and 'SPH2' when associated with LOOP 2. If the range hi value is greater than
the display capability of the 385, the 385 will show percent-of-scale. IF A MULTI-BYTE
PARAMETER REQUEST sent to this parameter with a length of 3 data words will cause the
385 to respond with parameters 10 thru 12.

Note: Parameters 10 & 12 represent the same value as channel 5XL+7, parameters 18 & 19.

CHANNEL [5XL+10], PARAMETER 11 - The 16 bit 2's complement integer of the Process Variable Range Lo. When
interfacing with a model 348 this will represent parameter 'SPL1' in FB15 when associated with
LOOP 1 and 'SPL2' when associated with LOOP 2. If the Range-Lo value is greater than the
display capability of the 385, the 385 will show percent-of-scale.

Note: Parameters 11 & 12 represent the same values as channel 5XL+7, parameters 20 & 21.

CHANNEL [5XL+10], PARAMETER 12 - The Decimal Point Position of the Process Variable with a range of $0$ to $4$
representing the number of decimal places. When interfacing with a Model 348, the decimal
digit will be positioned to provide the most number of significant digits possible.

These parameters are valid only if the LOOP is configured for a Moore Products Co.
Transmitter or a Model 348. Otherwise, a value of $0000$ will be returned.

VARIABLE 'Y' (Model 348 only)
CHANNEL [5XL+10], PARAMETER 16 - The most significant word of the 32-bit IEEE floating point representation of the
Variable Y in the Model 348. This parameter is input 'NY' of FB15 scaled to the Engineering
Units Y. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2
data words will cause the 385 to respond with both parameters 16 and 17.

CHANNEL [5XL+10], PARAMETER 17 - The least significant word of Variable Y.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of
$0000$ will be returned.

VARIABLE 'Y' RANGE HI (Model 348 only)
CHANNEL [5XL+10], PARAMETER 18 - The most significant word of the 32-bit IEEE floating point representation of the
Variable Y Range Hi in the Model 348. This is parameter 'SYH' of FB15. A MULTI-BYTE
PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the
385 to respond with both parameters 18 and 19.

CHANNEL [5XL+10], PARAMETER 19 - The least significant word of Variable Y Range Hi.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of
$0000$ will be returned.

VARIABLE 'Y' RANGE LO (Model 348 only)
CHANNEL [5XL+10], PARAMETER 20 - The most significant word of the 32-bit IEEE floating point representation of the
Variable Y Range Lo in the Model 348. This is parameter 'SYL' of FB15. A MULTI-BYTE
PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the
385 to respond with both parameters 20 and 21.
CHANNEL [5XL+10], PARAMETER 21 - The least significant word of Variable Y Range Lo.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

VARIABLE 'O-70' (Model 348 only)
CHANNEL [5XL+10], PARAMETER 28 - The most significant word of the 32-bit IEEE floating point representation of Output 70 of the HART Interface function block FB98 in the Model 348. These parameters allow a higher level device to write a value to the Model 348 for interconnection to other function blocks within the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 28 and 29.

CHANNEL [5XL+10], PARAMETER 29 - The least significant word of Variable O-70.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)]. A PARAMETER DATA SEND command of 2 words should be sent to parameter 28 with a data type of 32-bit floating point, absolute.

VARIABLE 'O-71' (Model 348 only)
CHANNEL [5XL+10], PARAMETER 30 - The most significant word of the 32-bit IEEE floating point representation of Output 71 of the HART Interface function block FB98 in the Model 348. These parameters allow a higher level device to write a value to the Model 348 for interconnection to other function blocks within the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 30 and 31.

CHANNEL [5XL+10], PARAMETER 31 - The least significant word of Variable O-71.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)]. A PARAMETER DATA SEND command of 2 words should be sent to parameter 30 with a data type of 32-bit floating point, absolute.

VARIABLE 'O-72' (Model 348 only)
CHANNEL [5XL+10], PARAMETER 32 - The most significant word of the 32-bit IEEE floating point representation of Output 72 of the HART Interface function block FB98 in the Model 348. These parameters allow a higher level device to write a value to the Model 348 for interconnection to other function blocks within the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 32 and 33.

CHANNEL [5XL+10], PARAMETER 33 - The least significant word of Variable O-72.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)]. A PARAMETER DATA SEND command of 2 words should be sent to parameter 32 with a data type of 32-bit floating point, absolute.

VARIABLE 'O-73' (Model 348 only)
CHANNEL [5XL+10], PARAMETER 34 - The most significant word of the 32-bit IEEE floating point representation of Output 73 of the HART Interface function block FB98 in the Model 348. These parameters allow a higher level device to write a value to the Model 348 for interconnection to other function blocks within the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 34 and 35.
CHANNEL [5XL+10], PARAMETER 35 - The least significant word of Variable O-73.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)]. A PARAMETER DATA SEND command of 2 words should be sent to parameter 34 with a data type of 32-bit floating point, absolute.

VARIABLE 'O-74: (Model 348 only)
CHANNEL [5XL+10], PARAMETER 36 - The most significant word of the 32-bit IEEE floating point representation of Output 74 of the HART Interface function block FB98 in the Model 348. These parameters allow a higher level device to write a value to the Model 348 for interconnection to other function blocks within the Model 348. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 36 and 37.

CHANNEL [5XL+10], PARAMETER 37 - The least significant word of Variable O-74.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made in the "C" mode [i.e. command source matches the station mode (CONSOLE/COMPUTER)]. A PARAMETER DATA SEND command of 2 words should be sent to parameter 36 with a data type of 32-bit floating point, absolute.

LOOP ALARM STATUS
CHANNEL [5XL+11], PARAMETER 1

BIT 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00
"1" E NA CC OS E4 N4 A4 E3 N3 A3 E2 N2 A2 E1 N1 A1
"0" -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

When a model 348 is used, this status word will represent the status of the alarms in FB12 when associated with LOOP 1 and FB73 when associated with LOOP 2. All 4 alarms are computed in the model 348. The model 385 does not add any alarm functionality as with the Transmitter Controller. Acknowledgment of any alarms from either a higher level console or from the face plate of the Model 385 will acknowledge any associated alarm in the Model 348 and its flashing function.

BIT 0: ALARM #1 (A1)--- This bit indicates the status of LOOP ALARM #1.

"1" ...... ALARM
"0" ...... No Alarm

If the LOOP is configured as a Moore Products Co. Transmitter with PID, ALARM #1 will represent the ALARM #1 in the Transmitter. If the LOOP is not configured as a Moore Products Co. Transmitter with PID, ALARM #1 will represent the ALARM #1 in the 385 Loop Display block.

BIT 1: NAK #1 (N1)---- This bit is SET whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RINGBACK was selected in configuration. It can be RESET over the LINK or when the flasher is acknowledged using the "ACK" button on the operator's panel or using input INA.

"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged

If the LOOP is configured as a Moore Products Co. Transmitter with PID, NAK #1 will represent the ALARM #1 in the Transmitter. If the LOOP is not configured as a Moore Products Co. Transmitter with PID, NAK #1 will represent the ALARM #1 in the 385 Loop Display block.
BIT 2: ENABLED #1 (E1) - This bit indicates that LOOP ALARM #1 has been ENABLED.

   "1" ...... ENABLED
   "0" ...... Not Enabled

BIT 3: ALARM #2 (A2) —— This bit indicates the status of LOOP ALARM #2.

   "1" ...... ALARM
   "0" ...... No Alarm

If the LOOP is configured as a Moore Products Co. Transmitter with PID, ALARM #2 will represent the ALARM #2 in the Transmitter. If the LOOP is not configured as a Moore Products Co. Transmitter with PID, ALARM #2 will represent the ALARM #2 in the 385 Loop Display block.

BIT 4: NAK #2 (N2)——— This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RINGBACK was selected in configuration. It can be RESET over the LINK or when the flasher is acknowledged using the "ACK" button on the operator's panel or using input INA.

   "1" ...... NOT ACKNOWLEDGED
   "0" ...... Acknowledged

If the LOOP is configured as a Moore Products Co. Transmitter with PID, NAK #2 will represent the ALARM #2 in the Transmitter. If the LOOP is not configured as a Moore Products Co. Transmitter with PID, NAK #2 will represent the ALARM #2 in the 385 Loop Display block.

BIT 5: ENABLED #2 (E2) - This bit indicates that LOOP ALARM #2 has been ENABLED.

   "1" ...... ENABLED
   "0" ...... Not Enabled

BIT 6: ALARM #3 (A3)—— This bit indicates the status of LOOP ALARM #3.

   "1" ...... ALARM
   "0" ...... No Alarm

BIT 7: NAK #3 (N3)——— This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RINGBACK was selected in configuration. It can be RESET over the LINK or when the flasher is acknowledged using the "ACK" button on the operator's panel or using the input INA.

   "1" ...... NOT ACKNOWLEDGED
   "0" ...... Acknowledged

BIT 8: ENABLED #3 (E3) - This bit indicates that LOOP ALARM #3 has been ENABLED.

   "1" ...... ENABLED
   "0" ...... Not Enabled

BIT 9: ALARM #4 (A4) —— This bit indicates the status of LOOP ALARM #4.

   "1" ...... ALARM
   "0" ...... No Alarm

BIT 10: NAK #4 (N4)——— This bit is set whenever the alarm goes from a no-alarm to an ALARM condition. It will also be SET when the alarm goes to a no-alarm condition if RINGBACK was selected in configuration. It can be RESET over the LINK or when the flasher is acknowledged using the "ACK" button on the operator's panel or using input INA.
"1" ...... NOT ACKNOWLEDGED
"0" ...... Acknowledged

BIT 11: ENABLED #4 (E4)- This bit indicates that LOOP ALARM #4 has been ENABLED.

"1" ...... ENABLED
"0" ...... Not Enabled

BIT 12: OUT OF SERVICE (OS)- This bit indicates that all the LINK alarms for this loop are OUT OF SERVICE.

"1" ...... OUT OF SERVICE
"0" ...... Normal

If the LOOP is configured as a Moore Products Co. Transmitter with PID, OS will represent the OS of the Transmitter. If the LOOP is not configured as a Moore Products Co. Transmitter with PID, OS will represent the OS of the 385.

BIT 13: CONFIGURATION CHANGE (CC)- This bit is SET if Transmitter L's configuration is changed. It will remain set until a "MASK-OFF" command is received over the LINK. This bit is set after a power-up or after communication is re-established.

"1" ...... CONFIGURATION CHANGE
"0" ...... No Configuration Change

BIT 14: ERROR NOT ACKNOWLEDGED (NA)- This bit is SET if Transmitter L develops an error or stops communicating. It will remain set until a "MASK-OFF" command is received over the LINK.

"1" ...... ERROR NOT ACKNOWLEDGED
"0" ...... Acknowledged

BIT 15: ERROR (E)-------This bit is SET if Transmitter L develops an error or stops communicating. It will remain set until the error condition has cleared or until communication is re-established.

"1" ...... ERROR
"0" ...... No Error

Changes can only be made to status word by sending a 16-bit word with a "1" ONLY in the BIT position to be changed along with a "MASK-ON" or "MASK-OFF" command. Changes can be made while the station is in LOCAL but the command source must match the CONSOLE/COMPUTER status bits (e.g. ref. status word 2).

BIT 0: Changes to this bit will be ignored.
BIT 1: A "MASK-OFF" will ACKNOWLEDGE Alarm #1.
BIT 2: A "MASK-ON" will ENABLE Alarm #1 and a "MASK-OFF" will DISABLE it.
BIT 3: Changes to this bit will be ignored.
BIT 4: A "MASK-OFF" will ACKNOWLEDGE Alarm #2.
BIT 5: A "MASK-ON" will ENABLE Alarm #2 and a "MASK-OFF" will DISABLE it.
BIT 6: Changes to these bits will be ignored.
BIT 7: A "MASK-OFF" will ACKNOWLEDGE Alarm #3.
BIT 8: A "MASK-ON" will ENABLE Alarm #3 and a "MASK-OFF" will DISABLE it.
BIT 9: Changes to these bits will be ignored.
BIT 10: A "MASK-OFF" will ACKNOWLEDGE Alarm #4.
BIT 11: A "MASK-ON" will ENABLE Alarm #4 and a "MASK-OFF" will DISABLE it.
BIT 12: A "MASK-ON" puts all Loop L LINK ALARMS "OUT OF SERVICE" and a "MASK-OFF" puts them into normal operation.
BIT 13: A "MASK-OFF" will clear the Configuration Change bit.
BIT 14: A "MASK-OFF" will acknowledge the error.
BIT 15: Changes to this bit will be ignored.
ALARM LIMITS
CHANNEL [5XL+11], PARAMETER 2 - LOOP NO. [L] A1 LIMIT - The A1 alarm limit has a valid range of -3.3% to 103.3%.
A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 2 thru 5.

a) $0000 - $0FF(A1 = -3.3% to 103.3%)

If the LOOP is configured for a Moore Products Co. Transmitter with PID or the Model 348, this parameter represents the alarm #1 limit set in the transmitter or the model 348. Otherwise, this parameter will represent the alarm #1 limit set in LOOP DISPLAY [L] function block in the 385.

PARAMETER CHANGES - Changes to this parameter will affect the specified LOOP ALARM. Changes can only be made in the "C" mode [i.e. command source matches station mode (CONSOLE/COMPUTER)] and will be entered as follows:

1) $'000 - $'FFF (-3.3% to -103.3%)

CHANNEL [5XL+11], PARAMETER 3 - LOOP NO. [L] A2 LIMIT - The A2 limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FF(A2 = -3.3% to 103.3%)

If the LOOP is configured for a Moore Products Co. Transmitter with PID or the Model 348, this parameter represents the alarm #2 limit set in the transmitter or the model 348. Otherwise, this parameter will represent the alarm #2 limit set in LOOP DISPLAY [L] function block in the 385.

PARAMETER CHANGES - Changes to this parameter will affect the specified LOOP ALARM. Changes can only be made in the "C" mode [i.e. command source matches station mode (CONSOLE/COMPUTER)] and will be entered as follows:

1) $'000 - $'FFF (-3.3% to -103.3%)

CHANNEL [5XL+11], PARAMETER 4 - LOOP NO. [L] A3 LIMIT - The A3 limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FF(A3 = -3.3% to 103.3%)

This parameter represents the alarm #3 limit set in LOOP DISPLAY [L] function block in the 385 or the Model 348.

PARAMETER CHANGES - Changes to this parameter will affect the specified LOOP ALARM. Changes can only be made in the "C" mode [i.e. command source matches station mode (CONSOLE/COMPUTER)] and will be entered as follows:

1) $'000 - $'FFF (-3.3% to -103.3%)

CHANNEL [5XL+11], PARAMETER 5 - LOOP NO. [L] A4 LIMIT - The A4 limit has a valid range of -3.3% to 103.3%.

a) $0000 - $0FF(A4 = -3.3% to 103.3%)

This parameter represents the alarm #4 limit set in LOOP DISPLAY [L] function block in the 385 or the Model 348.

PARAMETER CHANGES - Changes to this parameter will affect the specified LOOP ALARM. Changes can only be made in the "C" mode [i.e. command source matches station mode (CONSOLE/COMPUTER)] and will be entered as follows:

1) $'000 - $'FFF (-3.3% to -103.3%)
ALARM TYPES
CHANNEL [SLX+11], PARAMETER 6 - LOOP [L] A1 TYPE - The 16-bit multi-discrete word that defines the operations to be performed by Alarm #1 of Loop [L]. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the Model 385 to respond with all data associated with parameters 6 thru 9.

Changes can only be made to Alarm #1 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit integer, absolute word to this parameter. Words will be decoded as follows:

BITS: 2 1 0
  0 0 0 - no alarm action required*
  0 0 1 - HIGH alarm
  0 1 0 - LOW alarm
  0 1 1 - no alarm action required* (HI DEVIATION - Model 348 only)
  1 0 0 - no alarm action required* (LO DEVIATION - Model 348 only)
  1 0 1 - no alarm action required* (ABS DEVIATION - Model 348 only)
  1 1 0 - OUT OF RANGE alarm*
  1 1 1 - no alarm action required*

BITS: 4 3
  0 0 - 0.1% alarm deadband*
  0 1 - 0.5% alarm deadband
  1 0 - 1.0% alarm deadband*
  1 1 - 5.0% alarm deadband*

BITS: 7 6 5
  0 0 0 - 0.0 seconds - delay time IN
  0 0 1 - 0.4 seconds - delay time IN*
  0 1 0 - 1.0 seconds - delay time IN*
  0 1 1 - 2.0 seconds - delay time IN*
  1 0 0 - 5.0 seconds - delay time IN*
  1 0 1 - 15.0 seconds - delay time IN*
  1 1 0 - 30.0 seconds - delay time IN*
  1 1 1 - 60.0 seconds - delay time IN*

BITS: 10 9 8
  0 0 0 - 0.0 seconds - delay time OUT*
  0 0 1 - 0.4 seconds - delay time OUT*
  0 1 0 - 1.0 seconds - delay time OUT*
  0 1 1 - 2.0 seconds - delay time OUT*
  1 0 0 - 5.0 seconds - delay time OUT*
  1 0 1 - 15.0 seconds - delay time OUT*
  1 1 0 - 30.0 seconds - delay time OUT*
  1 1 1 - 60.0 seconds - delay time OUT*

BIT: 11
  0 - (RINGBACK option not required)
  1 - RINGBACK*

BITS: 12 thru 15 - set to 0

*Not valid for Moore Products Co. Transmitter with PID (function is valid with Model 348).

If the LOOP is configured for a Moore Products Co. Transmitter with PID, this parameter will represent the alarm #1 type set in the transmitter. Otherwise, this parameter will represent the alarm #1 type set in the LOOP DISPLAY [L] function block in the 385.

