DAYTRONIC

System 10 Guidebook

Section 5

General System Troubleshooting

Daytronic Corporation

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SECTION 5

PLEASE NOTE the following section- and figure-reference corrections for **Section 5** of this Guidebook:

When you are told to refer to:	**You should actually refer to:**
Section 1.B	Section 1.A.3
Section 1.C	Section 4 of the appropriate "On the Air" Booklet
Section 1.D	Section 5 of the appropriate "On the Air" Booklet
Fig. 1.E.1 (Section 1.E.1)	Fig. 1.5 (Section 1.E.1)
Fig. 1.E.2 (Section 1.E.1)	Fig. 1.6 (Section 1.E.1)
Section 1.F.1	Section 1.F.2
Section 1.F.2	Section 1.F.3
Section 1.G.2	Section 1.G.1
Section 1.G.7	Section 1.G.6
Appendix B	Section 1.B

Section 5.A

Introduction

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The field service support program for *System 10* is based on the assumption that most users are neither equipped nor inclined to attempt repair of the electronic hardware supporting this instrumentation. The main thrust of the present Guidebook section is therefore *to help the typical user isolate possible malfunctions and attribute them correctly to*

- *failure to set up the general system or a specific system element properly;*
- *the presence of internal or external conditions that are preventing proper operation of the system* (e.g., a blown fuse, a disconnected or unshielded cable);
- *failure to observe proper operational procedures and/or restrictions*; or
- *hardware or software failure of a specific internal element that can then be removed for repair or replacement.*

Section 5.B gives "Possible Solutions to Specific Problems" that may arise during normal operation of your DataPAC. No special test equipment or electronic expertise is required.

You should keep in mind, however, that the "possible solutions" here offered are in general *those which might lead to correction of the perceived problem through actions which the typical user can easily take.* In each case, other, more complex internal factors–hardware, software, or both–may be contributing to the problem. IF ALL OF THE LISTED "POSSIBLE SOLUTIONS" TO AN OBSERVED MALFUNCTION ARE INEFFECTIVE IN ELIMINATING THE MALFUNCTION–OR IF YOU OBSERVE A MALFUNCTION NOT COVERED IN SECTION 5.B–YOU SHOULD CALL THE DAYTRONIC CORPORATION SERVICE DEPARTMENT AT

(937) 293-2566

OR CONTACT THE **AUTHORIZED SERVICE FACILITY** NEAREST YOU.

FOR DETAILS CONCERNING THE OBTAINING OF SERVICE BOTH UNDER WARRANTY AND AFTER THE WARRANTY PERIOD HAS EXPIRED, SEE THE **DAYTRONIC CORPORATION PRODUCT SERVICE POLICY**.

When the problem seems to involve the functioning of a particular MNEMONIC COMMAND, you should refer to Section 4 of this Guidebook (**Alphabetical Directory of System 10 Mnemonic Commands**) to see whether the proper command syntax has been observed, and also whether the command is actually contained in the relevant Software Version(s) within your system.

IF YOU FIND THAT YOUR SYSTEM'S INTENDED FUNCTIONS REQUIRE THE UPDATING OF A PARTICULAR SOFTWARE VERSION OR VERSIONS, YOU SHOULD AGAIN CONTACT THE DAYTRONIC SERVICE DEPARTMENT OR NEAREST AUTHORIZED SERVICE FACILITY.

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Section 5.B

Possible Solutions to Specific Problems

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POWERUP PROBLEMS

5.B.1

Problem	Possible Cause	Possible Solution
a. The DataPAC does not power up (no fan noise; front-panel indicators do not light).	The power cord is not properly connected.	Make sure the power cord connection is good (see Section 1.B.1).
	The DataPAC fuse has blown (Models 10KU, 10K4, 10K6, 10K7).	1. Disconnect the power cord and any external devices (printer, computer, monitor, etc.) 2. Remove the fuse and replace it with one of proper size and amperage: nominal 120 V-AC takes a 2.5-amp fuse; nominal 220 V-AC takes a 1.25-amp fuse. 3. Reconnect the power cord and turn ON the DataPAC.
	The DataPAC CIRCUIT BREAKER has tripped (Models 10K1, 10K2, 10K8).	Reset the circuit breaker by depressing the combined ON-OFF/ CIRCUIT BREAKER button on the rear of the DataPAC.
	The DataPAC is receiving nominal 120 V-AC power but is set for nominal 220 V-AC.	Convert the DataPAC to nominal 120 V-AC power (see Appendix D).
b. The FUSE continues to blow, or the CIRCUIT BREAKER to trip, after every attempt to power up the DataPAC.	Some DataPAC element or elements are consistently producing an overload condition. This procedure will allow you to isolate any plug-in circuit board that may be responsible.	1. Disconnect the power cord and any external devices (printer, computer, monitor, etc.). 2. Open the SLOT CONNECTOR for every SLOT occupied by a circuit board (pull out the SLOT's ACTUATING LEVER and turn it 90 degrees clockwise–see Appendix B). 3. Replace the fuse or reset the circuit breaker (as above). 4. Reconnect the power cord and turn ON the DataPAC. 5. If the fuse now blows or the circuit-breaker trips, disconnect the power cord and contact the Daytronic Service Dept. The problem is most likely in the Power Supply or some other internal element not easily accessible to the operator. 6. If the DataPAC continues to run, turn it OFF and close *one* of the circuit-board SLOT CONNECTORS (turn the ACTUATING LEVER counterclockwise until the LOCATING KEY engages in the card's NOTCH–see Appendix B). 7. Turn ON the DataPAC again. 8. If the fuse now blows or the circuit-breaker trips, disconnect the power cord, remove the card whose SLOT CONNECTOR you just closed, and replace it with one of the same model, if available. Call the Daytronic Service Dept. to arrange for repair or replacement.

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5.B.1 POWERUP PROBLEMS

Problem	Possible Cause	Possible Solution
		9. If the DataPAC continues to run, repeat Steps 6, 7, and 8 until the board causing the overload is discovered.
c. The DataPAC's front-panel **ERR, CHR, MNE**, and **RET** indicators do not light up momentarily on powerup.		Contact the Daytronic Service Dept.