CHANNEL [SLX+11], PARAMETER 7 - LOOP [L] A2 TYPE - The 16-bit multi-discrete word that defines the operations to be performed by Alarm #2 of Loop [L].

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Changes can only be made to Alarm #2 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit integer, absolute word to this parameter. Words will be decoded as follows:

**BITs:**

- **2 1 0**
  - 0 0 0 - no alarm action required*
  - 0 0 1 - HIGH alarm
  - 0 1 0 - LOW alarm
  - 0 1 1 - no alarm action required* (HI DEVIATION - Model 348 only)
  - 1 0 0 - no alarm action required* (LO DEVIATION - Model 348 only)
  - 1 0 1 - no alarm action required* (ABS DEVIATION - Model 348 only)
  - 1 1 0 - OUT OF RANGE alarm*
  - 1 1 1 - no alarm action required*

- **4 3**
  - 0 0 - 0.1% alarm deadband*
  - 0 1 - 0.5% alarm deadband
  - 1 0 - 1.0% alarm deadband*
  - 1 1 - 5.0% alarm deadband*

- **7 6 5**
  - 0 0 0 - 0.0 seconds - delay time IN
  - 0 0 1 - 0.4 seconds - delay time IN*
  - 0 1 0 - 1.0 seconds - delay time IN*
  - 0 1 1 - 2.0 seconds - delay time IN*
  - 1 0 0 - 5.0 seconds - delay time IN*
  - 1 0 1 - 15.0 seconds - delay time IN*
  - 1 1 0 - 30.0 seconds - delay time IN*
  - 1 1 1 - 60.0 seconds - delay time IN*

- **10 9 8**
  - 0 0 0 - 0.0 seconds - delay time OUT
  - 0 0 1 - 0.4 seconds - delay time OUT*
  - 0 1 0 - 1.0 seconds - delay time OUT*
  - 0 1 1 - 2.0 seconds - delay time OUT*
  - 1 0 0 - 5.0 seconds - delay time OUT*
  - 1 0 1 - 15.0 seconds - delay time OUT*
  - 1 1 0 - 30.0 seconds - delay time OUT*
  - 1 1 1 - 60.0 seconds - delay time OUT*

- **BIT: 11**
  - 0 - (RINGBACK option not required)
  - 1 - RINGBACK*

- **BITs:**
  - 12 thru 15 - set to 0

*Not valid for Moore Products Co. Transmitter with PID (function is valid with Model 348).

If the LOOP is configured for a Moore Products Co. Transmitter with PID, the parameter represents the alarm #2 type set in the transmitter. Otherwise, this parameter will represent the alarm #2 type set in the LOOP DISPLAY [L] function block in the 385.

**CHANNEL [5XL+11], PARAMETER 8 - LOOP [L] A3 TYPE** - The 16-bit multi-discrete word that defines the operations to be performed by Alarm #3 of Loop [L].

Changes can only be made to Alarm #3 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit integer, absolute word to this parameter. Words will be decoded as follows:
BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required* (HI DEVIATION - Model 348 only)
1 0 0 - no alarm action required* (LO DEVIATION - Model 348 only)
1 0 1 - no alarm action required* (ABS DEVIATION - Model 348 only)
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required

BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

BIT: 11
0 - (RINGBACK option not required)
1 - RINGBACK

BITS: 12 thru 15 - set to 0

This parameter represents the alarm #3 type set in the LOOP DISPLAY [L] function block in the 385 or the associated LOOP Alarm in the Model 348.

CHANNEL [5XL+11], PARAMETER 9 - LOOP [L] A4 TYPE - The 16-bit multi-discrete word that defines the operations to be performed by Alarm #4 of Loop [L].

Changes can only be made to Alarm #4 while the station is in the "C" mode [i.e. command source matches the station (CONSOLE/COMPUTER)] by sending a 16-bit integer, absolute word to this parameter. Words will be decoded as follows:

BITS: 2 1 0
0 0 0 - no alarm action required
0 0 1 - HIGH alarm
0 1 0 - LOW alarm
0 1 1 - no alarm action required* (HI DEVIATION - Model 348 only)
1 0 0 - no alarm action required* (LO DEVIATION - Model 348 only)
1 0 1 - no alarm action required* (ABS DEVIATION - Model 348 only)
1 1 0 - OUT OF RANGE alarm
1 1 1 - no alarm action required
BITS: 4 3
0 0 - 0.1% alarm deadband
0 1 - 0.5% alarm deadband
1 0 - 1.0% alarm deadband
1 1 - 5.0% alarm deadband

BITS: 7 6 5
0 0 0 - 0.0 seconds - delay time IN
0 0 1 - 0.4 seconds - delay time IN
0 1 0 - 1.0 seconds - delay time IN
0 1 1 - 2.0 seconds - delay time IN
1 0 0 - 5.0 seconds - delay time IN
1 0 1 - 15.0 seconds - delay time IN
1 1 0 - 30.0 seconds - delay time IN
1 1 1 - 60.0 seconds - delay time IN

BITS: 10 9 8
0 0 0 - 0.0 seconds - delay time OUT
0 0 1 - 0.4 seconds - delay time OUT
0 1 0 - 1.0 seconds - delay time OUT
0 1 1 - 2.0 seconds - delay time OUT
1 0 0 - 5.0 seconds - delay time OUT
1 0 1 - 15.0 seconds - delay time OUT
1 1 0 - 30.0 seconds - delay time OUT
1 1 1 - 60.0 seconds - delay time OUT

BIT: 11
0 - (RINGBACK option not required)
1 - RINGBACK

BITS: 12 thru 15 - set to 0

This parameter represents the alarm #4 type set in the LOOP DISPLAY [L] function block in the 385 or the associated LOOP Alarms in the Model 348.

TOTALIZER - COUNT (Model 348 only)
CHANNEL [5X+11], PARAMETER 16 - The most significant word of the 32-bit IEEE floating point representation of the Totalizer-Count in the Model 348. This parameter is associated with FB16. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 16 and 17.

CHANNEL [5X+11], PARAMETER 17 - The least significant word of Totalizer-Count.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

TOTALIZER - COUNT MULTIPLIER (Model 348 only)
CHANNEL [5X+11], PARAMETER 18 - The most significant word of the 32-bit IEEE floating point representation of the Totalizer-Count Multiplier in the Model 348. This is parameter 'SCM' of FB16. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 18 and 19.

CHANNEL [5X+11], PARAMETER 19 - The least significant word of Count Multiplier.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.
TOTALIZER - COUNT UNITS (Model 348 only)
CHANNEL [5XL+11], PARAMETER 20 - Characters 1 and 2 of the Count Units associated with the Totalizer block FB16. The most significant byte is character 1 with a range of $20 to $5E. The least significant byte is character 2 with the same range. A MULTI-BYTE PARAMETER REQUEST sent to this parameter will cause the 385 to respond with both parameters 20 and 21.

CHANNEL [5XL+11], PARAMETER 21 - Characters 3 and 4 of Count Units.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

TOTALIZER - PRESET 1 (Model 348 only)
CHANNEL [5XL+11], PARAMETER 22 - The most significant word of the 32-bit IEEE floating point representation of the Totalizer-Preset 1 in the Model 348. This is parameter 'SP1' of FB16. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 22 and 23.

CHANNEL [5XL+11], PARAMETER 23 - The least significant word of Totalizer Preset 1.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in LOCAL or EMERGENCY/LOCAL and the command source matches the loop mode (CONSOLE/COMPUTER). A PARAMETER DATA SEND command of 2 words should be sent to parameter 22 with a data type of 32-bit floating point, absolute.

TOTALIZER - PRESET 2 (Model 348 only)
CHANNEL [5XL+11], PARAMETER 24 - The most significant word of the 32-bit IEEE floating point representation of the Totalizer-Preset 2 in the Model 348. This is parameter 'SP2' of FB16. A MULTI-BYTE PARAMETER REQUEST sent to this parameter with a length of 2 data words will cause the 385 to respond with both parameters 24 and 25.

CHANNEL [5XL+11], PARAMETER 25 - The least significant word of Totalizer Preset 2.

These parameters are valid only when interfacing with a Model 348. Otherwise a value of $0000 will be returned.

PARAMETER CHANGES - Changes to this parameter can only be made if the station is not in LOCAL or EMERGENCY/LOCAL and the command source matches the loop mode (CONSOLE/COMPUTER). A PARAMETER DATA SEND command of 2 words should be sent to parameter 24 with a data type of 32-bit floating point, absolute.

2.3 IEEE FLOATING POINT FORMAT

The format for parameter values in IEEE representation is based on the IEEE 754 Floating Point Standard.

Representation in bit form:

DATA BYTE 0 1 2 3
S EEEE EMMMM MMMMM MMMMM

S - Sign bit of Mantissa (1 if negative)
E - Exponent biased by 127 (decimal) in two's complement
M - Mantissa - 23-bit normalized value

The value of the floating point number described above is obtained by multiplying 2, raised to the power of the unbiased exponent, by the 24-bit Mantissa. The 24-bit Mantissa is composed of an assumed most significant bit of 1, a decimal point following the 1, and the 23 bits of the Mantissa.
Floating point values not used by a device will normally transmit $7F\ A0\ 00\ 00$ which represents the IEEE convention for NOT-A-NUMBER (NAN).

2.4 DATA BASE TRANSFERS

The LINK interface supports the UPLOADING and DOWNLOADING of the 385 database. This can be accomplished using the Model 320 Independent Computer Interface. The portion of the database requested is identified by using a RECORD NO. from $00$ - $FF$ (this manual includes 385 database records $00$ to $0B$), an OFFSET from $00$ - $FF$, and the NUMBER OF BYTES from $01$ - $100$. The configuration database which is stored in the NVRAM is located in records $08$ to $0B$.

2.4.1 Examples of Database Listing

This manual includes MOORE PRODUCTS CO database file for the 385. An example of a typical database listing is shown below:

```
1273 A 0A 72000C FR9800LRMB 12 CID CONFIGURATION I.D. CODE (ASCII)
```

- RECORD 
- OFFSET
- FUNCTION BLOCK 
- BYTES (decimal) for parameter
- MNEMONIC CODE for parameter

2.4.2 Uploading

Records, or a portion of a record, can be transferred from a Model 385 on the LINK, for use by other devices (i.e. computers), through the use of a Record Request command from a Model 320. The Record Request command can be used to access information directly from the database. Refer to AD320-10 for the command and format for Record Requests.

2.4.3 Downloading

A configuration which consists of 4 consecutive records can be downloaded to a Model 385 on the LINK via a Record Send command from a Model 320. Refer to AD320-10 for the correct command and format for a Record Send.

```
---------GENERAL CONFIGURATION DOWNLOAD PROCEDURE---------
```

1. Place the Model 385 in "Configuration Hold" (MASK-ON bit 6 of station status word).

2. Send 4 consecutive Record Send commands to records $08$, $09$, $0A$, & $0B$. Check the "Record Send Acknowledge" after each record send by reading the LIL Command Input Buffer and checking for any error codes (see complete listing of Model 385 error codes in paragraph 2.4.4). Note that the Model 385 will retain the current values of the Calibration & Transient database.

3. Place the Model 385 in "Run" (MASK-ON bit 7 of station status word).

2.4.4 Model 385 Record Send Acknowledge Error Codes

<table>
<thead>
<tr>
<th>ERROR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>NO ERROR</td>
</tr>
<tr>
<td>01</td>
<td>STATION NOT IN PROPER MODE TO ACCEPT RECORD</td>
</tr>
<tr>
<td>02</td>
<td>SOURCE OF STATION CONTROLLING DOWNLOAD DOES NOT MATCH RECORD SEND COMMAND</td>
</tr>
<tr>
<td>03</td>
<td>CHECKSUM ERROR ON RECORD SEND COMMAND</td>
</tr>
<tr>
<td>04</td>
<td>CHECKSUM ERROR ON RECORD DATA</td>
</tr>
<tr>
<td>05</td>
<td>INVALID RECORD NUMBER</td>
</tr>
<tr>
<td>06</td>
<td>INVALID OFFSET COUNT</td>
</tr>
</tbody>
</table>
2.5 ERROR MESSAGES

2.5.1 Error Messages Over the LINK

Error messages that appear in the alphanumeric display of the Model 385 will be transmitted over the LINK in channel 4, parameter 1 as the hexadecimal equivalent of the error message. Also, when an NU status occurs, the hexadecimal equivalent of the output arrow (#100-#109) that is not updating will be transmitted in this parameter.

2.5.2 Data Buffer

A buffer which saves process, setpoint and valve data values processed every 0.2 seconds by the station for the purpose of facilitating data acquisition from remote computers. Data buffer bits in the trending status word allow viewing or changing the LOOP being trended. The LOOP can be changed by sending a MASK-ON command to that bit which will set it to "1" and the other LOOP bits to "0". The 385 will then reset all buffer values to "0" and start placing data at the starting location. A MASK-OFF will stop saving and zero all data. The data is buffered in record 0C (256 bytes) partitioned as follows:

a. 40 process values are stored in offset locations 10 thru 5F.

b. 40 setpoint values are stored in offset locations 60 thru AF.

c. 40 valve values are stored in offset locations 80 thru FF.

d. Record ID information will be stored in offset locations $00 thru $0F as follows:

<table>
<thead>
<tr>
<th>BYTE #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$00</td>
<td>PLP Pointer to Latest Process Value ($)65</td>
</tr>
<tr>
<td>$01</td>
<td>PLS Pointer to Latest Setpoint Value ($)50</td>
</tr>
<tr>
<td>$02</td>
<td>PLV Pointer to Latest Valve Value ($)50</td>
</tr>
<tr>
<td>$03</td>
<td>POC Process Overwrite Counter ($0000-$FFFF)</td>
</tr>
<tr>
<td>$05</td>
<td>SOC Setpoint Overwrite Counter ($0000-$FFFF)</td>
</tr>
<tr>
<td>$07</td>
<td>VOC Valve Overwrite Counter ($0000-$FFFF)</td>
</tr>
<tr>
<td>$09</td>
<td>LN Loop Number of Stored Data ($00-$09)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit 7 6 5 4 3 2 1 0</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not Trending</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 1 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 2 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 3 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 4 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 5 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 6 Data</td>
</tr>
<tr>
<td>1</td>
<td>Storing Loop 7 Data</td>
</tr>
<tr>
<td>0</td>
<td>Storing Loop 8 Data</td>
</tr>
<tr>
<td>0</td>
<td>Storing Loop 9 Data</td>
</tr>
<tr>
<td>0</td>
<td>Storing Loop 10 Data</td>
</tr>
</tbody>
</table>

$0A THIS BYTE WILL BE $00 WHEN THE BUFFERS ARE EMPTY AND NOT $00 WHEN THE BUFFERS ARE NOT EMPTY.

2.6 SENDING HART COMMANDS AND RECEIVING HART RESPONSES

The Local Instrument Link (LIL) Record Transfer procedure can be used to communicate with SMART devices connected to a Model 385 that has a SMART Transmitter option installed.

SMART devices include the Moore Mycro XTC line of Transmitters and Transmitter-Controllers as well as many other devices using the HART protocol. HART is an open communication standard originally developed by Rosemount Inc. and
now maintained by the HART Communication Foundation consisting of over (25) companies world-wide.

The following is a general procedure for using the LIL Record Transfer procedure. Moore Application Documents AD320-10/20 should be consulted for more specific command details and information on the Model 320 Independent Computer Interface (ICI).

1. CHECK COMMAND INPUT BUFFERS & CLEAR IF NECESSARY - Issue Command $02 - ICI Status and Check Bit 3 of the Response Status Word. If set, the buffers can be cleared by issuing Command $0F - READ LIL COMMAND BUFFER. This can be repeated until all buffers have been cleared.

2. SEND RECORD TO 385 CONNECTED TO SMART TRANSMITTER - Issue Command $0B - Record Send with the record word RRRR and the offset byte set as follows:

   a. Upper byte of record word (RR__)
      $ - SMART Transmitter "1"
      $ - SMART Transmitter :
      $ - SMART Transmitter "10"

   b. Lower byte of record word & offset byte
      RR00 - HART Transmitter ID

NOTES: (1) The Record Byte Count (RBC) must be between 14 & 48. It can be set to 48 as a default for all HART commands, but sending only the exact number of bytes will minimize the amount of data that has to be transmitted on the LIL.

   (2) The HART Transaction ID is a unique number selected by the sender. The same ID will be placed in the response record by the Model 385 to enable the sender to identify the response.

   Record Data Words must be formatted as follows:

   DATA (1) XXXX - HART Transaction ID ($0000-$FFFF)
   DATA (2) 0000 - (future use)
   DATA (3) XXXX - No. of Preambles ($0005-$0014)
   DATA (4) DDAA - D-Delimiter Byte, A-Address Byte ($80)
   DATA (5) 0000 - (future use)
   DATA (6) 0UUU - U-Unique ID of Transmitter
   DATA (7) CCBB - C-HART Command, B-Requested Data Byte Count
   DATA (8) XXXX - Requested Data Bytes 1 & 2
   DATA (9) XXXX - Requested Data Bytes 3 & 4

   DATA (29) XXXX - Requested Data Bytes 23 & 24

   *Data Words (8)-(29) as required by HART command

   DD (Delimiter Bytes) - Short Frame $02, Long Frame $82

3. CHECK FOR RECORD ACKNOWLEDGE - Issue Command $02 - ICI Status and Check Bit 3 of the Response Status Word (RSW). If set, issue command $0F - READ COMMAND LIL BUFFER. If error code KK in response data is $00, proceed to step 4. If error code is recoverable (see list below), retry step 1. If Record Acknowledge not received after reasonable time, then time out.