DATA-CHANNEL PROBLEMS

5.B.2

Problem	Possible Cause	Possible Solution
a. There is *no* data reading for a given "REAL" ANALOG INPUT CHANNEL.	The channel's INPUT-SIGNAL CABLE is not properly connected or wired.	Make sure the input-signal cable connection is good (see Section 1.E.1). Also make sure that the cable configuration is appropriate to the specific transducer (or other analog signal source) and to the "type" of CONDITIONER CARD receiving the signal (for "Specific Conditioner Connections and Setup Considerations," see Section 1.E.2).
	The channel is not properly set up.	1. Apply a **RESET (RST)** command to the channel (see Appendix C). 2. "Retype" the channel via an appropriate **TYPE (TYP)** command (see Appendix C). 3. Verify that the channel is properly "located," using the **LCT x [CR]** interrogation (see Section 1.G.2). "Relocate" the channel, if necessary, via the **LOCATE (LCT)** command (see Appendix C). 4. Recalibrate the channel, via an appropriate technique (see Section 1.G).
	The channel's present MOTHERBOARD SLOT is faulty.	1. Turn OFF DataPAC power. 2. Remove the channel's CONDITIONER CARD from its present SLOT, having first disconnected the transducer cable from the card's rear I/O CONNECTOR (see Appendix B for "Card Insertion and Removal"). 3. Reinstall the CONDITIONER CARD in another SLOT (see again Appendix B). 4. Reconnect the transducer cable to the card (in its new SLOT). 5. Turn ON the DataPAC. 6. "Retype" the channel via an appropriate **TYPE (TYP)** command (see Appendix C). 7. "Relocate" the channel via an appropriate **LOCATE (LCT)** command (see Appendix C). 8. Recalibrate the channel, via an appropriate technique (see Section 1.G).
	The channel's CONDITIONER CARD is faulty.	1. Turn OFF DataPAC power. 2. Replace the channel's CONDITIONER CARD with one of the same model which is known to be working properly (if available). 3. Turn ON the DataPAC. 4. Apply a **RESET (RST)** command to the channel (see Appendix C).

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5.B.2 DATA-CHANNEL PROBLEMS

Problem	Possible Cause	Possible Solution
		5. "Retype," verify "location," and recalibrate the channel, as above.
b. A given "REAL" ANALOG INPUT CHANNEL is reporting *incorrect* data.	A wrong or improperly wired INPUT-SIGNAL CABLE is connected to the channel's CONDITIONER CARD.	Refer to Section 1.E.2 ("Specific Conditioner Connections and Setup Considerations").
	The channel is not properly set up.	1. Apply a **RESET (RST)** command to the channel (see Appendix C). 2. "Retype" the channel via an appropriate **TYPE (TYP)** command (see Appendix C). 3. Verify that the channel is properly "located," using the **LCT x [CR]** interrogation (see Section 1.G.2). "Relocate" the channel, if necessary, via the **LOCATE (LCT)** command (see Appendix C). 4. Recalibrate the channel, via an appropriate technique (see Section 1.G).
	Two or more channels with unassociated "type" designations have been "located" to the same A SLOT.	Make sure that all channels "located" to a given A SLOT have the same "type" designation or have "type" designations relating to the same CONDITIONER CARD (see Appendix C for a full list of "type" codes).
c. The data reading for a given "REAL" ANALOG INPUT CHANNEL is *unstable.*	The channel's INPUT-SIGNAL source is not properly grounded.	Refer to Section 1.E, along with the literature accompanying the source transducer, and verify proper connections both at the signal source and at the CONDITIONER CARD'S I/O CONNECTOR.
	The channel's INPUT-SIGNAL CABLE is not properly shielded.	Make sure that the cable is shielded as shown in the respective diagram in Section 1.E.2. The "SHIELD" wire must make contact with the DataPAC mainframe (see the note on "Connection of Cable 'Shield,'" Section 1.E.1). Also make sure that there are no high-voltage wires near the input cable.
	If it is a FREQUENCY INPUT CHANNEL, there may be stray pickup of frequencies outside the common-mode range.	Refer to Section 1.E.2.10A40 or 3.A.1(b.1) for use of capacitive-coupled inputs for "Suppression of Noise in Low-Frequency Input."
	The measurement signal may have unusually high dynamic content.	Enter the **FILTER (FIL)** command to increase the amount of digital filtering applied to the channel by the CENTRAL PROCESSOR (see Section 2.G.2). If signal instability persists, contact the Daytronic Service Dept. for modification of the cutoff frequency of the conditioner's analog filter.

DATA-CHANNEL PROBLEMS

Problem	Possible Cause	Possible Solution
d. The data reading for a given "REAL" ANALOG INPUT CHANNEL is *not being updated.*	The channel is not being scanned by the DataPAC's CENTRAL PROCESSOR.	Make sure the channel in question is within the DataPAC's current SCAN RANGE (i.e., its number is less than or equal to that specified by the latest **TERMINATOR (TER)** command and is within the range specified by the latest **SCAN (SCN)** command–see Section 1.F.1). Channels outside the present SCAN RANGE will not be displayed with an ampersand flag ("&") unless a command of **VSS = 1 [CR]** * is in effect (Section 1.F.1(c)).
	A **LOCK (LOK)** command is in effect for the channel.	Apply an appropriate **UNLOCK (UNL)** command (see Section 2.E).

5.B.3 LOGIC-BIT PROBLEMS

Problem	Possible Cause	Possible Solution
a. A given LOGIC BIT does not operate properly.	The bit has not been assigned a proper LOGIC SOURCE for the desired application.	Refer to Sections 2.H.1 and 2.H.2 and review the current LOGIC-SOURCE assignment for the bit (use a command of **SRC r [CR]** to interrogate). Use the **SRC** command to reset the LOGIC SOURCE, if necessary. (Note that it is always possible for a bit to be automatically set or reset by an "External Bit Control" command such as **BIT, BIN, BCD,** or **HEX** that is embedded in an existing **EXECUTE (EXU)** or **COMMAND (CMD)** sequence–see Section 2.K.)
	The bit has been assigned a LOGIC SOURCE of "LIMIT LOGIC," and the limit-value settings for the DATA CHANNEL associated with the bit are incorrect.	Refer to Sections 2.H.2(a), 2.F.4, and 2.F.2. Make sure that the HIGH-LIMIT value of the channel associated with the bit is in fact *higher* than the LOW-LIMIT value (see the **HIL** and **LOL** commands).
	The bit's LATCH has not been released.	Apply a **RELEASE (RLS)** command to the bit (see Section 2.H.4).
	The reading of system bits has been disabled by a **NO BITS (NOB)** command.	Enter a **BITS (BTS)** command (see Section 2.H.5).
b. One or more individual LOGIC I/O PORTS of a 10AIO-16 or 10BIO-16 Card do not operate properly.	The 10AIO-16 or 10BIO-16 has not been properly initialized.	Refer to Section 3.A.3(c.1) or 3.B.2(c.1), respectively, and apply the proper **A SLOT (ASL)** or **B SLOT (BSL)** command. A given BIT GROUP should not be assigned to more than one Logic I/O Card.
c. *All* of the LOGIC I/O PORTS of a 10AIO-16 or 10BIO-16 Card are set to *Logic 1* upon the setting to *Logic 1* of any one port.	The LOGIC I/O connection is not good.	Make sure the LOGIC I/O CONNECTOR is tightly connected to the rear pins of the 10AIO-16 or 10BIO-16 Card.
	The LOGIC REFERENCE VOLTAGE is not being supplied.	For the 10AIO-16, Pin 10 ("VCC") *must* be tied either to Pin L (Isolated + 5 V-DC) or to the user's external supply (up to + 24 V-DC); see Section 3.A.3(b). For the 10BIO-16, Pin 1 or 49 ("VCC") *must* be tied either to Pin 3 (Isolated + 5 V-DC) or to the user's external supply (up to + 24 V-DC); see Section 3.B.2(b).
d. The front-panel indicator lights for *unused* LOGIC INPUTS of a 10AIO-16 or 10BIO-16 Card are flickering.	The unused logic inputs are picking up stray voltages.	Desensitize the unused logic inputs by tying them all to COMMON (for the 10AIO-16, Pin 9; for the 10BIO-16, any even-numbered pin from Pin 2 through Pin 50–see Section 3.A.3(b) or 3.B.2(b), respectively).
e. An external logic device is not actuated when the corresponding bit is set.	Logic connections are not good.	Make sure all LOGIC I/O connections are good both at the 10AIO-16 or 10BIO-16 I/O CONNECTOR and at the external device.

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LOGIC-BIT PROBLEMS

Problem	Possible Cause	Possible Solution
	The LOGIC OUTPUT signal is of the wrong polarity to actuate the device.	Verify proper connection of drive signals to the device. Remember that Universal Logic I/O levels are *negative true* (i.e., GROUND when the bit is at *Logic 1*; + 5 V-DC when the bit is at *Logic 0*); see Section 3.A.3(c.3) or 3.B.2(c.3).
	If the external device is a relay, it is either defective or an *input* relay.	Verify that the relay is an *output* type and is functioning properly.

5.B.4

VIDEO PROBLEMS

Problem	Possible Cause	Possible Solution
a. There is no display on the DataPAC's internal CRT; nothing appears on the display BILLBOARD.	The DataPAC is not powered up.	Check power cord connections for the DataPAC, and make sure it is turned on.
	The display is set to EXTERNAL VIDEO MODE.	Apply a command of **VID = INT [CR]** *, or press the **Systm Confg** key (see Section 2.C.1(b)).
	The CRT BRIGHTNESS CONTROL has been turned down.	Adjust the CRT BRIGHTNESS CONTROL (see Section 2.C.1(e)).
	An "A Card" is not seated properly in its SLOT, and is shorting out the DataPAC's 12-V video supply.	1. Turn OFF the DataPAC. 2. Make sure each card has been properly inserted in the appropriate SLOT (see Appendix B for "Card Insertion and Removal"). 3. Turn ON the DataPAC.
	The CRT FUSE has blown.	Contact the Daytronic Service Dept.for instructions. CAUTION: HIGH VOLTAGE!
b. There is no display on the DataPAC's External Monitor; nothing appears on the display BILLBOARD.	The monitor is not powered up.	Check power cord connections for the monitor, and make sure it is turned on.
	The monitor is not properly connected to the DataPAC.	Check the cable connection between the DataPAC and the monitor; if a Model 10CVIOP Video I/O Processor is being used, make sure that the proper I/O connections have been made (see Section 2.N).
	The CRT BRIGHTNESS CONTROL has been turned down.	Adjust the CRT BRIGHTNESS CONTROL (see Section 2.C.1(e)).
	The CRT FUSE has blown.	Contact the Daytronic Service Dept.for instructions. CAUTION: HIGH VOLTAGE!
c. There is no display on the DataPAC's CRT (internal or external); **R1, R2, R3**, or **R4** appears in the BILLBOARD on power-up, instead of **RAM TEST PASSED**.	Defective 10BVT60 RAM.	Contact the Daytronic Service Dept.
d. The left edge of the display page cannot be seen (internal or external CRT).	The CRT is set to the wrong *video format.*	If the system contains at least one COLOR CRT, enter a command of **VDU = C, 50 [CR]** * or **VDU = C, 60 [CR]** *; if the system contains one or more MONOCHROME CRT's only, enter **VDU = M, 50 [CR]** * or **VDU = M, 60 [CR]** * (see Section 2.C.1 and Problem e, below).
e. The CRT display scrolls and/or shimmers.	The CRT is set to the wrong *video frame rate.*	If your local line frequency is 50 Hz, enter a command of **VDU = C, 50 [CR]** * or **VDU = M, 50 [CR]** *; if 60 Hz, enter **VDU = C, 60 [CR]** * or **VDU = M, 60 [CR]** * (see Section 2.C.1 and Problem d, above).