   ACKNOWLEDGE ERROR CODES (previously defined errors in AD320-10 are also listed)
   $00 - No Error (HART command sent to transmitter)
   $04 - Bad Record Checksum
   $05 - Invalid Record (unsupported rev #)
   $21 - HART Bus Busy with Other Host Transaction
   $22 - HART Bus Not Available
   $23 - HART Bus Not Initialized
   $24 - Invalid HART Command

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4. CHECK FOR INCOMING RECORD & READ - Issue Command $02 - ICI Status and Check Bit 2 of the Response Status Word (RSW). If set, issue command $0A - RECORD REQUEST with the record word RRRR set to $0014 and the offset byte to $00 and the station address SS to the address of the Model 320. If incoming record not received in reasonable time, then time out.

5. ANALYZE RECORD

Record data words will be formatted as follows:

DATA (1) XXXX - HART Transaction ID (same as send)
DATA (2) 0000 - (future use)
DATA (3) EEPP - E-Transmitter Error Code, P-# of Preambles
DATA (4) DDAA - D-Delimiter Byte, A-Address Byte
DATA (5) 0000 - (future use)
DATA (6) 0UUU - U-Unique ID of Transmitter
DATA (7) CCBB - C-HART Command, B-Response Data Byte Count
DATA (8) RRSS - R-HART Response Code, S-HART Device State
DATA (9) XXXX - Response Data Bytes 1 & 2*
DATA (10) XXXX - Response Data Bytes 3 & 4*

DATA (30) XXXX - Requested Data Bytes 23 & 24*

*Data Words (9)-(30) as required by HART response

TRANSMITTER ERROR CODES (EE)
$00 - No Error
$01 - No Response from Transmitter
FIGURE AS-1842-1 Local Instrument Link Minimum System
TYPICAL LIL STATIONS

MODEL 352B A11N1F
SINGLE-LOOP DIGITAL CONTROLLER

MODEL 351 A21NNN
TRIPLE-LOOP DIGITAL CONTROLLER

MODEL 324
PROGRAMMABLE SEQUENCE CONTROLLER

MODEL 320 A2NNN
INDEPENDENT COMPUTER INTERFACE

MODEL 321 A121RNN
EXPANSION SATELLITE

MODEL 382 EA21N1F
LOGIC & SEQUENCE CONTROLLER

MODEL 383V A21N1N
MULTI-POINT DISPLAY STATION

MODEL 352E A21N1F
SINGLE-LOOP DIGITAL CONTROLLER

LOCAL INSTRUMENT LINK (LIL)

(2) - (31) STATIONS

RS-232 OR RS-422

FIGURE AS-1842-2 Local Instrument Link Expanded System
TYPICAL LIL STATIONS

(2) - (31) STATIONS

MODEL 352B A11N1F
SINGLE-LOOP DIGITAL CONTROLLER

MODEL 351 A21NNN
TRIPLE-LOOP DIGITAL CONTROLLER

MODEL 324
PROGRAMMABLE SEQUENCE CONTROLLER

MODEL 320 A21NNN
INDEPENDENT COMPUTER INTERFACE

RS-232

MODEL 321 A121RNN
EXPANSION SATELLITE

(1-32)

HI-LEVEL
DATA LINK

(33-54)

MODEL 382 EA21N1F
LOGIC & SEQUENCE CONTROLLER

MODEL 383V A21N1N
MULTI-POINT DISPLAY STATION

MODEL 352E A21N1F
SINGLE-LOOP DIGITAL CONTROLLER

LOCAL INSTRUMENT LINK (LIL)

* MODEL 321A111RNN
CAN ALSO BE USED IF
NO. OF STATIONS < 31

1500 FT.

FIGURE AS-1842-3  Local Instrument Link Hi-Level Link Tie-In
# TABLE 2-1 - Model 385 Link Data Base Summary

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June 1994

2-81
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### Parameters

- **CH 7**: BAR, GRAPH, STATUS SW1
- **CH 8**: "A"
- **CH 9**: "A", ALARM STATUS SW7
- **CH 10**: "B"
- **CH 11**: "B", ALARM STATUS SW8

### Notes
- Parameters marked with: 
  - `+` are not valid when connected to a Model 348.
  - `^` are valid only for a Model 341

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June 1994
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**BEGIN PREAMBLE, DATABASE

******************************************************************************

* LOOP CONTROLLER OPERATOR STATION *
* DATABASE *

******************************************************************************

* ABSTRACT: This module defines the database of the 385. This database
* must reflect the definition of the database as found in the 385 design
* specification. The revision level of this file is to match the revision
* level of the design specification which it represents. Changes to this
* database are only to be performed by the person responsible for database
* coordination.

*

**END PREAMBLE, DATABASE

* LIR CONST

20

20 00000fb0
20 00000f60
20 00007fe0

*----------------------------------------------------------------------------*

* DATABASE COMPATIBILITY CODES *

*----------------------------------------------------------------------------*

* REVISIONS :

*DB_CMP: EQU $31 original developemental level 1.
DB_CMP: EQU $32 BBB release rev. 2

*DB_REV: EQU $30 original developemental level .0
DB_REV: EQU $31 NOTE: DR must always be greater than 0 from
* BBB level on to maintain compatability with
* config. program rev BBA

*----------------------------------------------------------------------------*

* MPU BOARD EQUATES *

*----------------------------------------------------------------------------*

* AD1DAT: EQU $2800 A/D #1 data, busy status, and link handshake
MAINIO: EQU $2800 D/A #1 data, output control, and digital outputs
A1CTRL: EQU $2802 A/D #1 control, mux set, and link lockout
C_7218: EQU $3000 Control register for 7218
PLSDAT: EQU $3000 Pulser input location (read)
D_7218: EQU $3001 Data register for 7218
KBDDAT: EQU $3001 Keyboard input location (read)
WDTIM: EQU $3002 Watch dog timer location (write to reset)
BASREG: EQU $3808 Base register of MC6840 timer I.C.
CONWRD: EQU $42 Control word sent to timer #1 of 6840

* This sets the timer for:
* a) use enable clock
* b) enable interrupt
* c) enable timer

COUNT1: EQU $411A Counter #1 seed value for 8.3 ms period @ 2MHz
DIPSWITCH: EQU $2803 Read only
* bit #: xxxxxxx1 = lockout HARD, T, FCO’s
  * xxxxxxx1x = lockout CALIBRATION
  * xxxxxxxxx = lockout ALARM
  * xxxxxxxxx = lockout TUNE
  * xxxxxxxxx = lockout SOFT

******************************************************************************

* PUSHBUTTON EQUATES
******************************************************************************

* CLS: EQU $00
  * EMPTY$: EQU $01
  * ACK$: EQU $02
  * DS: EQU $03
  * LOOPS: EQU $04
  * STORES: EQU $05
  * STPUP$: EQU $06
  * AMS: EQU $07
  * ENTER$: EQU $08
  * TUNES: EQU $09
  * LEFT$: EQU $09
  * STPDNS: EQU $0A
  * EXIT$: EQU $0B
  * SHOPS: EQU $0C
  * ALARMS: EQU $0D
  * RIGHTS: EQU $0D
  * TAGS: EQU $0E
  * ASCANS: EQU $0F

******************************************************************************

* MANUFACTURING BOARD EQUATES
******************************************************************************

* MANCOD: EQU $1000 Manufacturing board eprom start
  * MANTST: EQU $1006 Manufacturing test start address
  * MANID: EQU $4D42 Manufacturing board ID

******************************************************************************

* SERIAL PORT BOARD EQUATES
******************************************************************************

* ZFIRQ: EQU $1003 FIRQ routine entry point WHEN IN LINK SLOT
  * ZFIRQ2: EQU $5013 FIRQ routine entry point WHEN IN EXPANDER SLOT
  * ACIADATA: EQU $1FF1 TX and RX data registers
  * ACIACTRL: EQU $1FF0 Hardware address of acia control register
  * ACIA2EXP: EQU $5FFC Hardware address of acia control register
  * ACIA3EXP: EQU $5FFE Hardware address of acia control register
  * INITPRT2: EQU $5016 ESPT initialization routine entry
  * PORT2ID: EQU $5010 ROM ID code for ESPB
  * SPID: EQU $AA55 Serial Port board ID

******************************************************************************

* EXPANDER BOARD EQUATES
******************************************************************************

* BANK: EQU EXPDIR-4
  * AC_FLAG: EQU EXPDIR-6
2K DUAL-PORT EQUATES FOR LINK AND FB98

* RAM locations $1000 to $17FF

YY EQU $1000 OFFSET TO MOVE DUAL PORT RAM MAP INTO MPU RAM

ZZ EQU $1000 OFFSET TO MOVE GLOBAL DATA INTO MPU RAM ($100)

($1000 for REAL dual port)

I := SLC INPUT FROM LINK

O := SLC OUTPUT FOR LINK

LINKCODE: EQU YY+$5FE LINK COMPATIBILITY CODE
RX_BFI: EQU YY+$100 1.8 LIL receive command buffers, 32 bytes each
when first byte =0, no message present
RX_BFX: EQU YY+$1E0 1.

HLTSTO: EQU YY+$204 0. tells LILA to halt storing to part of dualport

2 bytes: halt = $1234 (from $1500 to $1FFF)

LILADDR: EQU YY+$206 1. LILA halt storing acknowledge (ACK = $AA)

LILADDR: EQU YY+$207 1. logical station address as LILA sets it

LILUPD: EQU YY+$208 1. LILA updated byte/5 sec; LILA still kicking

LILERR: EQU YY+$209 1. LILA error code; 0 = no error

CONFCM: EQU YY+$20A 1. global input config'd & updated; $FF = ready

SADDR: EQU YY+$210 0. station address input by SLC
GSCAN: EQU YY+$211 0. global scan complete = $AA by SLC
STSIZE: EQU YY+$212 0. station size (# of bytes) by SLC (2 BYTES)

EXTUPD: EQU YY+$217 0. SLC global update, inc'd by SLC after each cycle
HALFS: EQU YY+$218 0. inc'd every .5 sec. for LILA global update rate
LINKED: EQU YY+$21A 1. link board is actively operating
LILPER: EQU YY+$21E 1. link board personality ($1234 = good)
STATS: EQU YY+$220 1. ACTIVE STATION LIST (32 bytes): bit 0 set = onlink
OLMT: EQU YY+$28E 0. ONline MEMORY/Bus DRIVER TEST (2 BYTES)

each of next 3 tables are 16 bytes
**

GIORGIT: EQU YY+$290 0. global input origin table,STA# / CH# for SLC input
GIODATA: EQU YY+$2A0 1. global input data
GIUPDT: EQU YY+$2B0 1. global input updating, ONLY LSB inc'd by LILA

GIOGRT2: EQU YY+$2C0 0. global input origin table,STA# / CH# for SLC input
GIODATA2: EQU YY+$2D0 1. global input data
GIUPDT2: EQU YY+$2E0 1. global input updating, ONLY LSB inc'd by LILA

RECREC: EQU YY+$2FF 1. received unsolicited record flag

** RECREC is used when the SLC is sent records (download). This record
** transfer is only valid during CONF. HOLD.
** station transmit buffers, 32 bytes each

TX_BFI: EQU YY+$300 0.6 LIL TX command buffers
TX_BF6: EQU YY+$3A0 0.

record transfer buffers, 16 bytes each

RSNDTX: EQU YY+$3C0 0. send record TX buffer (due to rec. req.)
REQTX: EQU YY+$3D0 1. send record req. buf. (SLC DOES NOT USE IT)
RECRX1: EQU YY+$3E0 1. receive record request TX buffer
RCSTAT: EQU YY+$3F0 1. record buffer status
<table>
<thead>
<tr>
<th>Address</th>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>174 000013f0</td>
<td>RBFFLG:</td>
<td>EQU RCSTAT I/O. record buffer full flag (first byte of buff. stat.)</td>
</tr>
<tr>
<td>175</td>
<td>**</td>
<td>RBFFLG determines RECBUF use:</td>
</tr>
<tr>
<td>176</td>
<td>**</td>
<td>$0F = reserved for SLC use (SLC sending a record)</td>
</tr>
<tr>
<td>177</td>
<td>**</td>
<td>$F0 = reserved for LILA use (SLC receiving a record)</td>
</tr>
<tr>
<td>178</td>
<td>**</td>
<td>$00 = unreserved</td>
</tr>
<tr>
<td>179</td>
<td></td>
<td>RECBUF: EQU YY+400 I/O. record buffer (512 bytes)</td>
</tr>
<tr>
<td>180 00001400</td>
<td>GODATA:</td>
<td>EQU ZZ+600 O. global output data (need 76 bytes for SLC)</td>
</tr>
<tr>
<td>181 00001600</td>
<td>DPEND:</td>
<td>EQU YY+7FF I/O. LAST USEFUL DUAL-PORT LOCATION.</td>
</tr>
</tbody>
</table>

**VOLATILE DATA**

SECTION DSCT

OFFSET 0000

<table>
<thead>
<tr>
<th>Address</th>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>194 00000000</td>
<td>NMIFLAG:</td>
<td>RMB 1 Indicates NMI routine executing</td>
</tr>
<tr>
<td>195 00000001</td>
<td>RAMFLAG:</td>
<td>RMB 1 Indicates ramtest in progress</td>
</tr>
<tr>
<td>196</td>
<td></td>
<td>VOLITAL: EQU *</td>
</tr>
<tr>
<td>197 00000002</td>
<td></td>
<td>* ram from here to NONVITAL is initialized to $00 on powerup</td>
</tr>
<tr>
<td>198</td>
<td></td>
<td>HSTACK: EQU * Hardware Stack ($)</td>
</tr>
<tr>
<td>199</td>
<td></td>
<td>E00A: RMB 1 Controller software status</td>
</tr>
<tr>
<td>200</td>
<td></td>
<td>* LSE Bit # 1= condition TRUE 0= condition FALSE</td>
</tr>
<tr>
<td>201</td>
<td></td>
<td>7 6 5 4 3 2 1 0</td>
</tr>
<tr>
<td>210</td>
<td></td>
<td>FPSTACK: RMB 42 temporary User stack area for FPAC</td>
</tr>
<tr>
<td>211</td>
<td></td>
<td>FPSTKPTR: RMB 2 FPAC stack pointer storage register</td>
</tr>
<tr>
<td>212</td>
<td></td>
<td>E18A: RMB 1 link lockout and handshaking signals (bits 5 and 6)</td>
</tr>
<tr>
<td>213</td>
<td></td>
<td>E20A: RMB 2 Quick tune timeout counter</td>
</tr>
<tr>
<td>214</td>
<td></td>
<td>E22A: RMB 1 software cycle time counter</td>
</tr>
<tr>
<td>215</td>
<td></td>
<td>E24A: RMB 2 general purpose cycle counter</td>
</tr>
<tr>
<td>216</td>
<td></td>
<td>E25A: RMB 1 flashing 5 digit display duty cycle counter</td>
</tr>
<tr>
<td>217</td>
<td></td>
<td>E27A: RMB 1 finish task flag: used by routines which must finish</td>
</tr>
<tr>
<td>218</td>
<td></td>
<td>* an important task even if an NMI occurs</td>
</tr>
<tr>
<td>219</td>
<td></td>
<td>E29A: RMB 1 flashing status lights duty cycle counter</td>
</tr>
<tr>
<td>220</td>
<td></td>
<td>E30A: RMB 2 &quot;tick&quot; counter NOT updated when out of control</td>
</tr>
<tr>
<td>221</td>
<td></td>
<td>TIMCR2: RMB 1 Timer #2 control mirror</td>
</tr>
<tr>
<td>222</td>
<td></td>
<td>IRQ_FLAG: RMB 1 IRQ busy flag</td>
</tr>
<tr>
<td>223</td>
<td></td>
<td>CNTN_8: RMB 1 8.3 mSec interrupt counter</td>
</tr>
<tr>
<td>224</td>
<td></td>
<td>DISP_WDT: RMB 1 Display watchdog timer handshake with IRQ</td>
</tr>
<tr>
<td>225</td>
<td></td>
<td>LOCKOUT: RMB 1 0 = menu not locked out ; 1 = menu is locked out</td>
</tr>
<tr>
<td>226</td>
<td></td>
<td>E29A: RMB 1 flashing status lights duty cycle counter</td>
</tr>
<tr>
<td>227</td>
<td></td>
<td>E30A: RMB 2 &quot;tick&quot; counter NOT updated when out of control</td>
</tr>
<tr>
<td>228</td>
<td></td>
<td>TIMCR2: RMB 1 Timer #2 control mirror</td>
</tr>
<tr>
<td>229</td>
<td></td>
<td>IRQ_FLAG: RMB 1 IRQ busy flag</td>
</tr>
<tr>
<td>230</td>
<td></td>
<td>CNTN_8: RMB 1 8.3 mSec interrupt counter</td>
</tr>
<tr>
<td>231</td>
<td></td>
<td>DISP_WDT: RMB 1 Display watchdog timer handshake with IRQ</td>
</tr>
<tr>
<td>232</td>
<td></td>
<td>LOCKOUT: RMB 1 0 = menu not locked out ; 1 = menu is locked out</td>
</tr>
</tbody>
</table>
SCRAFLASHPAD:
E11A: RMB $20 Control level code scratch pad
E12A: RMB $10 IRQ level code scratch pad

******************************************************************************
* CONFIGURATION RAM *
******************************************************************************

* FF = VIEW
  0 = MAIN MENU
  1 = FUNCTION BLOCK
  2 = PARAMETER
  3 = VALUE
  all other values INVALID

CON_LEV: RMB 1 Current configuration level (0,1,2,3)

CON_TAB: RMB 2 Address of config table being used
CON_MAX: RMB 1 Maximum number of parameters
CON_PAR: RMB 1 Current relative parameter # (1to?)