VIDEO PROBLEMS

Problem	Possible Cause	Possible Solution
f. Keystrokes go only part way across the screen (internal or externalCRT).	The CRT is set to the wrong "BVS" number.	If the DataPAC contains a Model 10BVS90 Video Signal Card, enter a command of **BVS = 90 [CR]** *; if it contains a Model 10BVS95 Graphics Video Signal Card, enter **BVS = 95 [CR]** * (see Section 2.C.1).
g. The display is scrambled (internal or external CRT).		Contact the Daytronic Service Dept.
h. A CHANNEL DISPLAY FIELD does not display the correct DATA, BIT-STATE, MESSAGE, or VIDEO PLAYBACK.	The CHANNEL DISPLAY FIELD has not been properly set up.	1. Press the **Video Formt** key to enter TEXT EDITOR MODE. 2. Refer to Section 2.C.5 and verify that the CHANNEL DISPLAY FIELD has been properly set up. Make sure that the field's Channel, Bit, or Message Number is correct (a LOGIC-BIT Number must be preceded by "#"; a MESSAGE Number, by "$"; and a VIDEO PLAYBACK Number, by "*"). 3. Press the **Exit** key to return to LIVE DISPLAY MODE.
	The CHANNEL DISPLAY FIELD'S foreground is set to the same color or intensity as its background.	Refer to Section 2.C.12, and review the "STATUS"-defining command(s) currently in effect for the field. For a DATA FIELD, these will be **VBC, VGT, VBT, VLT**, and **STS**; for a BIT-STATE FIELD, **BSD** and **BDP**; for a MESSAGE FIELD, **MES**; and for a VIDEO PLAYBACK FIELD, **STS**.
	IF A MESSAGE FIELD is *blank*, instead of displaying the desired MESSAGE, DataPAC power has been recycled, and the MESSAGE text has defaulted to blank.	Reenter the **MESSAGE (MES)** command (see Section 2.C.12(d)).
	If it is a VIDEO PLAYBACK FIELD, the system "history memory" may be inaccessible.	Make sure the system History Card is in RECORD MODE (see Section 3.B.4(e.2)), and that it is not disconnected from its SLOT. The **RMD** command must be applied after every powerup in order to activate all current playbacks. If any "10BHM" and/or 10BSPC Cards are present, make sure that none of them is disconnected from its SLOT.
i. Keystrokes are not being correctly interpreted when in "TEXT EDITOR" MODE.	Lower-case symbols are being entered into a DataPAC containing a Model 10BVS90 Video Signal Card along with a Model 10BVT60 Video Text Card of Software Version "9.0" or higher.	Press the **Caps Lock** key before entering "TEXT EDITOR" MODE, or replace the Model 10BVS90 with a Model 10BVS95 Graphics Video Signal Card.

5.B.5 COMMUNICATIONS PROBLEMS

Problem	Possible Cause	Possible Solution
a. The DataPAC and the connected HOST COMPUTER (or other device) do not communicate; there is no response to a MNEMONIC COMMAND entered via the DataPAC's COMPUTER INTERFACE PORT.	The RS-232-C CABLE between the two devices is disconnected. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **CHR, MNE, RET**, AND **RCV** INDICATORS WILL NOT LIGHT WHEN COMMUNICATION IS ATTEMPTED.	Connect the RS-232-C interface cable between the DataPAC's COMPUTER INTERFACE PORT and the external device (see Section 2.B.2(a)).
	The RS-232-C CABLE between the two devices is improperly wired. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **CHR, MNE**, AND **RET** INDICATORS WILL NOT LIGHT WHEN COMMUNICATION IS ATTEMPTED; THE **RCV** INDICATOR MAY OR MAY NOT LIGHT.	Refer to Section 2.B.2(a) for suggested cabling ("full handshake" is recommended); rewire as necessary.
	The RS-232-C PROTOCOL settings of the two devices do not match. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **RCV** INDICATOR WILL LIGHT WHEN COMMUNICATION IS ATTEMPTED, BUT NOT **CHR, MNE**, OR **RET**.	Refer to Section 2.B.2(b). Both devices must be set to the same BAUD RATE, NUMBER OF DATA BITS, NUMBER OF STOP BITS, AND PARITY.If you are using the MODEL 10CIF488 IEEE Interface Adaptor, see Section 2.B.4(b); here, both the 10CIF488's SERIAL PORT and the DataPAC's COMPUTER INTERFACE PORT must be set to an RS-232-C protocol of 153.6K Baud, 8 Data Bits, 2 Stop Bits, and No Parity.
	The DataPAC is set to recognize a COMMAND TERMINATOR different from that transmitted by the connected RS-232-C device. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **CHR, MNE**, AND **RET** INDICATORS MAY OR MAY NOT LIGHT WHEN COMMUNICATION IS ATTEMPTED.	Reset the DataPAC's COMMAND TERMINATOR via the **CMT** command (see Section 2.B.5). The DataPAC is initially set to recognize a COMMAND TERMINATOR of CARRIAGE RETURN.(Note that the DataPAC's **MNE** indicator will *not* light even on reception of a properly terminated command, if that command does not belong to the CENTRAL PROCESSOR'S command set–e.g., if it is a "VIDEO," "HISTORY," or "SATELLITE" command. If the "smart" card to which the command is addressed has its own front-edge **MNE** indicator–as do the Models 10BDR64 and 10BD4–this indicator will light on reception of the command at the DataPAC's COMPUTER INTERFACE PORT.)
	The DataPAC has been inappropriately set to "SATELLITE" mode. IN THIS CASE, THE FRONT-PANEL **CHR, MNE, RET**, AND **RCV** INDICATORS WILL LIGHT IN THE NORMAL WAY WHEN COMMUNICATION FROM THE CONNECTED DEVICE TO THE DATAPAC IS ATTEMPTED, WHILE NO OUTPUT RESPONSE WILL BE OBSERVED FROM THE DATAPAC TO THE CONNECTED DEVICE.	Refer to Section 3.B.3(b.2) and enter a command of **ASN = 0 [CR]** *. This applies to all "A-sized" DataPACs and to all "B-sized" DataPACs with Model 10BCP100 Software Version earlier than "9.1."