REF: EQU * Reference point for the following offsets

.FBN: EQU *-REF
CON_FBN: RMB 1 Current function block # (1to99)

.LPN: EQU *-REF
CON_LPN: RMB 2 Current logical parameter number

.HART: EQU *-REF
CON_HART: RMB 1 Current config. par's HART write command code

.ADDR: EQU *-REF
CON_ADDR: RMB 2 Current config. par's address code

.SIZE: EQU *-REF
CON_SIZE: RMB 1 Current config. par's size (bytes)

.HILIM: EQU *-REF
HILIMIT: RMB 2 Current parameter's upper value limit

.VALUE: EQU *-REF
CON_VAL: RMB 2 Current parameter value (0to$FFFF)

.LOLIM: EQU *-REF
LOLIMIT: RMB 2 Current parameter's lower value limit

.Loop: EQU *-REF
CON_LOOP: RMB 1 Current relative LOOP number

.MESS: EQU *-REF
CON_MESS: RMB 4 Current config. par's message (HInx, SRE, etc.)

.DCC: EQU *-REF
CON_DCC: RMB 1 Current par display characterizer code (DCC)

.SCC: EQU *-REF
CON_SCC: RMB 1 Current par storage characterizer code (SCC)

.PLL: EQU *-REF
CON_PLL: RMB 1 Current par pulser limit code (PLC)

.ACC.TAB: RMB 2 Pulser acceleration look-up table
.BUT.BFR: RMB 2 Button buffer
.PASS: RMB 1 Pass count for loop control
.QWIKFLAG: RMB 1 Indicates qwik tune / qwik alarm active
.QWIKRAM: RMB 4 Qwik tune / alarm scratchpad

****************************************************************************

* DIAGNOSTIC RAM *

* D02B: RMB 2 Most recent error code (volitlal version)
D05A: RMB 1 Was A/D, D/A #1 diagnostic routine status , Not used
D06A: RMB 1 Was A/D, D/A #2 diagnostic routine status , Not used
D07A: RMB 1 DISPLAY TEST HANDSHAKE FLAG
D08A: RMB 1 DISPLAY TEST TIME BETWEEN SHIFTS
NONMI: RMB 1 Flag for no NMI at last power down
DEEROR: RMB 1 miscellaneous DIAGNOSTIC ERROR FLAG
AD2_UPD: RMB 1 Expander Board A/D updating flag
EL_FLAG: RMB 1 Emergency Local Flag
LNK.ERR: RMB 2 LIL clearable version of D02B
EXECFLG: RMB 1 Function execution flag
OVERTIME: RMB 1 Overtime cycle counter

*****************************************************************************

* I/O DATA *

*****************************************************************************

PWR_UP: RMB 1 0 = Power up cycle 1 = Running
MPU_MUX: RMB 1 A/D multiplexer control word
I00A: RMB 2 A/D #1 input #1 (raw FB 01 Analog Input)
I01A: RMB 2 A/D #1 input #2 (raw FB 02 Analog Input)
I02A: RMB 2 A/D #1 input #3 (not used)
I03A: RMB 2 A/D #1 input #4 (ground reference)
I31A: RMB 1 not used space holder only
I08A: RMB 2 D/A #1 output value (FB 03 analog output)
I09A: RMB 1 D/A #1 output ON/OFF state
I12A: RMB 1 state of Digital Input #1 (FB06)
I13A: RMB 1 state of Digital Output #s 1 & 2 (FB04 & FB05)

* bit 4 = 1 FB04 output "ON" ; 0 = "OFF"
* bit 5 = 1 FB05 output "ON" ; 0 = "OFF"

*****************************************************************************

* DISPLAY AND BUTTON CONTROL RAM *

*****************************************************************************
<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>351</td>
<td>PULSES: Translated pulser count</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>352</td>
<td>FASTPULS: Accelerated pulser count</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>353</td>
<td>PB_STAT: Pushbutton status (see pushbutton equates)</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>354</td>
<td>DISP_BUF: Magnitude of number currently displayed</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>355</td>
<td>DPOINT: Decimal point of number currently displayed</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>356</td>
<td>SIGN: Sign of number currently displayed</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>357</td>
<td>ADDR_DIG: Address of 5 digit segment string to display</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>358</td>
<td>FLAG_DIG: Flag determines if 5 digit segment driver runs</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>359</td>
<td>ADDR_ALF: Address of alpha string to display</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>360</td>
<td>ALFA_1: Data displayed in first alpha-num. char. from left</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>361</td>
<td>ALFA_2: Data displayed in second alpha-num. char. from left</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>362</td>
<td>ALFA_3: Data displayed in third alpha-num. char. from left</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>363</td>
<td>ALFA_4: Data displayed in fourth alpha-num. char. from left</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>364</td>
<td>LAMPSTAT: Bit mapping of lamps currently on</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>365</td>
<td>NUMSTAT: Bit mapping of current display lamp on</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>366</td>
<td>ALRMSTAT: Bit mapping of currently active alarm lamps</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>367</td>
<td>FLASHER: Bit mapping of alarm lamps currently on and/or flashing</td>
<td>RMB</td>
<td>4</td>
</tr>
<tr>
<td>368</td>
<td>LST_DSP: Last cycle value of DISPNUM</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>369</td>
<td>NOZERO: Leading zero suppression flag</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>370</td>
<td>RANGE: FP form of current display block full scale value</td>
<td>RMB</td>
<td>4</td>
</tr>
<tr>
<td>371</td>
<td>ZERO: FP form of current display block zero scale value</td>
<td>RMB</td>
<td>4</td>
</tr>
<tr>
<td>372</td>
<td>BUT_STAT: Front panel display lamp status</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>373</td>
<td>DEBTIME: Debounce time counter for autorepeat pushbuttons</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>374</td>
<td>LST_INP: Displayed loop's last 5 digit value</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>375</td>
<td>LST_BUT: Last button pressed</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>376</td>
<td>FAILCODE: Code indicating failure mode</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>377</td>
<td>NEW_ERR: Flag indicating direction of pulser turn</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>378</td>
<td>DIRECT: Flag controls blinking cursor</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>379</td>
<td>FLASH: Totalized on-line error count</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>380</td>
<td>E_COUNT: Flag controls blinking cursor</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>381</td>
<td>CUR_FLG: Scroll time counter</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>382</td>
<td>BLNK: Scroll time counter</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>383</td>
<td>SCROLL: Delay</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>384</td>
<td>DELAY: Bit mapped on-line errors that are active</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>385</td>
<td>E_ACTIVE: Bit mapped on-line errors that are acknowledged</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>386</td>
<td>E_ACK: Bit mapped currently displayed on-line error</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>387</td>
<td>E_DISP: Bit mapped active non-updating inputs</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>388</td>
<td>NU_ACTIVE: Bit mapped acknowledged non-updating inputs</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>389</td>
<td>NU_ACK: Bit mapped last displayed non-updating input</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>390</td>
<td>NU_DISP: MSB = NON-UPDATING STATION # ; LSB = EFFECTED OUTPUT</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>391</td>
<td>NUI_DATA: Display driver #1 data</td>
<td>RMB</td>
<td>8</td>
</tr>
<tr>
<td>392</td>
<td>DR1_DAT: Display driver #1 data</td>
<td>RMB</td>
<td>8</td>
</tr>
<tr>
<td>393</td>
<td>DR2_DAT: Display driver #2 data</td>
<td>RMB</td>
<td>8</td>
</tr>
<tr>
<td>394</td>
<td>DR3_DAT: Display driver #3 data</td>
<td>RMB</td>
<td>8</td>
</tr>
<tr>
<td>395</td>
<td>DR4_DAT: Display driver #4 data</td>
<td>RMB</td>
<td>8</td>
</tr>
<tr>
<td>396</td>
<td>D_FLAG: NOT 0 = autoscan in progress</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>397</td>
<td>SCRITIME: Scroll time counter</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>398</td>
<td>DELTIME: Delay time counter</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>399</td>
<td>WINDOW: Alpha-numeric Window position in ASCII Character String $20 to $5Es</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>400</td>
<td>CURSOR: Cursor position in window</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>401</td>
<td>ALF_BLNK: Flag to blank the alpha-numeric display</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>402</td>
<td>BLNK_5: Flag to blank the 5 digit display</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>403</td>
<td>NUM_BLNK: Flag to blank the 1 to 10 numerical Lamps</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>404</td>
<td>D.BLINK: Flag to blank the P.S and V lamps</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>405</td>
<td>BUT_BLNK: Flag to blank the CFl and AM lamps</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>406</td>
<td>LST_VAL: Last value of E22A used by control</td>
<td>RMB</td>
<td>2</td>
</tr>
<tr>
<td>407</td>
<td>BGFLASH: Flag indicating a flashing Bargraph</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>408</td>
<td>CAL_FLG: Shop calibration in progress flag = 1 else = 0</td>
<td>RMB</td>
<td>1</td>
</tr>
<tr>
<td>409</td>
<td>NUI_CHK: NUI CHECK FLAG: 0 = DON'T CHECK, NOT 0 = CHECK NUI</td>
<td>RMB</td>
<td>1</td>
</tr>
</tbody>
</table>
410 000001c7 UPDFLAG: RMB 1 Force display update flag
411 000001c8 UPDTIME: RMB 1 Time until next natural display update
412 000001c9 SHOW_ACN: RMB 1 Auto-Configuration in progress flag
413 000001ca SCRIL_FLG: RMB 1 Alpha-numeric display scrolling flag
414 000001cb EXECFLAG: RMB 1 Indicates whether or not HART board code executed
415 000001cc BAR_COUNT: RMB 3 Last bar count SP:PV:VB
416 000001cf KBD_BUFR: RMB 1 Current keyboard latch
417 000001d0 PV_ADDR: RMB 2 Address of current display's PV value (12 BIT)
418 000001d2 SP_ADDR: RMB 2 Address of current display's SP value (12 BIT)
419 000001d4 VB_ADDR: RMB 2 Address of current display's VB value (12 BIT)
420 000001d6 PV_VALUE: RMB 2 Displayed loop's current Process value
421 000001d8 SP_VALUE: RMB 2 Displayed current Setpoint value
422 000001da VB_VALUE: RMB 2 Displayed loop's current Valve value
423 000001dc LAST_PV: RMB 2 Displayed loop's last Process value
424 000001de LAST_SP: RMB 2 Displayed loop's last Setpoint value
425 000001e0 LAST_VB: RMB 2 Displayed loop's last Valve value
426 000001e2 DISP.ZERO: RMB 4 Current display's Range Lo Value (Floating Point)
427 000001e6 DISP.SPAN: RMB 4 Current display's Range Hi to Lo Value (Floating Point)
428 000001ea DISP.DPP: RMB 1 Current display's Decimal point position
429 000001eb DISP.ENG: RMB 4 Current display's Eng. Units ASCII string
430 000001ef ROT_STAT: RMB 1 Rotate status stack flag
431 000001f0 VALID_D: RMB 1 Flag to which P, S or V bars are valid
432 000001f1 VBD: RMB 1 Valve Bar Direct flag (dir; NOT 0 = rev
433 000001f2 CWMM: RMB 1 Clockwise Manual flag (CW; NOT 0 = CCW
434 000001f3 DISP.TYP: RMB 1 Current display type
435 000001f4 DISP.INE: RMB 1 Current display External setpoint value
436 000001f5 DISP_E: RMB 2 Current display Error status
437 000001f7 LINMODE: RMB 1 Current C/L button / C/L lamp / C/L mode defaults
438 000001fa DISPLAY_INIT: RMB 1 Initialize display flag (0: reinit
439 000001f9 REO: RMB 1 Recalc DCFB control flag

******************************************************************************
*  VOLATILE FUNCTION BLOCK DATA  
******************************************************************************

* SW04: RMB 2 Trending Status

* 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
* - - - - - - L10 L9 L8 L7 L6 L5 L4 L3 L2 L1
* : Not used, set to 0
* L1: Loop #1 Trending, 0 = NOT Trending
* L2: Loop #2 Trending, 0 = NOT Trending
* L3: Loop #3 Trending, 0 = NOT Trending
* L4: Loop #4 Trending, 0 = NOT Trending
* L5: Loop #5 Trending, 0 = NOT Trending
* L6: Loop #6 Trending, 0 = NOT Trending
* L7: Loop #7 Trending, 0 = NOT Trending
* L8: Loop #8 Trending, 0 = NOT Trending
* L9: Loop #9 Trending, 0 = NOT Trending
* L10: Loop #10 Trending, 0 = NOT Trending

* SW05: RMB 2 Flashing Bargraph status

* 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
* - - - - - - L10 L9 L8 L7 L6 L5 L4 L3 L2 L1
*
SW06: RMB 2 Valve Bar Direct Status

ANALOG INPUT #1

F0100A: RMB 4 Kf, breakpoint derived coefficient
         RMB 4 Floating point representation of output
         RMB 4 Gain coefficient

ANALOG INPUT #2

F0200A: RMB 4 Kf, breakpoint derived coefficient
         RMB 4 Floating point representation of output
         RMB 4 Gain coefficient

ANALOG OUTPUT #1

F0300A: RMB 4 Gain coefficient

DISPLAY BLOCK #1

F1100A: RMB 2 Present cycle INA value
         RMB 2 Address of Alarm #1 Trip-point
         RMB 2 Delay time remaining in/out of alarm #1 (ticks)
         RMB 2 Alarm #1 deadband
         RMB 1 Alarm #1 status
         RMB 2 Address of Alarm #2 Trip-point
528 0000227  RMB 2  Delay time remaining in/out of alarm #2 (ticks)
529 0000229  RMB 2  Alarm #2 deadband
530 000022b  RMB 1  Alarm #2 status
531 000022c  RMB 2  Address of Alarm #3 Trip-point
532 000022e  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
533 0000230  RMB 2  Alarm #3 deadband
534 0000232  RMB 1  Alarm #3 status
535 0000233  RMB 2  Address of Alarm #4 Trip-point
536 0000235  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
537 0000237  RMB 2  Alarm #4 deadband
538 0000239  RMB 1  Alarm #4 status
539 000023a  RMB 2  Bit map of active statuses (alarm and error)

540 0000020  .E_ACK: EQU *.F1100A
541 000023c  RMB 2  Bit map of acknowledged statuses
542 000023e  RMB 1  Bit map of statuses configured to flash
543 000023f  RMB 1  Bit map of statuses configured to light
544 0000240  RMB 1  Bit map of active alarms
545 0000241  RMB 2  Last cycle active status
546 000027  .KF: EQU *.F1100A
547 0000243  RMB 4  Kf, breakpoint derived coefficient
548 000002b  .FPOUT: EQU *.F1100A
549 0000247  RMB 4  FP form of previous cycle output value
550 000024b  RMB 1  First cycle flag
551 0000030  .CDT: EQU *.F1100A
552 000024c  RMB 1  configured display type
553  *  $FF = signal /conventional type display
554  *  $00 = smart xmt/r mod 348 physical connection
555  *  $0n = model 348 logical loop display
556  *  n = associated physical loop # (1-10)
557 558 559  DISPLAY BLOCK #2
560
561 000024d  F1200A: RMB 2  Present cycle INA value
562 000024f  RMB 2  Address of Alarm #1 Trip-point
563 0000251  RMB 2  Delay time remaining in/out of alarm #1 (ticks)
564 0000253  RMB 2  Alarm #1 deadband
565 0000255  RMB 1  Alarm #1 status
566 0000256  RMB 2  Address of Alarm #2 Trip-point
567 0000258  RMB 2  Delay time remaining in/out of alarm #2 (ticks)
568 000025a  RMB 2  Alarm #2 deadband
569 000025c  RMB 1  Alarm #2 status
570 000025d  RMB 2  Address of Alarm #3 Trip-point
571 000025f  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
572 0000261  RMB 2  Alarm #3 deadband
573 0000263  RMB 1  Alarm #3 status
574 0000264  RMB 2  Address of Alarm #4 Trip-point
575 0000266  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
576 0000268  RMB 2  Alarm #4 deadband
577 000026a  RMB 1  Alarm #4 status
578 000026b  ESW02: RMB 2  Bit map of active statuses (alarm and error)
579 000026d  RMB 2  Bit map of acknowledged statuses
580 000026f  RMB 1  Bit map of statuses configured to flash the lamp
581 0000270  RMB 1  Bit map of statuses configured to light the lamp
582 0000271  RMB 1  Bit map of active alarms
583 0000272  RMB 2  Last cycle active status
584 0000274  RMB 4  Kf, breakpoint derived coefficient
585 0000278  RMB 4  FP form of previous cycle output value
586 000027c  RMB 1  First cycle flag
<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>587 0000027d</td>
<td>RMB 1 configured display type</td>
</tr>
<tr>
<td>588</td>
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<tr>
<td>589</td>
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<tr>
<td>590</td>
<td>DISPLAY BLOCK #3</td>
</tr>
<tr>
<td>591</td>
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</tr>
<tr>
<td>592 0000027e</td>
<td>F1300A: RMB 2 Present cycle INA value</td>
</tr>
<tr>
<td>593 00000280</td>
<td>RMB 2 Address of Alarm #1 Trip-point</td>
</tr>
<tr>
<td>594 00000282</td>
<td>RMB 2 Delay time remaining in/out of alarm #1 (ticks)</td>
</tr>
<tr>
<td>595 00000284</td>
<td>RMB 2 Alarm #1 deadband</td>
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<tr>
<td>596 00000286</td>
<td>RMB 1 Alarm #1 status</td>
</tr>
<tr>
<td>597 00000287</td>
<td>RMB 2 Address of Alarm #2 Trip-point</td>
</tr>
<tr>
<td>598 00000289</td>
<td>RMB 2 Delay time remaining in/out of alarm #2 (ticks)</td>
</tr>
<tr>
<td>599 0000028b</td>
<td>RMB 2 Alarm #2 deadband</td>
</tr>
<tr>
<td>600 0000028d</td>
<td>RMB 1 Alarm #2 status</td>
</tr>
<tr>
<td>601 0000028c</td>
<td>RMB 2 Address of Alarm #3 Trip-point</td>
</tr>
<tr>
<td>602 00000290</td>
<td>RMB 2 Delay time remaining in/out of alarm #3 (ticks)</td>
</tr>
<tr>
<td>603 00000292</td>
<td>RMB 2 Alarm #3 deadband</td>
</tr>
<tr>
<td>604 00000294</td>
<td>RMB 1 Alarm #3 status</td>
</tr>
<tr>
<td>605 00000295</td>
<td>RMB 2 Address of Alarm #4 Trip-point</td>
</tr>
<tr>
<td>606 00000297</td>
<td>RMB 2 Delay time remaining in/out of alarm #4 (ticks)</td>
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<td>607 00000299</td>
<td>RMB 2 Alarm #4 deadband</td>
</tr>
<tr>
<td>608 0000029b</td>
<td>RMB 1 Alarm #4 status</td>
</tr>
<tr>
<td>609 0000029c</td>
<td>ESW03: RMB 2 Bit map of active statuses (alarm and error)</td>
</tr>
<tr>
<td>610 0000029e</td>
<td>RMB 2 Bit map of acknowledged statuses</td>
</tr>
<tr>
<td>611 000002a0</td>
<td>RMB 1 Bit map of statuses configured to flash the lamp</td>
</tr>
<tr>
<td>612 000002a1</td>
<td>RMB 1 Bit map of statuses configured to light the lamp</td>
</tr>
<tr>
<td>613 000002a2</td>
<td>RMB 1 Bit map of active alarms</td>
</tr>
<tr>
<td>614 000002a3</td>
<td>RMB 2 Last cycle active status</td>
</tr>
<tr>
<td>615 000002a4</td>
<td>RMB 4 Kf, breakpoint derived coefficient</td>
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<td>616 000002a5</td>
<td>RMB 4 FP form of previous cycle output value</td>
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<td>617 000002a6</td>
<td>ESW03: RMB 1 First cycle flag</td>
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<td>618 000002ae</td>
<td>RMB 1 configured display type</td>
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<td>619</td>
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<td>DISPLAY BLOCK #4</td>
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</tr>
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<td>623 000002af</td>
<td>F1400A: RMB 2 Present cycle INA value</td>
</tr>
<tr>
<td>624 000002b0</td>
<td>RMB 2 Address of Alarm #1 Trip-point</td>
</tr>
<tr>
<td>625 000002b3</td>
<td>RMB 2 Delay time remaining in/out of alarm #1 (ticks)</td>
</tr>
<tr>
<td>626 000002b5</td>
<td>RMB 2 Alarm #1 deadband</td>
</tr>
<tr>
<td>627 000002b7</td>
<td>RMB 1 Alarm #1 status</td>
</tr>
<tr>
<td>628 000002b9</td>
<td>RMB 2 Address of Alarm #2 Trip-point</td>
</tr>
<tr>
<td>629 000002ba</td>
<td>RMB 2 Delay time remaining in/out of alarm #2 (ticks)</td>
</tr>
<tr>
<td>630 000002bc</td>
<td>RMB 2 Alarm #2 deadband</td>
</tr>
<tr>
<td>631 000002be</td>
<td>RMB 1 Alarm #2 status</td>
</tr>
<tr>
<td>632 000002bf</td>
<td>RMB 2 Address of Alarm #3 Trip-point</td>
</tr>
<tr>
<td>633 000002c1</td>
<td>RMB 2 Delay time remaining in/out of alarm #3 (ticks)</td>
</tr>
<tr>
<td>634 000002c3</td>
<td>RMB 2 Alarm #3 deadband</td>
</tr>
<tr>
<td>635 000002c5</td>
<td>RMB 1 Alarm #3 status</td>
</tr>
<tr>
<td>636 000002c6</td>
<td>RMB 2 Address of Alarm #4 Trip-point</td>
</tr>
<tr>
<td>637 000002c8</td>
<td>RMB 2 Delay time remaining in/out of alarm #4 (ticks)</td>
</tr>
<tr>
<td>638 000002ca</td>
<td>RMB 2 Alarm #4 deadband</td>
</tr>
<tr>
<td>639 000002cc</td>
<td>RMB 1 Alarm #4 status</td>
</tr>
<tr>
<td>640 000002cd</td>
<td>ESW04: RMB 2 Bit map of active statuses (alarm and error)</td>
</tr>
<tr>
<td>641 000002cf</td>
<td>RMB 2 Bit map of acknowledged statuses</td>
</tr>
<tr>
<td>642 000002d1</td>
<td>RMB 1 Bit map of statuses configured to flash the lamp</td>
</tr>
<tr>
<td>643 000002d2</td>
<td>RMB 1 Bit map of statuses configured to light the lamp</td>
</tr>
<tr>
<td>644 000002d3</td>
<td>RMB 1 Bit map of active alarms</td>
</tr>
<tr>
<td>645 000002d4</td>
<td>RMB 2 Last cycle active status</td>
</tr>
</tbody>
</table>
* DISPLAY BLOCK #5

F1500A:  
RMB  2  Present cycle INA value
RMB  2  Address of Alarm #1 Trip-point
RMB  2  Delay time remaining in/out of alarm #1 (ticks)
RMB  2  Alarm #1 deadband
RMB  1  Alarm #1 status
RMB  2  Address of Alarm #2 Trip-point
RMB  2  Delay time remaining in/out of alarm #2 (ticks)
RMB  2  Alarm #2 deadband
RMB  1  Alarm #2 status
RMB  2  Address of Alarm #3 Trip-point
RMB  2  Delay time remaining in/out of alarm #3 (ticks)
RMB  2  Alarm #3 deadband
RMB  1  Alarm #3 status
RMB  2  Address of Alarm #4 Trip-point
RMB  2  Delay time remaining in/out of alarm #4 (ticks)
RMB  2  Alarm #4 deadband
RMB  1  Alarm #4 status

ESW05:  
RMB  2  Bit map of active statuses (alarm and error)
RMB  2  Bit map of acknowledged statuses
RMB  1  Bit map of statuses configured to flash the lamp
RMB  1  Bit map of statuses configured to light the lamp
RMB  1  Bit map of active alarms
RMB  2  Last cycle active status
RMB  4  Kf, breakpoint derived coefficient
RMB  4  FP form of previous cycle output value
RMB  1  configured display type

* DISPLAY BLOCK #6

F1600A:  
RMB  2  Present cycle INA value
RMB  2  Address of Alarm #1 Trip-point
RMB  2  Delay time remaining in/out of alarm #1 (ticks)
RMB  2  Alarm #1 deadband
RMB  1  Alarm #1 status
RMB  2  Address of Alarm #2 Trip-point
RMB  2  Delay time remaining in/out of alarm #2 (ticks)
RMB  2  Alarm #2 deadband
RMB  1  Alarm #2 status
RMB  2  Address of Alarm #3 Trip-point
RMB  2  Delay time remaining in/out of alarm #3 (ticks)
RMB  2  Alarm #3 deadband
RMB  1  Alarm #3 status
RMB  2  Address of Alarm #4 Trip-point
RMB  2  Delay time remaining in/out of alarm #4 (ticks)
RMB  2  Alarm #4 deadband
RMB  1  Alarm #4 status

ESW06:  
RMB  2  Bit map of active statuses (alarm and error)
RMB  2  Bit map of acknowledged statuses
RMB  1  Bit map of statuses configured to flash the lamp
705 00000334  RMB 1  Bit map of statuses configured to light the lamp
706 00000335  RMB 1  Bit map of active alarms
707 00000336  RMB 2  Last cycle active status
708 00000338  RMB 4  Kf, breakpoint derived coefficient
709 0000033e  RMB 4  FP form of previous cycle output value
710 00000340  RMB 1  First cycle flag
711 00000341  RMB 1  configured display type
712
713
714  * DISPLAY BLOCK #7
715
716 00000342  F1700A: RMB 2  Present cycle INA value
717 00000344  RMB 2  Address of Alarm #1 Trip-point
718 00000346  RMB 2  Delay time remaining in/out of alarm #1 (ticks)
719 00000348  RMB 2  Alarm #1 deadband
720 0000034a  RMB 1  Alarm #1 status
721 0000034b  RMB 2  Address of Alarm #2 Trip-point
722 0000034d  RMB 2  Delay time remaining in/out of alarm #2 (ticks)
723 0000034f  RMB 2  Alarm #2 deadband
724 00000351  RMB 1  Alarm #2 status
725 00000352  RMB 2  Address of Alarm #3 Trip-point
726 00000354  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
727 00000356  RMB 2  Alarm #3 deadband
728 00000358  RMB 1  Alarm #3 status
729 00000359  RMB 2  Address of Alarm #4 Trip-point
730 0000035b  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
731 0000035d  RMB 2  Alarm #4 deadband
732 0000035f  RMB 1  Alarm #4 status
733 00000360  ESW07: RMB 2  Bit map of active statuses (alarm and error)
734 00000362  RMB 2  Bit map of acknowledged statuses
735 00000364  RMB 1  Bit map of statuses configured to flash the lamp
736 00000365  RMB 1  Bit map of statuses configured to light the lamp
737 00000366  RMB 1  Bit map of active alarms
738 00000367  RMB 2  Last cycle active status
739 00000369  RMB 4  Kf, breakpoint derived coefficient
740 0000036d  RMB 4  FP form of previous cycle output value
741 00000371  RMB 1  First cycle flag
742 00000372  RMB 1  configured display type
743
744
745  * DISPLAY BLOCK #8
746
747 00000373  F1800A: RMB 2  Present cycle INA value
748 00000375  RMB 2  Address of Alarm #1 Trip-point
749 00000377  RMB 2  Delay time remaining in/out of alarm #1 (ticks)
750 00000379  RMB 2  Alarm #1 deadband
751 0000037b  RMB 1  Alarm #1 status
752 0000037c  RMB 2  Address of Alarm #2 Trip-point
753 0000037e  RMB 2  Delay time remaining in/out of alarm #2 (ticks)
754 00000380  RMB 2  Alarm #2 deadband
755 00000382  RMB 1  Alarm #2 status
756 00000383  RMB 2  Address of Alarm #3 Trip-point
757 00000385  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
758 00000387  RMB 2  Alarm #3 deadband
759 00000389  RMB 1  Alarm #3 status
760 0000038a  RMB 2  Address of Alarm #4 Trip-point
761 0000038c  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
762 0000038e  RMB 2  Alarm #4 deadband
763 00000390  RMB 1  Alarm #4 status
764 00000391  ESW08:  RMB  2  Bit map of active statuses (alarm and error)
765 00000393  RMB  2  Bit map of acknowledged statuses
766 00000395  RMB  1  Bit map of statuses configured to flash the lamp
767 00000396  RMB  1  Bit map of statuses configured to light the lamp
768 00000397  RMB  1  Bit map of active alarms
769 00000398  RMB  2  Last cycle active status
770 0000039a  RMB  4  Kf, breakpoint derived coefficient
771 0000039e  RMB  4  FP form of previous cycle output value
772 000003a2  RMB  1  First cycle flag
773 000003a3  RMB  1  configured display type
774
775
776  *  DISPLAY BLOCK #9
777
778 000003a4  F1900A:  RMB  2  Present cycle INA value
779 000003a6  RMB  2  Address of Alarm #1 Trip-point
780 000003a8  RMB  2  Delay time remaining in/out of alarm #1 (ticks)
781 000003aa  RMB  2  Alarm #1 deadband
782 000003ac  RMB  1  Alarm #1 status
783 000003ad  RMB  2  Address of Alarm #2 Trip-point
784 000003af  RMB  2  Delay time remaining in/out of alarm #2 (ticks)
785 000003b1  RMB  2  Alarm #2 deadband
786 000003b3  RMB  1  Alarm #2 status
787 000003b4  RMB  2  Address of Alarm #3 Trip-point
788 000003b6  RMB  2  Delay time remaining in/out of alarm #3 (ticks)
789 000003b8  RMB  2  Alarm #3 deadband
790 000003ba  RMB  1  Alarm #3 status
791 000003bb  RMB  2  Address of Alarm #4 Trip-point
792 000003bd  RMB  2  Delay time remaining in/out of alarm #4 (ticks)
793 000003bf  RMB  2  Alarm #4 deadband
794 000003c1  RMB  1  Alarm #4 status
795 000003c2  ESW09:  RMB  2  Bit map of active statuses (alarm and error)
796 000003c4  RMB  2  Bit map of acknowledged statuses
797 000003c6  RMB  1  Bit map of statuses configured to flash the lamp
798 000003c7  RMB  1  Bit map of statuses configured to light the lamp
799 000003e8  RMB  1  Bit map of active alarms
800 000003e9  RMB  2  Last cycle active status
801 000003eb  RMB  4  Kf, breakpoint derived coefficient
802 000003ef  RMB  4  FP form of previous cycle output value
803 000003d3  RMB  1  First cycle flag
804 000003d4  RMB  1  configured display type
805
806
807  *  DISPLAY BLOCK #10
808
809 000003d5  F2000A:  RMB  2  Present cycle INA value
810 000003d7  RMB  2  Address of Alarm #1 Trip-point
811 000003d9  RMB  2  Delay time remaining in/out of alarm #1 (ticks)
812 000003db  RMB  2  Alarm #1 deadband
813 000003dd  RMB  1  Alarm #1 status
814 000003de  RMB  2  Address of Alarm #2 Trip-point
815 000003e0  RMB  2  Delay time remaining in/out of alarm #2 (ticks)
816 000003e2  RMB  2  Alarm #2 deadband
817 000003e4  RMB  1  Alarm #2 status
818 000003e5  RMB  2  Address of Alarm #3 Trip-point
819 000003e7  RMB  2  Delay time remaining in/out of alarm #3 (ticks)
820 000003e9  RMB  2  Alarm #3 deadband
821 000003eb  RMB  1  Alarm #3 status
822 000003ec  RMB  2  Address of Alarm #4 Trip-point
823 000003ee  RMB  2  Delay time remaining in/out of alarm #4 (ticks)
824 000003e0  RMB  2  Alarm #4 deadband
825 000003e2  RMB  1  Alarm #4 status
826 000003e3  ESW10: RMB  2  Bit map of active statuses (alarm and error)
827 000003e5  RMB  2  Bit map of acknowledged statuses
828 000003e7  RMB  1  Bit map of statuses configured to flash the lamp
829 000003e8  RMB  1  Bit map of statuses configured to light the lamp
830 000003e9  RMB  1  Bit map of active alarms
831 000003fa  RMB  2  Last cycle active status
832 000003fc  RMB  4  Kf, breakpoint derived coefficient
833 00000400  RMB  4  FP form of previous cycle output value
834 00000404  RMB  1  First cycle flag
835 00000405  RMB  1  configured display type
836
837
838
839
840 00000406  F3000A: RMB  1  Ack. Button pushed flag
841 00000407  RMB  1  Last cycle logic value of INA
842 00000408  RMB  1  Last cycle pulse status
843 00000409  RMB  1  Pulse in alarm timer
844 0000040a  RMB  1  Pulse out alarm timer
845
846
847
848
849 0000040b  F3500A: RMB  4  G01 : FP form of the GAIN on the OUTPUT
850 0000040f  RMB  4  GA1 : FP form of the GAIN on INA
851 00000413  RMB  4  GB1 : FP form of the GAIN on INB
852 00000417  RMB  4  GC1 : FP form of the GAIN on INC
853 0000041b  RMB  4  BO1 : FP form of the BIAS on the OUTPUT
854 0000041f  RMB  4  BA1 : FP form of the BIAS on INA
855 00000423  RMB  4  BB1 : FP form of the BIAS on INB
856 00000427  RMB  4  BC1 : FP form of the BIAS on INC
857
858
859
860
861 0000042b  F3600A: RMB  4  G01 : FP form of the GAIN on the OUTPUT
862 0000042f  RMB  4  GA1 : FP form of the GAIN on INA
863 00000433  RMB  4  GB1 : FP form of the GAIN on INB
864 00000437  RMB  4  GC1 : FP form of the GAIN on INC
865 0000043b  RMB  4  BO1 : FP form of the BIAS on the OUTPUT
866 0000043f  RMB  4  BA1 : FP form of the BIAS on INA
867 00000443  RMB  4  BB1 : FP form of the BIAS on INB
868 00000447  RMB  4  BC1 : FP form of the BIAS on INC
869
870
871
872
873 0000044b  F3700A: RMB  4  G01 : FP form of the GAIN on the OUTPUT
874 0000044f  RMB  4  GA1 : FP form of the GAIN on INA
875 00000453  RMB  4  GB1 : FP form of the GAIN on INB
876 00000457  RMB  4  GC1 : FP form of the GAIN on INC
877 0000045b  RMB  4  BO1 : FP form of the BIAS on the OUTPUT
878 0000045f  RMB  4  BA1 : FP form of the BIAS on INA
879 00000463  RMB  4  BB1 : FP form of the BIAS on INB
880 00000467  RMB  4  BC1 : FP form of the BIAS on INC
881
* QUAD LOGIC BLOCK #1

F4000A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of INC 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of IND 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of INE 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of INF 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of ING 00="0",01="1"
F4000A: RMB 1 Previous cycle logic val of INH 00="0",01="1"

* QUAD LOGIC BLOCK #2

F4100A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of INC 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of IND 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of INE 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of INF 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of ING 00="0",01="1"
F4100A: RMB 1 Previous cycle logic val of INH 00="0",01="1"

* QUAD LOGIC BLOCK #3

F4200A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of INC 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of IND 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of INE 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of INF 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of ING 00="0",01="1"
F4200A: RMB 1 Previous cycle logic val of INH 00="0",01="1"

* QUAD FLIP/FLOP BLOCK #1

F4500A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of INC 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of IND 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of INE 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of INF 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of ING 00="0",01="1"
F4500A: RMB 1 Previous cycle logic val of INH 00="0",01="1"