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Problem	Possible Cause	Possible Solution
	An invalid MNEMONIC COMMAND has been received at the DataPAC's COMPUTER INTERFACE PORT. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **CHR**, **RET**, AND **RCV** INDICATORS WILL PROBABLY LIGHT WHEN THE COMMAND IS TRANSMITTED, BUT NOT **MNE**.	Refer to Section 4 of this Guidebook and retransmit the correct command syntax. (Note that the DataPAC's **MNE** indicator will *not* light even on reception of a valid command, if that command does not belong to the CENTRAL PROCESSOR'S command set–e.g., if it is a "VIDEO," "HISTORY," or "SATELLITE" command. If the "smart" card to which the command is addressed has its own front-edge **MNE** indicator–as do the Models 10BDR64 and 10BD4–this indicator will light on reception of the command at the DataPAC's COMPUTER INTERFACE PORT.)
	A command has been entered which applies only to a "smart" card not presently installed in the DataPAC.	Refer to Section 4 of this Guidebook for the specific card or cards to which each command applies.
	A command has been entered which is recognized by the DataPAC only when it is received through the keyboard.	Examples of such commands are **SAVE (SAV)** and **DELETE (DEL)** (see Section 4 for details).
b. Incorrect data or no data is being transmitted from the DataPAC's COMPUTER INTERFACE PORT in response to a received command.	The RS-232-C CABLE is not properly connected or wired.	See above.
	The RS-232-C PROTOCOL settings of the DataPAC do not match those of the receiving device.	See above. The selected BAUD RATE must, of course, be one to which the receiving device (computer, printer, etc.) is compatible.
	A transmission-initiating command is being typed on a disconnected keyboard. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **KBD** INDICATOR WILL NOT LIGHT WHEN A KEY IS PRESSED.	Make sure the keyboard connection is good (see Section 1.C). If the **KBD** indicator fails to light, even when the terminal of the keyboard connector cord is fully engaged in the DataPAC's KEYBOARD CONNECTOR, contact the Daytronic Service Dept.
	A standard "READ" COMMAND–or a **CHANNEL (CHN)** or **LIMIT ZONE (LZN)** command–is being entered via the keyboard.	As explained in Sections 1.A.3(d) and 1.H.1, such commands will NOT produce output from the COMPUTER INTERFACE PORT when they are entered through the keyboard.
	The DataPAC is set to transmit an OUTPUT TERMINATOR and/or END-OF-TRANSMISSION TERMINATOR different from the corresponding communications terminators recognized by the receiving device.	Refer to Section 1.H.3(g) and apply the **OPT** command to reset the DataPAC's OUTPUT TERMINATOR *and* END-OF-TRANSMISSION TERMINATOR, *if they are to be the same.* If they are to be different, apply a separate **EOT** command following the **OPT** command. The DataPAC is initially set to transmit an OUTPUT TERMINATOR and END-OF-TRANSMISSION TERMINATOR of CARRIAGE RETURN, LINE FEED.

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5.B.5 COMMUNICATIONS PROBLEMS

Problem	Possible Cause	Possible Solution
	A B-SLOT *other than* that dedicated to the COMPUTER INTERFACE PORT has been designated to be the DataPAC's DEFAULT COMMUNICATIONS PORT; any transmission-initiating command entered by keyboard or contained in an **EXECUTE (EXU)** or **COMMAND (CMD)** string will therefore NOT be responded to by the COMPUTER INTERFACE PORT.	Return the function of DEFAULT COMMUNICATIONS PORT to the DataPAC's COMPUTER INTERFACE PORT by entering a command of **COM = 26 [CR] *** (see Section 3.B.5(d.1)).
c. There is no response to a MNEMONIC COMMAND entered via the DataPAC's plug-in KEYBOARD.	No keyboard entry is being received by the DataPAC's CENTRAL PROCESSOR, because the keyboard is not properly connected. IN THIS CASE, THE DATAPAC'S FRONT-PANEL **KBD** INDICATOR WILL NOT LIGHT WHEN A KEY IS PRESSED.	Make sure the keyboard connection is good (see Section 1.C). If the **KBD** indicator fails to light, even when the terminal of the keyboard connector cord is fully engaged in the DataPAC's KEYBOARD CONNECTOR, contact the Daytronic Service Dept.
	Though physically connected to the DataPAC, the keyboard has been electronically "attached" to a Model **IPC** (Industrial Personal Computer) or **AGU** (Advanced Graphics Unit) also connected to the DataPAC. IN THIS CASE, THE RED INDICATOR LIGHT ON THE KEYBOARD'S **SYSTM CONFG** KEY SHOULD BE ON.	Return the keyboard to the DataPAC by pressing the **Systm Confg (SYSTEM CONFIGURATION)** key (see the *IPC* or *AGU Manual* for details). **Systm Confg** is also used to control the DataPAC's VIDEO MODE (see Section 5.B.4(a), above, and Section 2.C.1(b)).
	An invalid MNEMONIC COMMAND has been entered.	Refer to Section 4 of this Guidebook and retype the correct command syntax.
	A command has been entered which applies only to a "smart" card not presently installed in the DataPAC.	Refer to Section 4 of this Guidebook for the specific card or cards to which each command applies.
	A command has been entered *without* a terminating CARRIAGE RETURN ([CR]).	Press CARRIAGE RETURN to put the entered command into effect.
	A command has been entered which is not recognized by the DataPAC when it is received through the keyboard.	Examples of such commands are **HDR [CR], TLR [CR], ITR [CR], CON [CR]**, and all forms of the **LNE, VDL**, and **VUL** commands (see Section 4 for details).
	A B-SLOT *other than* that dedicated to the COMPUTER INTERFACE PORT has been designated to be the DataPAC's DEFAULT COMMUNICATIONS PORT; any *port-related* "WRITE," "READ," or IMPERATIVE commands entered by keyboard will therefore NOT be recognized and/or responded to by the COMPUTER INTERFACE PORT.	Return the function of DEFAULT COMMUNICATIONS PORT to the DataPAC's COMPUTER INTERFACE PORT by entering a command of **COM = 26 [CR] *** (see Section 3.B.5(d.1)).

Problem	Possible Cause	Possible Solution
d. There is an incorrect response or no response to a keyboard request for setup values pertaining to the DataPAC's COMPUTER INTERFACE PORT (**CMT, OPT, EOP, CPC, DLY,** etc.).	A B-SLOT *other than* that dedicated to the COMPUTER INTERFACE PORT has been designated to be the DataPAC's DEFAULT COMMUNICATIONS PORT (see above)	Return the function of DEFAULT COMMUNICATIONS PORT to the DataPAC's COMPUTER INTERFACE PORT (see above).