* QUAD FLIP/FLOP BLOCK #2

F4600A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4600A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
F4600A: RMB 1 Previous cycle logic val of INC 00="0",01="1"
* QUAD FLIP/FLOP BLOCK #3

F4700A: RMB 1 Previous cycle logic val of INA 00="0",01="1"
F4400A: RMB 1 Previous cycle logic val of INB 00="0",01="1"
R4300A: RMB 1 Previous cycle logic val of OUTPUT 00="0",01="1"
R4200A: RMB 1 Previous cycle logic val of INH 00="0",01="1"
R4100A: RMB 1 Previous cycle logic val of OUTPUT 00="0",01="1"

* TRANSFER SWITCH #1

F5400A: RMB 1 Previous cycle logic val of INC 00="0",01="1"

* TRANSFER SWITCH #1

F5500A: RMB 1 Previous cycle logic val of INC 00="0",01="1"

* TRANSFER SWITCH #1

F5600A: RMB 1 Previous cycle logic val of INC 00="0",01="1"

* LINK INTERFACE RAM

LIL_FBN: RMB 1 Current LIL function block # (1to99)
LIL_LPN: RMB 2 Current LIL logical parameter number
LIL_HART: RMB 1 Current LIL par's HART write command code
LIL_ADDR: RMB 2 Current LIL par's address code
LIL_SIZE: RMB 1 Current LIL par's size (bytes)
LIL_HI: RMB 2 Current LIL par's parameter's upper value limit
LIL.VAL: RMB 2 Current LIL parameter value (0toFFFF)
LIL_LO: RMB 2 Current LIL parameter's lower value limit
LIL_LOOP: RMB 1 Current LIL relative LOOP number
.CMDS EQU *LIL_FBN
LIL_CMDS: RMB 1 Current LIL parameter's valid command code
.QUAL EQU *LIL_FBN
LIL_QUAL: RMB 1 Current LIL parameter's qualifier code
.SPC EQU *LIL_FBN
LIL_SPC: RMB 1  Current LIL parameter's special processing code
.PSZ EQU *LIL_FBN
LIL_PSZ: RMB 1  Current LIL parameter's channel size
PARNUM: RMB 1  Current LIL relative parameter number
ANYSOURCE: RMB 1  Current LIL command defined as "anysource"
F9800A: RMB 1  COMMAND PROCESSING FLAG FOR AUXFB98
F9801A: RMB 1  Emergency Local timer
F9818A: RMB 2  previous command buffer address
F9819A: RMB 2  previous transmit buffer address
F9820A: RMB 8  last update value for NUI loaded by link board
F9821A: RMB 7  last update value for NUI loaded by link board
NUITIMER: RMB 8  timeout counter before NUI status occurs (81-88)
NUITIMER2: RMB 7  timeout counter before NUI status occurs(89-95)
F9826A: RMB 1  bit set by download record received, bits 4-7 not used
* bits 0 to 3 represent record #’s $08 to $0B; $0F = complete
REC1RX: RMB 1  Each byte used as F9826A is to indicate which records
REC2RX: RMB 1  have been received when downloading
REC3RX: RMB 1
REC4RX: RMB 1
REC5RX: RMB 1
REC6RX: RMB 1
F9827A: RMB 1  EMERG. LOCAL flag = non-zero
*:: $F0 set by FB98, $0F set by AUXFB98 (EL set by either or both)
F9828A: RMB 1  link CONF. HOLD flag = non-zero
F9829A: RMB 1  "ANY" source flag = non-zero
F9830A: RMB 3  record source addresses must match
F9831A: RMB 1  Link WDT reset flag/reset counter (variable values)
*: %0001 xxxx = time until link reset should occur
*: %1xxx xxxx = soft reset of LILA, inc'd until 0
F9832A: RMB 1  .5 second counter for LILA global update rate
INPUTS: RMB 16  STATION INPUTS FROM LINK (channels 53 to 60)
F98PULSE: RMB 10  PULSE FB98 OUTPUT HIGH FOR 1.0 SECOND FLAGS
*: One byte each for OUTPUTS 200 to 210
*: 0 = Random parameter request; 1 = multi-byte request
RX_LIST: RMB 8  Chronological order of receive buffer processing
LAST_BANK: RMB 1  Last ram bank searched by HART record code
SW01: EQU *
BRD_STATUS: RMB 2  Storage location of current board status word for LIL
SL_MPU: RMB 4  MPU Board's software revision level
SL_LIL: RMB 4  LIL Board's software revision level
SL_EXP: RMB 4  EXP Board's software revision level
SL_TYPE: RMB 2  MPU Board's station type
RECORD_1: RMB 2  FIRST DOWNLOAD RECORD
CFG_SIZE: RMB 2  CONFIGURATION SIZE
INPUTA: RMB 2  Current value of LIL. input "A"
*: 0 = Address of Alarm #1 Trip-point
*: 1 = Address of Alarm #2 Trip-point
*: 2 = Delay time remaining in/out of alarm #1 (ticks)
*: 3 = Delay time remaining in/out of alarm #2 (ticks)
*: 4 = Alarm #1 deadband
*: 5 = Alarm #1 status
*: 6 = Alarm #2 deadband
1059 0000054a  RMB 1  Alarm #2 status
1060 0000054b  RMB 2  Address of Alarm #3 Trip-point
1061 0000054d  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
1062 0000054f  RMB 2  Alarm #3 deadband
1063 00000551  RMB 1  Alarm #3 status
1064 00000552  RMB 2  Address of Alarm #4 Trip-point
1065 00000554  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
1066 00000556  RMB 2  Alarm #4 deadband
1067 00000558  RMB 1  Alarm #4 status
1068 00000559  INPUTB: RMB 2  Current value of LIL input "B"
1069 0000055b  RMB 2  Address of Alarm #1 Trip-point
1070 0000055d  RMB 2  Delay time remaining in/out of alarm #1 (ticks)
1071 0000055f  RMB 2  Alarm #1 deadband
1072 00000561  RMB 1  Alarm #1 status
1073 00000562  RMB 2  Address of Alarm #2 Trip-point
1074 00000564  RMB 2  Delay time remaining in/out of alarm #2 (ticks)
1075 00000566  RMB 2  Alarm #2 deadband
1076 00000568  RMB 1  Alarm #2 status
1077 00000569  RMB 2  Address of Alarm #3 Trip-point
1078 0000056b  RMB 2  Delay time remaining in/out of alarm #3 (ticks)
1079 0000056d  RMB 2  Alarm #3 deadband
1080 0000056f  RMB 1  Alarm #3 status
1081 00000570  RMB 2  Address of Alarm #4 Trip-point
1082 00000572  RMB 2  Delay time remaining in/out of alarm #4 (ticks)
1083 00000574  RMB 2  Alarm #4 deadband
1084 00000576  RMB 1  Alarm #4 status
1085 00000577  STATSIZE: RMB 2  Current size of global database
1086 00000579  ONLINK: RMB 1  ON LINK <> 0 ; NOT ON LINK = 0
1087  
1088 0000057a  SW02: RMB 2  Station Status Word
1089  
1090  *  15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
1091  *  - E C3 C2 C1  - T R CH X1 X2 DV FB NA AA
1092  *  
1093  *  . : Not used, set to 0
1094  *  E : 1= Error, 0 = no error
1095  *  C3 : 1= Configuration change bit #3, 0 = reset
1096  *  C2 : 1= Configuration change bit #2, 0 = reset
1097  *  C1 : 1= Configuration change bit #1, 0 = reset
1098  *  R : 1= Run, 0 = Configuration hold
1099  *  T : 1= Trending, 0 = Not trending
1100  *  CH : 1= Configuration Hold, 0 = not config. Hold.
1101  *  DV : 1= Database Valid, 0 = Database invalid
1102  *  X1 : Most significant bit of config. change counter
1103  *  X2 : Least significant bit of config. change counter
1104  *  FB : 1= Flashing bargraph, 0 = Bargraph not flashing
1105  *  NA : 1= Unacknowledged alarms, 0 = No unacknowledged alarms
1106  *  AA : 1= Active Alarm, 0 = No Active Alarm
1107  *  
1108  
1109  
1110 00000083  
1111 0000057c  SPARE_FB_RAM EQU $5FF-*
1112  
1113 000005ff  RMB $5FF-* SPARE
1114  
1115  
1116  
1117  
***************END OF VOLITAL FUNCTION BLOCK DATA***************
1118  
1119 1110 00000083  
1120  
1121 1111 0000057c  STARTUP: RMB 1 System startup flag set by RESET and cleared by NMI
1122  
1123  
1124  
1125  
1126  
1127  
***************FUNCTION BLOCK OUTPUT TABLE***************
OUTTBL: RMB 512 Output ID #s 0 to 255

******************************************************************************

* NONVOLITIAL DATA
******************************************************************************

* DATA FROM HERE TO BEG_TRNS IS PROTECTED
* FROM A DOWNLOAD FROM THE LINK AND FCO's

* NOTE: Must keep NVRAM equivalent of EEPROM mirror area at $800
  NVRAM: RMB $800* Begin
  E03B RMB 2 Was Total of EEPROM stores, Not used
  LAST_ERR: RMB 2 Most recent error code
  EXPTYP: RMB 3 Last exp. ID tag
  MPUTYP: RMB 3 Last mpu. ID tag
  LASTVIEW: RMB 1 Last viewed output ID #
  .DRN: EQU *NVRAM
  DRN: RMB 2 DRN USER DATABASE REVISION NUMBER
  DISPNUM: RMB 1 Last viewed display block

  Bit: 7 6 5 4 3 2 1 0
  ____________
  !__________ 0 to $0A for display # 1 to 10 and "S"
  !__________ advanced via LOOP button
  ____________ NOT USED

D_STAT: RMB 10 Current "D" display status (1 ea.) indexed via DISPNUM

  Bit: 7 6 5 4 3 2 1 0
  ____________
  !__________ 0 0 = Process variable
  !__________ 0 1 = Set Point
  !__________ 1 0 = Valve

ST_STAT: RMB 2 Station Status Word saved on power down

******************************************************************************

* DATA FROM HERE TO END_TRNS IS PROTECTED FROM DOWNLOADING

BEG_TRNS:

SW03: RMB 2 Function Block Status

  15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
  E N A CC - - - NU EL - - CM CN FB - L -

  L : 1= Local , 0 = Not Local  (set according to "S")
  FB : 1= Flashing bargraph , 0 = Bargraph not flashing
  CN : 1= Console , 0 = Not Console  (set according to "S")
  CM : 1= Computer, 0 = Not Computer (set according to "S")
  EL : 1= Emergency Local, 0 = NOT emergency local
  NU : 1= Non-updating input to FB98, 0 = All FB98 inputs updating
  CC : 1= Configuration changed, 0 = Configuration NOT changed

******************************************************************************
1177 * 1178 * 1179 * 1180 * 1181 * 1182 * 1183 0000081c
1184 * 1185 * 1186 * 1187 * 1188 * 1189 * 1190 * 1191 * 1192 * 1193 * 1194 * 1195 * 1196 * 1197 * 1198 * 1199 * 1200 * 1201 * 1202 * 1203 * 1204 * 1205 * 1206 * 1207 0000081c
1208 00000820
1209 00000822
1210 00000824
1211 00000826
1212 00000828
1213 0000082a
1214 0000082c
1215 0000082e
1216
1217 00000830
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
* NA : 1= Error(s) NOT acknowledged, 0 = Error(s) acknowledged
* EL : 1= Active error(s), 0 = No active error(s)
* : Not used, set to 0

LSW01: RMB 2 DISPLAY #1 LOOP STATUS WORD

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
CA CE CL OS LS HS CH EM OR RS CM CN EI SS L AM

* : Not used, set to 0

AM : 1 = Automatic, 0 = Manual (set according to loop)
L : 1 = Local, 0 = Not Local (set according to loop)
SS : 1 = Standby Sync, 0 = Not Standby Sync (mod 348 only)
EI : 1 = External setpoint, 0 = Internal setpoint (set according to loop)
CN : 1 = Console, 0 = Not Console (set according to loop)
CM : 1 = Computer, 0 = Not Computer (set according to loop)
RS : 1 = Ramping setpoint, 0 = setpoint not ramping (set according to loop)
OR : 1 = Over Ride, 0 = Not Over Ride (mod 348 only)
EM : 1 = Emergency Manual, 0 = Not Emergency Manual (mod 348 only)
CH : 1 = Configuration Hold, 0 = Not Configuration
HS : 1 = High SP limit, 0 = Not High SP limit (mod 348 only)
LS : 1 = Low SP limit, 0 = Not Low SP limit (mod 348 only)
OS : 1 = Alarms Out of Service, 0 = Alarms In Service
CL : 1 = XTC Configured loop, 0 = Non-xtc configured loop
CE : 1 = External setpoint, 0 = Internal setpoint (set according to loop)
CA : 1 = XTC Configured loop, 0 = Non-xtc configured loop

LSW02: RMB 2 Display No. 2 Loop Status (See LSW01 for map)
LSW03: RMB 2 Display No. 3 Loop Status (See LSW01 for map)
LSW04: RMB 2 Display No. 4 Loop Status (See LSW01 for map)
LSW05: RMB 2 Display No. 5 Loop Status (See LSW01 for map)
LSW06: RMB 2 Display No. 6 Loop Status (See LSW01 for map)
LSW07: RMB 2 Display No. 7 Loop Status (See LSW01 for map)
LSW08: RMB 2 Display No. 8 Loop Status (See LSW01 for map)
LSW09: RMB 2 Display No. 9 Loop Status (See LSW01 for map)
LSW10: RMB 2 Display No. 10 Loop Status (See LSW01 for map)

ASW01: RMB 2 Display No. 1 Alarm Status

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
EA NA CC OS E4 N4 A4 E3 N3 A3 E2 N2 A2 E1 N1 A1

* : Not used, set to 0

EA : 1 = Transmitter error or transmitter not communicating
0 = No error and transmitter communicating
NA : 1 = Unacknowledged transmitter error
0 = Acknowledged
CC : 1 = Transmitter configuration changed
0 = No change to transmitter configuration
OS : 1 = Display Alarms out of service
0 = Display Alarms in service
E4 : 1 = Display Alarm #4 enabled
0 = Display Alarm #4 disabled
N4 : 1 = Display Alarm #4 NOT acknowledged
0 = Display Alarm #4 is acknowledged
A4 : 1 = Display Alarm #4 in alarm condition
* 0= Display Alarm #4 NOT in alarm condition
* E3 : 1= Display Alarm #3 enabled
* 0= Display Alarm #3 disabled
* N3 : 1= Display Alarm #3 NOT acknowledged
* 0= Display Alarm #3 is acknowledged
* A3 : 1= Display Alarm #3 in alarm condition
* 0= Display Alarm #3 NOT in alarm condition
* E2 : 1= Display Alarm #2 enabled
* 0= Display Alarm #2 disabled
* N2 : 1= Display Alarm #2 NOT acknowledged
* 0= Display Alarm #2 is acknowledged
* A2 : 1= Display Alarm #2 in alarm condition
* 0= Display Alarm #2 NOT in alarm condition
* E1 : 1= Display Alarm #1 enabled
* 0= Display Alarm #1 disabled
* N1 : 1= Display Alarm #1 NOT acknowledged
* 0= Display Alarm #1 is acknowledged
* A1 : 1= Display Alarm #1 in alarm condition
* 0= Display Alarm #1 NOT in alarm condition

1256 00000832
1257 00000834
1258 00000836
1259 00000838
1260 0000083a
1261 0000083c
1262 0000083e
1263 00000840
1264 00000842

ASW02: RMB 2 Display No. 2 Alarm Status (See ASW01 for map)
ASW03: RMB 2 Display No. 3 Alarm Status (See ASW01 for map)
ASW04: RMB 2 Display No. 4 Alarm Status (See ASW01 for map)
ASW05: RMB 2 Display No. 5 Alarm Status (See ASW01 for map)
ASW06: RMB 2 Display No. 6 Alarm Status (See ASW01 for map)
ASW07: RMB 2 Display No. 7 Alarm Status (See ASW01 for map)
ASW08: RMB 2 Display No. 8 Alarm Status (See ASW01 for map)
ASW09: RMB 2 Display No. 9 Alarm Status (See ASW01 for map)
ASW10: RMB 2 Display No. 10 Alarm Status (See ASW01 for map)

1265
1266 00000844
1267 00000846

SW07: RMB 2 Link Channel "A" Alarm Status (See ASW01 for map)
SW08: RMB 2 Link Channel "B" Alarm Status (See ASW01 for map)

1268
1269 00000848
1270 00000850
1271 00000858
1272 00000860

CHAN_A_TYPE: RMB 8 Link Channel "A" Alarm Type Words (See F1100B for map)
CHAN_B_TYPE: RMB 8 Link Channel "B" Alarm Type Words (See F1100B for map)
CHAN_A_LIM: RMB 8 Link Channel "A" Alarm Limits (See F1101B)
CHAN_B_LIM: RMB 8 Link Channel "B" Alarm Limits (See F1101B)

1273
1274
1275 00000868
1276 00000068
1277 00000868
1278
1279
1280
1281
1282
1283

END_TRNS: EQU * END OF TRANSIENT DATA
TRANSIZE: EQU (END_TRNS-NVRAM)
TRANSCRC: RMB 2 CRC OF TRANSIENT DATA

*******************************************************************************
* CONSTANT DATA *
*******************************************************************************

BEG_HARD: EQU *

BEG_EST: EQU *
RMB 99 Execution sequence table
END_EST: EQU * END OF TABLE
EST_SIZE: EQU END_EST-BEG_EST

TAB_START: EQU BEG_EST-NVRAM+RECBUF
TAB_END: EQU TAB_START+EST_SIZE

1284 0000086a
1285
1286 0000086a
1287 0000086a
1288 0000086a
1289 00000063
1290
1291 0000146a
1292 0000146d
1293
1294
LAST_FCO: RMB 1 last stored FCO 0 to 255

* ANALOG INPUT #1
F0100B: RMB 1 SRE 0 = NO ; 1 = YES

* ANALOG INPUT #2
F0200B: RMB 1 SRE 0 = NO ; 1 = YES

* ANALOG OUTPUT #1
F0300B: RMB 1 INA 0 to 255
RMB 1 INB 0 to 255

* DIGITAL OUTPUT #1
F0400B: RMB 1 INA 0 to 255

* DIGITAL OUTPUT #2
F0500B: RMB 1 INA 0 to 255

DISPLAY #1

F1100B: RMB 1 INA 0 to 255
.A1T: EQU *F1100B
.RMB 2 Display Alarm # 1 see bit mapping below

.A2T: EQU *F1100B
.RMB 2 Display Alarm # 2 see bit mapping below

.A3T: EQU *F1100B
.RMB 2 Display Alarm # 3 see bit mapping below

.A4T: EQU *F1100B
.RMB 2 Display Alarm # 4 see bit mapping below

DISPLAY ALARM #1 THRU #4 DECODING

LSB Bit #
7 6 5 4 3 2 1 0

: : 0 0 0 NO ALARM
: : 0 0 1 HIGH ALARM
: : 0 1 0 LOW ALARM
: : 1 1 0 OUT OF RANGE

: : ALL OTHER BIT PATTERNS = NO ALARM

: :

: : 0 0 0.1 % DEADBAND
: : 0 1 0.5 % DEADBAND
: : 1 0 1.0 % DEADBAND
: : 1 1 5.0 % DEADBAND
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386 00000009
1387 000008dd
1388
1389
1390
1391
1392 0000000b
1393 000008df
1394
1395
1396
1397
1398 0000000d
1399 000008e1
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412

MSB Bit #

<table>
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<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
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0 0 0 0.0 SEC. DELAY TIME IN
0 0 1 0.4 SEC. DELAY TIME IN
0 1 0 1.0 SEC. DELAY TIME IN
0 1 1 2.0 SEC. DELAY TIME IN
1 0 0 5.0 SEC. DELAY TIME IN
1 0 1 15.0 SEC. DELAY TIME IN
1 1 0 30.0 SEC. DELAY TIME IN
1 1 1 60.0 SEC. DELAY TIME IN

15 14 13 12 11 10 9 8

- 0 Ringback disabled :
- 1 Ringback enabled :
- 0 Light on alarm disabled:
- 1 Light on alarm enabled :
- - Not Sent over link
- -

1386 00000009
1387 000008dd
1388
1389
1390
1391
1392 0000000b
1393 000008df
1394
1395
1396
1397
1398 0000000d
1399 000008e1
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412

.HRL: EQU *F1100B

RMB 2 Minimum Range units value (less D.P.)

$B6C2 = -18750
$0000 = 0
$493E = +18750

.HRH: EQU *F1100B

RMB 2 Maximum Range units value (less D.P.)

$B6C2 = -18750
$0000 = 0
$493E = +18750

.DPP: EQU *F1100B

RMB 1 Decimal point position / Square root extraction

LSB Bit #

7 6 5 4 3 2 1 0

::: 0 0 0 DPP = XXXX
::: 0 0 1 DPP = XXX.X
::: 0 1 0 DPP = XXX.XX
::: 0 1 1 DPP = XX.XXX
::: 1 0 0 DPP = X.XXXX
::: ALL OTHER PATTERNS = NO DPP
::: 0 Auto - configure disabled
::: 1 Auto - configure enabled
::: 
* 1413 : : 0 Valve bar reverse acting
* 1414 : : 1 Valve bar direct acting
* 1415 : :
* 1416 : : 0 Counter to clockwise manual pulser
* 1417 : : 1 Clockwise manual pulser
* 1418 : :
* 1419 : : 0 Self clearing flashers disabled
* 1420 : : 1 Self clearing flashing enabled
* 1421 :
* 1422 : 0 Square root extraction NOT required
* 1423 * 1 Square root extraction required
* 1424
* 1425
* 1426 0000000e .HTT: EQU *-F1100B
* 1427 000008e2 HTT_1: RMB 1 Configured Input Type
* 1428 * 0 = Signal (uses INA)
* 1429 * 1 = Conventional (4-20 mA PV)
* 1430 * 2 = Non-MPCo. Smart (4-20 mA PV)
* 1431 * 3 = MPCo. Smart (4-20 mA PV)
* 1432 * 4 = MPCo. Smart w/PID (4-20 mA PV)
* 1433 * 5 = Smart (HART PV)
* 1434 * 6 = MPCo. Smart (HART PV)
* 1435 * 7 = MPCo. Smart w/PID (HART V)
* 1436
* 1437
* 1438 0000000f .EXT_SP: EQU *-F1100B
* 1439 000008e3 RMB 1 INE 0 to 255 External Setpoint Source
* 1440
* 1441 00000010 .HRU: EQU *-F1100B
* 1442 000008e4 RMB 4 Eng. Units ASCII Character String $20 to $5E
* 1443
* 1444 00000014 .PDL: EQU *-F1100B
* 1445 000008e8 RMB 1 Principle display loop (mod 348 only)
* 1446
* 1447 00000015 .SDL: EQU *-F1100B
* 1448 000008e9 RMB 1 Secondary display loop (mod 348 only)
* 1449
* 1450
* 1451
* 1452
* 1453 000008ea DISPLAY #2
* 1454 000008eb F1200B: RMB 1 INA 0 to 255
* 1455 000008ed RMB 2 Display Alarm # 1 see f1100B for mapping
* 1456 000008ef RMB 2 Display Alarm # 2 see f1100B for mapping
* 1457 000008f1 RMB 2 Display Alarm # 3 see f1100B for mapping
* 1458 000008f3 RMB 2 Display Alarm # 4 see f1100B for mapping
* 1459 000008f5 RMB 2 Min Range units (less D.P.) $B6C2 to $493E
* 1460 000008f7 RMB 2 Max Range units (less D.P.) $B6C2 to $493E
* 1461 000008f8 RMB 1 Decimal point position / Square root extraction
* 1462 000008f9 HTT_2: RMB 1 Configured Input Type
* 1463 000008fa RMB 1 INE 0 to 255 External Setpoint Source
* 1464 000008fc HRU_2: RMB 4 Eng. Units ASCII Character String $20 to $5E
* 1465 000008ff RMB 1 Principle display loop (mod 348 only)
* 1466
* 1467
* 1468
* 1469
* 1470 00000900 DISPLAY #3
* 1471 00000901 F1300B: RMB 1 INA 0 to 255
* 1472 RMB 2 Display Alarm # 1 see f1100B for mapping
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* SQUARE ROOT EXTRACTOR #1

F2400B: RMB 1 INA 0 to 255

* SQUARE ROOT EXTRACTOR #2

F2500B: RMB 1 INA 0 to 255

* SQUARE ROOT EXTRACTOR #3

F2600B: RMB 1 INA 0 to 255

* COMMON ACKNOWLEDGE BLOCK

F3000B: RMB 1 INA 0 to 255

EQU *-F3000B

RMB 2 Common acknowledge distribution:

Bin

0 FBxx display alarms are NOT acknowledged

1 FBxx display alarms are acknowledged

* MSB      LSB
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 x


* PLS:     EQU *-F3000B

RMB 2 Common pulse with flash distribution:

Bin

0 FBxx display alarms do NOT flash alarm light

1 FBxx display alarms flash alarm light
* MSB
* 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 xx
* !___________!!! !!!!!!!!!!___ FB11
* ! ! !!!!!!!!___ FB12
* not used !!! !!!!!!!!___ FB13
* !!! !!!!!!!!___ FB14
* !!! !!!!!!!!___ FB15
* !!! !!!!!!!!___ FB16
* !!! !!!!!!!!___ FB17
* !!! !!!!!!!!___ FB18
* !!! !!!!!!!!___ FB19
* !______________ FB20

STN_TAG:
.STN: EQU *.F3000B
RMB 12 STN Station Tag Name
CNFG_FN: RMB 8 CFN Configuration File name
RMB 1 Null termination byte for config. program

* DIGITAL OUTPUT #3

F3100B: RMB 1 INA 0 to 255

* DIGITAL OUTPUT #4

F3200B: RMB 1 INA 0 to 255

* DIGITAL OUTPUT #5

F3300B: RMB 1 INA 0 to 255

* DIGITAL OUTPUT #6

F3400B: RMB 1 INA 0 to 255

* MATH BLOCK #1

F3500B: RMB 1 SOURCE OF IN A 0 to 255
RMB 1 SOURCE OF IN B 0 to 255
RMB 1 SOURCE OF IN C 0 to 255
.OA: EQU *.F3500B
RMB 1 math operation A -+UL\DIV 0 to 3

* MATH BLOCK #2

F3600B: RMB 1 SOURCE OF IN A 0 to 255
RMB 1 SOURCE OF IN B 0 to 255
RMB 1 SOURCE OF IN C 0 to 255
RMB 1 math operation A -+UL\DIV 0 to 3
RMB 1 math operation B -+UL\DIV 0 to 3
* MATH BLOCK #3

F3700B:    RMB 1    SOURCE OF IN A 0 to 255
F3700C:    RMB 1    SOURCE OF IN B 0 to 255
F3700D:    RMB 1    SOURCE OF IN C 0 to 255
F3700E:    RMB 1    math operation A -> ULADIV 0 to 3
F3700F:    RMB 1    math operation B -> ULADIV 0 to 3

* QUAD LOGIC #1

F4000B:    EQU *
.F4000C:    EQU *F4000B
.INA:       EQU *F4000B
            RMB 1    INA 0 to 255
.INB:       EQU *F4000B
            RMB 1    INB 0 to 255
.INC:       EQU *F4000B
            RMB 1    INC 0 to 255
.IND:       EQU *F4000B
            RMB 1    IND 0 to 255
.INE:       EQU *F4000B
            RMB 1    INE 0 to 255
.INF:       EQU *F4000B
            RMB 1    INF 0 to 255
.ING:       EQU *F4000B
            RMB 1    ING 0 to 255
.INH:       EQU *F4000B
            RMB 1    INH 0 to 255
.L1:        EQU *F4000B
            RMB 1    Logic element L1
.L2:        EQU *F4000B
            RMB 1    Logic element L2
.L3:        EQU *F4000B
            RMB 1    Logic element L3
.L4:        EQU *F4000B
            RMB 1    Logic element L4

* QUAD LOGIC #2

F4100B:    RMB 1    INA 0 to 255
F4100C:    RMB 1    INB 0 to 255
F4100D:    RMB 1    INC 0 to 255
F4100E:    RMB 1    IND 0 to 255
F4100F:    RMB 1    INE 0 to 255
F4101:     RMB 1    INF 0 to 255
F4102:     RMB 1    ING 0 to 255
F4103:     RMB 1    INH 0 to 255
F4104:     RMB 1    Logic element L1
F4105:     RMB 1    Logic element L2
F4106:     RMB 1    Logic element L3

Bit # 0000 (0) = AND
0001 (1) = NAND
0010 (2) = OR
0011 (3) = NOR
0100 (4) = EOR

not used Lx 0011 (3) = NOR
                    0100 (4) = EOR
1770 * QUAD LOGIC #3
1771  
1772 000009f8  F4200B:  RMB 1  INA 0 to 255
1773 000009f9  RMB 1  INB 0 to 255
1774 000009fa  RMB 1  INC 0 to 255
1775 000009fb  RMB 1  IND 0 to 255
1776 000009fc  RMB 1  IEE 0 to 255
1777 000009fd  RMB 1  INF 0 to 255
1778 000009fe  RMB 1  ING 0 to 255
1779 000009ff  RMB 1  INH 0 to 255
1780 00000a00  RMB 1  Logic element L1
1781 00000a01  RMB 1  Logic element L2
1782 00000a02  RMB 1  Logic element L3
1783 00000a03  RMB 1  Logic element L4
1784  
1785  
1786 * QUAD FLIP/FLOP #1
1787  
1788 00000a04  F4500B:  RMB 1  INA 0 to 255
1789 00000a05  RMB 1  INB 0 to 255
1790 00000a06  RMB 1  INC 0 to 255
1791 00000a07  RMB 1  IND 0 to 255
1792 00000a08  RMB 1  IEE 0 to 255
1793 00000a09  RMB 1  INF 0 to 255
1794 00000a0a  RMB 1  ING 0 to 255
1795 00000a0b  RMB 1  INH 0 to 255
1796  
1797  
1798 * QUAD FLIP/FLOP #2
1799  
1800 00000a0c  F4600B:  RMB 1  INA 0 to 255
1801 00000a0d  RMB 1  INB 0 to 255
1802 00000a0e  RMB 1  INC 0 to 255
1803 00000a0f  RMB 1  IND 0 to 255
1804 00000a10  RMB 1  IEE 0 to 255
1805 00000a11  RMB 1  INF 0 to 255
1806 00000a12  RMB 1  ING 0 to 255
1807 00000a13  RMB 1  INH 0 to 255
1808  
1809  
1810 * QUAD FLIP/FLOP #3
1811  
1812 00000a14  F4700B:  RMB 1  INA 0 to 255
1813 00000a15  RMB 1  INB 0 to 255
1814 00000a16  RMB 1  INC 0 to 255
1815 00000a17  RMB 1  IND 0 to 255
1816 00000a18  RMB 1  IEE 0 to 255
1817 00000a19  RMB 1  INF 0 to 255
1818 00000a1a  RMB 1  ING 0 to 255
1819 00000a1b  RMB 1  INH 0 to 255
1820  
1821  
1822  
1823  
1824 00000a1c  F5100B:  RMB 1  INA 0 to 255
1825  

* 10 SEGMENT CHARACTERIZER #1
* 10 SEGMENT CHARACTERIZER #2
1829 00000a1d  F5200B:  RMB 1  INA 0 to 255
1830
1831
1832
1833
1834 00000a1e  F5300B:  RMB 1  INA 0 to 255
1835
1836
1837
* TRANSFER SWITCH #1
1838
1839 00000a1f  F5400B:  RMB 1  INA 0 to 255
1840 00000a20  RMB 1  INB 0 to 255
1841 00000a21  RMB 1  INC 0 to 255
1842
1843
1844
* TRANSFER SWITCH #2
1845
1846 00000a22  F5500B:  RMB 1  INA 0 to 255
1847 00000a23  RMB 1  INB 0 to 255
1848 00000a24  RMB 1  INC 0 to 255
1849
1850
1851
1852
1853 00000a25  F5600B:  RMB 1  INA 0 to 255
1854 00000a26  RMB 1  INB 0 to 255
1855 00000a27  RMB 1  INC 0 to 255
1856
1857
1858
* LINK INTERFACE
1859
1860 00000a28  F9800B:  EQU *
1861 00000a28  CHOUTS:  RMB 1  INA 0 to 255
1862 00000a29  CHOUTS1:  RMB 1  INB 0 to 255
1863 00000a2a  LSA:  RMB 1  LSA  Link station address 0 to 64
1864
1865
* SOURCES FOR LINK INPUTS
1866 00000a2b  CHINS:  EQU *
1867 00000003  .HA0:  EQU *-F9800B
1868 00000a2b  RMB 1  A00 #100 station source 0 to 64
1869 00000004  .HC0:  EQU *-F9800B
1870 00000a2c  RMB 2  C00 #100 channel source 0 to 256
1871
1872 00000a2e  CHINS1:  EQU *
1873 00000006  .HA1:  EQU *-F9800B
1874 00000a2e  RMB 1  A01 #101 station source 0 to 64
1875 00000007  .HC1:  EQU *-F9800B
1876 00000a2f  RMB 2  C01 #101 channel source 0 to 256
1877
1878 00000a31  CHINS2:  EQU *
1879 00000009  .HA2:  EQU *-F9800B
1880 00000a31  RMB 1  A02 #102 station source 0 to 64
1881 0000000a  .HC2:  EQU *-F9800B
1882 00000a32  RMB 2  C02 #102 channel source 0 to 256
1883
1884 00000a34  CHINS3:  EQU *
.HA3: EQU *.F9800B
       RMB 1 A03 #103 station source 0 to 64
.HC3: EQU *.F9800B
       RMB 2 C03 #103 channel source 0 to 256
1889
.CHINS4: EQU *
.HA4: EQU *.F9800B
       RMB 1 A04 #104 station source 0 to 64
.HC4: EQU *.F9800B
       RMB 2 C04 #104 channel source 0 to 256
1895
.CHINS5: EQU *
.HA5: EQU *.F9800B
       RMB 1 A05 #105 station source 0 to 64
.HC5: EQU *.F9800B
       RMB 2 C05 #105 channel source 0 to 256
1901
.CHINS6: EQU *
.HA6: EQU *.F9800B
       RMB 1 A06 #106 station source 0 to 64
.HC6: EQU *.F9800B
       RMB 2 C06 #106 channel source 0 to 256
1907
.CHINS7: EQU *
.HA7: EQU *.F9800B
       RMB 1 A07 #107 station source 0 to 64
.HC7: EQU *.F9800B
       RMB 2 C07 #107 channel source 0 to 256
1913
.CHINS8: EQU *
.HA8: EQU *.F9800B
       RMB 1 A08 #108 station source 0 to 64
.HC8: EQU *.F9800B
       RMB 2 C08 #108 channel source 0 to 256
1919
.CHINS9: EQU *
.HA9: EQU *.F9800B
       RMB 1 A09 #109 station source 0 to 64
.HC9: EQU *.F9800B
       RMB 2 C09 #109 channel source 0 to 256
1925
.NUI: EQU *
       RMB 1 Non Updating Input 1 bit each channel
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943