5.B.6

HISTORY CARD PROBLEMS

Problem	Possible Cause	Possible Solution
a. The History Card's front-panel **RAM** indicator goes ON each time power is cycled.		Contact the Daytronic Service Dept.
b. The History Card's front-panel **CONFIG ERROR** indicator goes ON each time power is cycled.	Insufficient memory is detected for the existing recorder configuration.	Make sure that no "History Option" Cards (Model "10BHM" or 10BSPC) have been removed or disconnected. If all memory cards are present, contact the Daytronic Service Dept.
c. The History Card's front-panel **MNE** indicator does not light when a command relating to the History Card is entered via the DataPAC's COMPUTER INTERFACE PORT.		See Section 5.B.5(a), above.
d. A recorder does not record data; the corresponding front-panel **REC** indicator does not light.	The recorder has been halted in accordance with the conditions specified by a **HALT (HLT)** command applying to that recorder.	Apply a **START FROM HALT (STH)** command to the recorder (see Section 3.B.4(e.5)). Note that if "nonvolatile history" is in effect, a halted recorder will remain halted–even upon cycling of power–until application of **STH**.
	The History Card is not in RECORD MODE; IN THIS CASE, THE FRONT-PANEL **SET UP MODE** INDICATOR WILL BE ON.	Exit SETUP MODE by entering a **RECORD MODE (RMD)** command (see Section 3.B.4(e.2)).
	The DataPAC is not powered up.	Check power cord connections for the DataPAC, and make sure it is turned on.
e. A recorder does not record data at the desired time-interval rate.	The time interval has not been properly entered in the recorder's **STORE (STO)** expression.	Refer to Section 3.B.4(d.5) and reenter the recorder's **STO** expression. No more than one interval ("INT") term can be included in this expression.
f. A recorder or recorders do not operate with the DEPTH values that have been specified by the user.	The DEPTH of a given recorder (and of all higher-numbered recorders) has been automatically adjusted to provide a memory volume sufficient for the recorder's entered LIST.	Either (1) reduce the size of the recorder's LIST statement (see Sections 3.B.4(b.1) and 3.B.4(d.3)), or (2) expand the total history memory by means of optional "10BHM" and/or 10BSPC Card(s) (see Section 3.B.4(b.2)).
g. A recorder does not accept an entered **LST**, **STO**, or **HLT** command.	The command statement is too long.	Re-enter the command with a shorter **LST, STO**, or **HLT** expression (**LST** can take up to 78 characters–see Section 3.B.4(d.3); **STO** and **HLT** can take up to 16 MNEMONIC terms and up to 15 OPERATORS–see Sections 3.B.4(d.5) and 3.B.4(d.6)). Also note that the **LST** sequence must be entered in ascending order.

HISTORY CARD PROBLEMS

Problem	Possible Cause	Possible Solution
h. A recorder does not transmit the full range of FRAMES specified by an **EMP** or **HDU** command.	The SERIAL-NUMBER range corresponding to the range of FRAMES to be "emptied" or "dumped" is *discontinuous.*	Reapply the **EMP** or **HDU** command.
i. System PLAYBACKS are not active following powerup.	The **RECORD MODE (RMD)** command has not been entered since power was last recycled.	Apply the **RMD** command (see Section 3.B.4(e.2) for details).
j. A keyboard-entered **NONVOLATILE HISTORY (NVH)** command is not effective.	DataPAC power has not been recycled.	Recycle power following entry of the **NVH** command.

5.B.7. AUXILIARY COMPUTER INTERFACE PROBLEMS

NOTE: The COMPUTER INTERFACE PORT problems and solutions treated in Sections 5.B.5(a) and (b), above, may also apply to a DataPAC's AUXILIARY COMPUTER INTERFACE PORT (ACI)–except that in the case of an ACI, an **ASN = 0** setting for the DataPAC is not required. Also, for an ACI to respond to a *port-related* "WRITE," "READ," or IMPERATIVE COMMAND entered via the DataPAC's keyboard or via an **EXECUTE (EXU)** or **COMMAND (CMD)** function, a **COMMUNICATIONS (COM)** command of **COM = s [CR]*** is required, where "s" is the number of the SLOT occupied by the Model 10BACI in question (see Section 3.B.5(d.1)).

Section 5.C

Optional Diagnostic Tools

DAYTRONIC

System 10 Guidebook

5.C.1 Model 10AEX-20 "A Card" Extender Board

The Model 10AEX-20 lets you operate any System 10 "A CARD" outside its designated A SLOT, by bringing the appropriate SLOT connections out the front of the DataPAC mainframe. It thus permits direct access to all of the card's "on-board" hardware, while at the same time maintaining any and all of the card's rear connections (to transducer, contact closures, other system cards, etc.). The Extender Board may thus be used for purposes of signal tracing, waveform observation, adjustment of internal controls, or various other diagnostic or service functions.

To "extend" a given A CARD outside its SLOT, you merely

a. Turn OFF the DataPAC and remove the A CARD, following the instructions given in Appendix B ("Card Insertion and Removal").

b. Pull forward the 10AEX-20's actuator lever and turn it clockwise as far as possible, thus opening the 44-pin SLOT CONNECTOR.

c. Aligning the A CARD with the 10AEX-20, insert the A CARD'S rear I/O CONNECTOR into the 10EX-20's (vertical) 20-pin female connector, and insert the A CARD'S front SLOT TERMINALS into the 10AEX-20's SLOT CONNECTOR.

d. Lock the card into place and close the SLOT CONNECTOR by turning the 10AEX-20's actuator lever counterclockwise.

e. Insert the 10AEX-20 with mounted A CARD into the DataPAC's A SLOT, just as you would any standard A CARD.

f. Reactivate the DataPAC. AS WITH ANY PLUG-IN CIRCUIT CARD, TURN **OFF** DATAPAC POWER BEFORE REMOVING THE 10AEX-20.

The Model 10AST is a special diagnostic and service tool. Plugging directly into the SLOT CONNECTOR of any DataPAC A SLOT, its front section protrudes from the slot. Through an array of labelled terminal posts, it allows voltmeter or oscilloscope observation of power and reference voltages, logic and calibration signals, data-bus lines, and all other signals pertinent to the slot in question. The 10AST also lets the system *read and display* the slot's Signal Common, Power Common, AC and/or DC Reference, Input Signals, and ±9 V-DC Power Supply levels, as it would any standard DataPAC DATA CHANNELS (see Section b, below).

Insert the 10AST just like any standard A CARD (see Appendix B for "Card Insertion and Removal"), seating its SLOT TERMINALS in the 44-pin SLOT CONNECTOR of the A SLOT to be monitored (it will not, or course, make contact with any connector mounted at the *rear* of the SLOT). AS WITH ANY PLUG-IN CIRCUIT CARD, TURN **OFF** DATAPAC POWER BEFORE REMOVING THE 10AST.

a. MODEL 10AST TEST POINTS

Beginning in the upper left corner of the terminal-post array, the following test points (in order) are made available by the 10AST for operator observation. NOTE: IN EACH CASE THE VOLTMETER'S POSITIVE LEAD SHOULD BE CONNECTED TO THE TERMINAL POST IN QUESTION, WHILE THE NEGATIVE LEAD IS CONNECTED EITHER TO ONE OF THE **PWR. COM (POWER COMMON)** POSTS (FOR MEASUREMENT OF POWER-SUPPLY VOLTAGES) OR TO ONE OF THE **SIG. COM (SIGNAL COMMON)** POSTS (FOR MEASUREMENT OF CONDITIONER SIGNALS).

1. **WW (IO) #4, #3, #2, #1**

   —the four Wire-Wrap pins (44 through 41) respectively, of the slot into which the 10AST has been inserted. If no signals are wire-wrapped to the slot, no signals are here available.

2. **CAL #2, #1**

   —the logic-signal inputs to the conditioner card as a result of **SHUNT CALIBRATION—POSITION (SHP)**, **SHUNT CALIBRATION—NEGATIVE (SHN)**, and **RESUME (RSM)** commands being issued by the operator via the CENTRAL PROCESSOR (see Section 1.G.7 of this Guidebook).

3. **SIG IN x.1, x1**

   —a means of displaying various signals on the 10AST's SUBCHANNEL NOS. 1, 2, and 3 (see below for the relevant setup procedure). The "x1" input is a one-to-one input; the "x.1" input attenuates the signal.

4. **ISOLATED SUPPLY, COM**

   —a means of observing the DataPAC motherboard's Isolated +5-V Supply and Common signals.

5. **TC REF, BUS, ENABLE**

   —the output signals sent by a Thermocouple Conditioner (10A9-8, 10A10-4, etc.) to the Model 10A11 Thermocouple Output Processor Card: TC REF is the reference-junction diode signal; TC BUS is the Thermocouple Conditioner SUBCHANNEL output signal; TC ENABLE is the Thermocouple Conditioner slot call signal.

6. **HIGH BYTE**

   —a logic signal issued by the CENTRAL PROCESSOR that controls the transfer of data to digital processing boards. When the data's *least significant bit* is being transferred, this pin will be at *Logic 0*; when the data's *most significant bit* is being transferred, it will be at *Logic 1*.

7. **STROBE**

   —a logic signal issued by the CENTRAL PROCESSOR to the analog card slot enabling signal output from the selected SUBCHANNEL of that slot.

8. **DATA BUS 8, 7, 6, 5, 4, 3, 2, 1**

   —the 8-bit (one-byte) word used by the CENTRAL PROCESSOR for issuance of setup conditions and for the retrieval of data from digital signal processing boards (used in conjunction with the HIGH BYTE signal, above).

9. **AC REF**

   —the 3 V-AC, 3280-Hz reference signal used by A-CARDS as oscillator inputs or to drive circuit power amplifiers. Normal reading with voltmeter on DC range is 0.000 ± 0.010 V-DC; normal reading with a "true rms" voltmeter on AC "x20" range is 3.000 ± 0.010 V-AC (rms).

10. **DC REF**

    —the 5 V-DC reference signal used by A-CARDS as reference or circuit drive signals. Normal reading is +5.0000 ± 0.0005 V-DC with no drift.

11. **CALL BUS**

    —the analog signal-conditioner output that goes to the system A/D conversion circuits.

12. **SUB CHAN. BIT #4, #2, #1**

    —the 3-bit address issued by the CENTRAL PROCESSOR to select the appropriate conditioned channel output to be placed on the CALL BUS.

13. **SLOT CALL**

    —a logic-signal input from the CENTRAL PROCESSOR that causes the signal conditioner's output to be placed on the Call Bus or Data Bus.

14. **PWR. COM**

    —two pins available for connection of meter negative lead for measuring power-supply voltages.

15. **SIG. COM**

    —two pins available for connection of meter negative or scope ground lead for measuring or monitoring of conditioner signals.

16. **+9V**

    —the +9 V-DC CMOS power output of the analog rack Linear Regulator Board. Normal reading is +8.90 V-DC (+ 0.10, - 0.40 V-DC).

17. **–9V**

    —the –9 V-DC CMOS power output of the analog rack Linear Regulator Board. Normal reading is -8.90 V-DC (+ 0.10, - 0.40 V-DC).

b. DISPLAYING TEST SIGNALS AS DATA CHANNELS

1. Make sure the DataPAC's EEPROM Switch is OFF, and turn OFF the DataPAC.

2. Install the 10AST into the desired A-CARD SLOT.

3. Turn the DataPAC back ON and set the EEPROM Switch to the ON position (the red **E2P** indicator should light).

4. Set up a system video page to display DATA CHANNEL NOS. 1 through 8 (see Section 1.d or 2.c for video setup).

5. Enter a **TYPE (TYP)** command of

   TYP 1 TO 8 = 55 [CR]*

6. Enter the following series of **LOCATE (LCT)** commands, where "d" is the number of the A-CARD "DECK" in which the 10AST is located (if it is an "A-Sized" DataPAC, omit this number), and where "s" is the number of the A-CARD SLOT occupied by the 10AST:

   LCT 1 = ds1 [CR]*
   LCT 2 = ds2 [CR]*
   LCT 3 = ds3 [CR]*
   LCT 4 = ds4 [CR]*
   LCT 5 = ds5 [CR]*
   LCT 6 = ds6 [CR]*
   LCT 7 = ds7 [CR]*
   LCT 8 = ds8 [CR]*

   NOTE: The red SUBCHANNEL LED INDICATORS on the Model 10AST should light as these location assignments are made.

7. The following data will now be displayed for system DATA CHANNEL NOS. 1 through 8:

Channel	Reads
1	SIGNAL INPUT as connected to the 10AST's SIG. IN x.1 or x1 pins
2	SIGNAL INPUT as connected to the 10AST's SIG. IN x.1 or x1 pins
3	SIGNAL INPUT as connected to the 10AST's SIG. IN x.1 or x1 pins
4	DC REF value, 5000 ± 1 count
5	+9 V-DC POWER SUPPLY output divided by 2 and missing a decimal point, 4450 (+ 50, - 200) counts
6	–9 V-DC POWER SUPPLY output divided by 2 and missing a decimal point, –4450 (- 50, + 200) counts
7	SIGNAL COMMON, 0 ± 1 count
8	POWER COMMON, 0 ± 10 counts

5.C.3 MODELS 10AHM AND 10BDHM HEALTH MONITOR CARDS

a. INTRODUCTION

The "A-sized" Model **10AHM** Health Monitor Card lets the system read and display all pertinent power and reference voltages. It has its own independent temperature-stabilized reference source to verify the accuracy of all measurements. The companion Model **10BDHM** is a "B-sized" card which, when connected to the 10AHM via the supplied cable, can be used to monitor B-Deck voltage supplies, plus critical software handshake lines and other dynamic signals.

b. INSTALLATION AND CONFIGURATION

The 10AHM may be installed in any unoccupied "A" SLOT, and the 10BDHM in any unoccupied "B" SLOT. See Appendix B for "Card Insertion and Removal." The 10AHM's rear connector should be connected to that of the 10BDHM by means of the cable supplied with the 10BDHM. BE SURE TO TURN OFF POWER BEFORE INSTALLING AND INTERCONNECTING THE 10AHM AND 10BDHM CARDS.