          Bitn
0  Output IDxx NUI disabled
1  Output IDxx NUI enabled

BIT POSITION
7 6 5 4 3 2 1 0
! ! ! ! ! ! ! ___ OiD 108
! ! ! ! ! ! ____ OiD 109
! ! ! ! ! ____ not used
! ! ! ! !______ not used
! ! ! ! _______ not used
! ! ! ! _______ not used
! ! ! _________ not used
! ! ! !________ not used
! ! ! !________ not used
! ! ! __________ not used
1944
1945 00000a4a
1946 RMB 1 Non Updating Input annunciation 1 bit each channel
1947 *
1948 * Bitn
1949 * 0 Output IDxx NUI disabled
1950 * 1 Output IDxx NUI enabled
1951 *
1952 *
1953 BIT POSITION
1954 *
1955 *
1956 *
1957 *
1958 *
1959 *
1960 *
1961 *
1962 *
1963 1964 00000a4b
1965 RECORD LO: EQU * Record transfers locked out
1966 .RLO: EQU *-F9800B
1967 RMB 1 0= NO ; 1= YES
1968 00000023
1969 PARAM LO: EQU * Parameter data sends locked out
1970 .PLO: EQU *-F9800B
1971 RMB 1 0= NO ; 1= YES
1972 00000a4c
1973 END_HARD: EQU *
1974 00000a4d
1975 HARDSIZE: EQU (END_HARD-BEG_HARD)
1976 HARD_CRC: EQU RMB 2 CRC HARD DATA
1977 1978
1979
1980
1981
1982 00000a4f
1983 BEGIN_SOFT: EQU *
1984
1985
1986
1987 00000a4f
1988 F010B: EQU *
1989 .SFB: EQU *-F010B
1990 00000000
1991 RMB 2 FB1 $0000 TO $0024 FOR 10.000 Hz to 0.001 Hz
1992 $0000 - $0009 for SFB = 10.000 to 1.000
1993 $000A - $0012 for SFB = 0.900 to 0.100
1994 $0013 - $001B for SFB = 0.090 to 0.010
1995 $001C - $0024 for SFB = 0.009 to 0.001
1996
1997
1998 00000a51
1999
2000
2001DISPLAY BLOCK #1
2002
2003
2003 00000a53
2004 00000000
2005 00000a53
2006 00000002
2007 00000a55
2008 00000004
2009 00000a57
2010 00000006
2011 00000a59
2012 00000008
2013 00000a5b
2014 0000000a
2015 00000a5d
2016
2017
2018
2019
2020 00000a69
2021 00000a69
2022 00000a6b
2023 00000a6d
2024 00000a6f
2025 00000a71
2026 00000a73
2027
2028
2029
2030
2031 00000a7f
2032 00000a7f
2033 00000a81
2034 00000a83
2035 00000a85
2036 00000a87
2037 00000a89
2038
2039
2040
2041
2042 00000a95
2043 00000a95
2044 00000a97
2045 00000a99
2046 00000a9b
2047 00000a9d
2048 00000a9f
2049
2050
2051
2052
2053 00000ab
2054 00000ab
2055 00000ad
2056 00000af
2057 00000ab1
2058 00000ab3
2059 00000ab5
2060
2061

F1101B: EQU *
.SA1: EQU *-F1101B
RMB 2 Alarm #1 trip point $0000 to $0FF
F1201B: EQU *
RMB 2 Alarm #2 trip point $0000 to $0FF
RMB 2 Alarm #3 trip point $0000 to $0FF
RMB 2 Alarm #4 trip point $0000 to $0FF
.RMB 2 SFB 0.001 to 10.000 Hz SEE F0101B
RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #2

F1301B: EQU *
RMB 2 Alarm #1 trip point $0000 to $0FF
RMB 2 Alarm #2 trip point $0000 to $0FF
RMB 2 Alarm #3 trip point $0000 to $0FF
RMB 2 Alarm #4 trip point $0000 to $0FF
RMB 2 SFB 0.001 to 10.000 Hz SEE F0101B
RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #3

F1401B: EQU *
RMB 2 Alarm #1 trip point $0000 to $0FF
RMB 2 Alarm #2 trip point $0000 to $0FF
RMB 2 Alarm #3 trip point $0000 to $0FF
RMB 2 Alarm #4 trip point $0000 to $0FF
RMB 2 SFB 0.001 to 10.000 Hz SEE F0101B
RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #4

F1501B: EQU *
RMB 2 Alarm #1 trip point $0000 to $0FF
RMB 2 Alarm #2 trip point $0000 to $0FF
RMB 2 Alarm #3 trip point $0000 to $0FF
RMB 2 Alarm #4 trip point $0000 to $0FF
RMB 2 SFB 0.001 to 10.000 Hz SEE F0101B
RMB 12 Display Tag name ASCII Character String $20 to $5E
* DISPLAY BLOCK #6

F1601B: EQU *

RMB 2  Alarm #1 trip point $0000 to $0FFF
RMB 2  Alarm #2 trip point $0000 to $0FFF
RMB 2  Alarm #3 trip point $0000 to $0FFF
RMB 2  Alarm #4 trip point $0000 to $0FFF
RMB 2  SFB 0.001 to 10.000 Hz SEE F0101B
DTN_6: RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #7

F1701B: EQU *

RMB 2  Alarm #1 trip point $0000 to $0FFF
RMB 2  Alarm #2 trip point $0000 to $0FFF
RMB 2  Alarm #3 trip point $0000 to $0FFF
RMB 2  Alarm #4 trip point $0000 to $0FFF
RMB 2  SFB 0.001 to 10.000 Hz SEE F0101B
DTN_7: RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #8

F1801B: EQU *

RMB 2  Alarm #1 trip point $0000 to $0FFF
RMB 2  Alarm #2 trip point $0000 to $0FFF
RMB 2  Alarm #3 trip point $0000 to $0FFF
RMB 2  Alarm #4 trip point $0000 to $0FFF
RMB 2  SFB 0.001 to 10.000 Hz SEE F0101B
DTN_8: RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #9

F1901B: EQU *

RMB 2  Alarm #1 trip point $0000 to $0FFF
RMB 2  Alarm #2 trip point $0000 to $0FFF
RMB 2  Alarm #3 trip point $0000 to $0FFF
RMB 2  Alarm #4 trip point $0000 to $0FFF
RMB 2  SFB 0.001 to 10.000 Hz SEE F0101B
DTN_9: RMB 12 Display Tag name ASCII Character String $20 to $5E

* DISPLAY BLOCK #10

F2001B: EQU *

RMB 2  Alarm #1 trip point $0000 to $0FFF
RMB 2  Alarm #2 trip point $0000 to $0FFF
RMB 2  Alarm #3 trip point $0000 to $0FFF
RMB 2  Alarm #4 trip point $0000 to $0FFF
RMB 2  SFB 0.001 to 10.000 Hz SEE F0101B
DTN_10: RMB 12 Display Tag name ASCII Character String $20 to $5E

* STATION CONTROL BLOCK

F3001B: EQU *
.TST: EQU *-F3001B
RMB 1  Tag Name Scroll Time 1 to 10 sec $01 to $0A
RMB 1  Auto-Scan Delay Time 1 to 20 sec $01 to $14

* MATH BLOCK #1

F3501B: EQU *
.SGO: EQU *-F3501B
SGO 2 GO1 .030 to 3.000 $001E to $0BB8
.SGA: EQU *-F3501B
SGA 2 GA1 .030 to 3.000 $001E to $0BB8
.SGB: EQU *-F3501B
SGB 2 GB1 .030 to 3.000 $001E to $0BB8
.SGC: EQU *-F3501B
SGC 2 GC1 .030 to 3.000 $001E to $0BB8
.SBO: EQU *-F3501B
SBO 2 BO1 -3.000 to 3.000 $F448 to $0BB8
.SBA: EQU *-F3501B
SBA 2 BA1 -3.000 to 3.000 $F448 to $0BB8
.SBB: EQU *-F3501B
SBB 2 BB1 -3.000 to 3.000 $F448 to $0BB8
.SBC: EQU *-F3501B
SBC 2 BC1 -3.000 to 3.000 $F448 to $0BB8

* MATH BLOCK #2

F3601B: RMB 2 GO1 .030 to 3.000 $001E to $0BB8
RMB 2 GA1 .030 to 3.000 $001E to $0BB8
RMB 2 GB1 .030 to 3.000 $001E to $0BB8
RMB 2 GC1 .030 to 3.000 $001E to $0BB8
RMB 2 BO1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BA1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BB1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BC1 -3.000 to 3.000 $F448 to $0BB8

* MATH BLOCK #3

F3701B: RMB 2 GO1 .030 to 3.000 $001E to $0BB8
RMB 2 GA1 .030 to 3.000 $001E to $0BB8
RMB 2 GB1 .030 to 3.000 $001E to $0BB8
RMB 2 GC1 .030 to 3.000 $001E to $0BB8
RMB 2 BO1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BA1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BB1 -3.000 to 3.000 $F448 to $0BB8
RMB 2 BC1 -3.000 to 3.000 $F448 to $0BB8

* 10 SEGMENT CHARACTERIZER #1

F5101B: EQU *
.CHAR1_X: EQU *
.SX0: EQU *-F5101B
SX0 2 X0 0.0 to 100.0 $0080 to $0F80
.SX1: EQU *-F5101B
SX1 2 X1 0.0 to 100.0 $0080 to $0F80
.SX2: EQU *-F5101B
2180 00000b65 .SX3: RMB 2 X2 0.0 to 100.0 $0080 to $0F80
2181 00000006 EQU *-F5101B
2182 00000b67 RMB 2 X3 0.0 to 100.0 $0080 to $0F80
2183 00000008 EQU *-F5101B
2184 00000b69 RMB 2 X4 0.0 to 100.0 $0080 to $0F80
2185 0000000a EQU *-F5101B
2186 00000b6b .SX5: RMB 2 X5 0.0 to 100.0 $0080 to $0F80
2187 0000000c EQU *-F5101B
2188 00000b6d .SX6: RMB 2 X6 0.0 to 100.0 $0080 to $0F80
2189 0000000c EQU *-F5101B
2190 00000b6f .SX7: RMB 2 X7 0.0 to 100.0 $0080 to $0F80
2191 0000000c EQU *-F5101B
2192 00000b67 .SX8: RMB 2 X8 0.0 to 100.0 $0080 to $0F80
2193 00000007 EQU *-F5101B
2194 00000b67 .SX9: RMB 2 X9 0.0 to 100.0 $0080 to $0F80
2195 00000007 EQU *-F5101B
2196 00000b67 .SX10: RMB 2 X10 0.0 to 100.0 $0080 to $0F80
2197 00000b77 CHAR1_Y: EQU *
2198 00000001 .SY0: RMB 2 Y0 0.0 to 100.0 $0080 to $0F80
2199 00000b77 EQU *-F5101B
2200 00000018 .SY1: RMB 2 Y1 0.0 to 100.0 $0080 to $0F80
2201 00000b79 EQU *-F5101B
2202 0000001a .SY2: RMB 2 Y2 0.0 to 100.0 $0080 to $0F80
2203 00000b7b EQU *-F5101B
2204 0000001c .SY3: RMB 2 Y3 0.0 to 100.0 $0080 to $0F80
2205 00000b7d EQU *-F5101B
2206 0000001c .SY4: RMB 2 Y4 0.0 to 100.0 $0080 to $0F80
2207 00000b7f EQU *-F5101B
2208 00000020 .SY5: RMB 2 Y5 0.0 to 100.0 $0080 to $0F80
2209 00000b81 EQU *-F5101B
2210 00000022 .SY6: RMB 2 Y6 0.0 to 100.0 $0080 to $0F80
2211 00000b83 EQU *-F5101B
2212 00000024 .SY7: RMB 2 Y7 0.0 to 100.0 $0080 to $0F80
2213 00000b85 EQU *-F5101B
2214 00000026 .SY8: RMB 2 Y8 0.0 to 100.0 $0080 to $0F80
2215 00000b87 EQU *-F5101B
2216 00000028 .SY9: RMB 2 Y9 0.0 to 100.0 $0080 to $0F80
2217 00000b89 EQU *-F5101B
2218 0000002a .SY10: RMB 2 Y10 0.0 to 100.0 $0080 to $0F80
2219 00000b8b EQU *-F5101B
2220
2221
2222
2223
2224 00000b8d CHAR2_X: EQU *
2225 00000b8d F5201B: RMB 2 X0 0.0 to 100.0 $0080 to $0F80
2226 00000b8f RMB 2 X1 0.0 to 100.0 $0080 to $0F80
2227 00000b91 RMB 2 X2 0.0 to 100.0 $0080 to $0F80
2228 00000b93 RMB 2 X3 0.0 to 100.0 $0080 to $0F80
2229 00000b95 RMB 2 X4 0.0 to 100.0 $0080 to $0F80
2230 00000b97 RMB 2 X5 0.0 to 100.0 $0080 to $0F80
2231 00000b99 RMB 2 X6 0.0 to 100.0 $0080 to $0F80
2232 00000b9b RMB 2 X7 0.0 to 100.0 $0080 to $0F80
2233 00000b9d RMB 2 X8 0.0 to 100.0 $0080 to $0F80
2234 00000ba9 RMB 2 X9 0.0 to 100.0 $0080 to $0F80
2235 00000ba1 RMB 2 X10 0.0 to 100.0 $0080 to $0F80
2236 00000ba3 CHAR2_Y: EQU *
2237 00000ba3 RMB 2 Y0 0.0 to 100.0 $0080 to $0F80
2238 00000ba5 RMB 2 Y1 0.0 to 100.0 $0080 to $0F80

* 10 SEGMENT CHARACTERIZER #2
<table>
<thead>
<tr>
<th>Address</th>
<th>operand</th>
<th>Type</th>
<th>start</th>
<th>end</th>
</tr>
</thead>
<tbody>
<tr>
<td>2239</td>
<td>RMB</td>
<td>Y0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>2240</td>
<td>RMB</td>
<td>Y1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
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<td>2247</td>
<td>RMB</td>
<td>Y8</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
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<td>RMB</td>
<td>Y9</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>2249</td>
<td>RMB</td>
<td>Y10</td>
<td>0.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* 10 SEGMENT CHARACTERIZER #3

```
CHAR3_X:  EQU *
F5301B:   RMB 2 X0 0.0 to 100.0 $0080 to $0F80
         RMB 2 X1 0.0 to 100.0 $0080 to $0F80
         RMB 2 X2 0.0 to 100.0 $0080 to $0F80
         RMB 2 X3 0.0 to 100.0 $0080 to $0F80
         RMB 2 X4 0.0 to 100.0 $0080 to $0F80
         RMB 2 X5 0.0 to 100.0 $0080 to $0F80
         RMB 2 X6 0.0 to 100.0 $0080 to $0F80
         RMB 2 X7 0.0 to 100.0 $0080 to $0F80
         RMB 2 X8 0.0 to 100.0 $0080 to $0F80
         RMB 2 X9 0.0 to 100.0 $0080 to $0F80
         RMB 2 X10 0.0 to 100.0 $0080 to $0F80
```

```
CHAR3_Y:  EQU *
         RMB 2 Y0 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y1 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y2 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y3 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y4 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y5 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y6 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y7 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y8 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y9 0.0 to 100.0 $0080 to $0F80
         RMB 2 Y10 0.0 to 100.0 $0080 to $0F80
```

END_SOFT: EQU *
SOFTSIZE: EQU (END_SOFT-BEG_SOFT)

SOFTCRC: RMB 2 SOFT DATA CRC
LOAD_END: EQU * END OF THE LINE FOR DOWNLOADS
CALSIZE: EQU 12
RMB $BFE-CALSIZE-* SPARE
SPARE_CON_DATA EQU -*LOAD_END

`------------------------------------------------------------------`
* CALIBRATION DATA *
`------------------------------------------------------------------`

BEG_CAL: EQU * BEGIN CALIBRATION DATA

* NOTE: New calibration parameters should be inserted here to keep the
  rest of the calibration parameters in their absolute addresses.
* In other words, calibration memory should grow DOWNWARD. Therefore, 
* the variable "CALSIZE" must be adjusted to the number of bytes 
* required by calibration NOT including the CRC.

* ANALOG INPUT #1

F0102B: EQU *
.CZ: EQU *-F0102B 
RMB 2 Calibration Coefficients

F0202B: EQU *
RMB 4 Calibration Coefficients

* ANALOG OUTPUT #1

F0302B: EQU *
RMB 4 Calibration Coefficients

END_CAL: EQU * END OF CALIBRATION DATA
CALCRC: RMB 2 CRC OF CALIBRATION DATA
RMB $C00-* SPARE
TRACEBFR: EQU * Trace memory buffer. NOT protected upon download

* RAMBUFFER: EQU * DOWNLOAD DATA HOLD BUFFER

* RAMBUFFER: A buffer region for downloaded data. If a complete 
* download (i.e. 4 complete records, in order) are 
* received, then and only then will the data be moved 
* to the operating NVRAM area. Protected areas will 
* of course not be effected.

RBOFFSET: EQU BEG_HARD-NVRAM
BUFR.PNTR: EQU RAMBUFFER+RBOFFSET 
RMB $E00-*

CONFIG_TABLE: EQU * Configuration table area 
RMB $F00-*

GLOBAL_TAB: RMB 125 2 bytes/chan source addresses for global pars

TAGSPACE: RMB 50 TAG DISPLAY RAM / ASCII STRING EDITING SPACE

SCAN_BUFR: EQU * Auto-scan ASCII string buffer
SPARE_RAM: EQU $FFF-*

THE_END RMB $FFF-*

* FIRQ SCRATCH PAD *

********************************************************************************************************

E13A: EQU $F00 places FIRQ scratch pad at $F00 to $FFFF
*
* for use by multitasking monitor. When the monitor
*
* isn’t used, $F00 - $FFF is used as described above.

LOOPSIZE: EQU INPUTB-INPUTA

END
1 00000000 ( 0) DSCT