If the 10AHM is used alone, up to 8 subchannels will be used to monitor various reference voltages. These are Subchannel Nos. 1 through 8 of the table below. If the 10BDHM is used along with the 10AHM, there will be up to 21 subchannels in all (Nos. 1 through 21). Note that you need not use all of the available 10AHM/10BDHM subchannels; you may, if desired, use any continuous range of subchannels within the main subchannel sequence, so long as the first subchannel is No. 1. For example, you may choose to use only Subchannel Nos. 1 through 3, or Subchannel Nos. 1 through 12. Remember, however, that the subchannels you use must constitute a *continuous range beginning with Subchannel No. 1* (you cannot, for example, choose only Subchannels 1, 5, 7, and 13 or the range of Subchannel Nos. 8 through 15).

You will therefore dedicate to your 10AHM (or 10AHM/10BDHM) a continuous range of up to 8 (or up to 21) otherwise unused system DATA CHANNELS. You will do so by "locating" these channels appropriately. You will then need to specify appropriate TYPE CODES, "m" (SCALING FACTOR) values, "b" (ZERO OFFSET) values, and DIGITAL FILTER values to each 10AHM or 10AHM/10BDHM subchannel. You will also most likely want to apply specific LIMIT VALUES to certain subchannels for continuous automatic monitoring by the system (recommended alarm limits are given in the following section).

1. Using the **TYPE (TYP)** command, you should first assign the required TYPE CODE to each 10AHM- or 10AHM/10BDHM-dedicated channel, as given in the table below. If, for example, the continuous range of channels you have selected for assignment to 10AHM Subchannel Nos. 1 through 4 begins with Channel No. x, you would command

   TYP x = 55 [CR]*
   TYP x+1 = 71 [CR]*
   TYP x+2 = 71 [CR]*
   TYP x+3 = 55 [CR]*

2. You will now use two **LOCATE (LCT)** commands (only) to specify the continuous range of system channels being dedicated to the 10AHM/10BDHM. If this range of channels is Channel No. x to and including Channel No. n, you would enter these two **LCT** commands:

   LCT x = DSS1 [CR]*
   LCT x+1 TO n = DSS2 [CR]*

   where "D" is the number of the "A Deck" occupied by the 10AHM card, and "SS" is the number of the A-Deck SLOT occupied by that card (with leading zero, if necessary).

Table 1. 10AHM/10BDHM Subchannels

Subchannel Number	TYPE Code	SCALING FACTOR (EMM)	Function
1	55	20.000	V_{in}
2	71	2.5000	Independent Reference
3	71	2.7768	AC Reference
4	55	5.000	DC Reference
5	55	10.000	+9 (+8.9) V
6	55	10.000	–9 (–8.9) V
7	70	1.2500	Signal Common
8	55	5.000	Power Common
9	55	5.00	+5 V Microprocessor Rail
10	55	10.00	B-Deck +12 V
11	55	10.00	B-Deck –12 V
12	55	5.00	ISO-5 Supply (+6 V)
13	55	5.00	EEPROM Enable
14	55	5.00	Service Request
15	55	5.00	Peripheral Overrun
16	55	5.00	Carriage Return
17	55	5.00	ΔService Request
18	55	5.00	ΔPeripheral Overrun
19	55	5.00	ΔCarriage Return
20	70	1.2500	B-Deck Signal Common
21	55	5.000	B-Deck Power Common

3. Using the **SCALING FACTOR (EMM)** command, assign the required "m" coefficient to each dedicated 10AHM/10BDHM channel, as given in the table above.

4. Using the range form of the **ZERO OFFSET (BEE)** command, assign a "b" term of ZERO ("0") to each dedicated 10AHM/10BDHM channel:

   BEE x TO n = 0 [CR]*

   where again "x" is the first channel dedicated to the 10AHM/10BDHM and "n" is the last.

5. Using the range form of the **FILTER (FIL)** command, assign a filter constant of "9" to each dedicated 10AHM/10BDHM channel.

6. Use the **LOW LIMIT (LOL)** and **HIGH LIMIT (HIL)** commands to set appropriate limit values for selected channels, as desired (see Section 2.F).

C. 10AHM/10BDHM SUBCHANNELS

10AHM Subchannels:

Subchannel No. 1: Used to measure various voltages referenced to SIGNAL COMMON with a clip lead. May be used to troubleshoot cards in conjunction with the Model 10AST Analog Slot Test Card (see Section 5.C.2, above).

Subchannel No. 2: An on-board +2.5000-V reference, temperature-stabilized in its own oven. This is used to track the gain drift, if any, of the A/D and its amplifier. Suggested alarm limits: 2.4995 to 2.5005.

Subchannel No. 3: Measures the amplitude of the system AC Reference, which controls the excitation levels for LVDT and AC strain gage cards. Its frequency (3276.8 Hz) also provides sync for a variety of cards. Suggested alarm limits: 2.9980 to 3.0020.

Subchannel No. 4: Measures the system DC Reference. Since System 10 is ratiometric, this should always read 5.000 ± 0.001 V. Deviations indicate trouble with the Model **10BIP232** RS-232 Interface Card. Suggested alarm limits: 4.998 to 5.002.

Subchannel Nos. 5 and 6: Measure the ±9-volt supplies, which are factory-set to ±8.90 V. Normal loading effects should not result in more than 0.3-V drop. Suggested alarm limits: 8.50 to 9.00.

Subchannel No. 7: Measures the local (A-Deck) SIGNAL COMMON. Large deviations from 0 indicate excessive current, and thus possible faulty modules on the A Deck. Faulty input wiring can occasionally cause this also. Suggested alarm limits: ±0.0010.

Subchannel No. 8: Measures the local (A-Deck) POWER COMMON. As with SIGNAL COMMON, large deviations from 0 indicate excessive current, and thus possible faulty modules on the A Deck. Faulty input wiring can occasionally cause this also. Suggested alarm limits: ±0.080.

10BDHM Subchannels:

Subchannel No. 9: Measures the microprocessor's +5-V rail. Suggested alarm limits: 4.75 to 5.25.

Subchannel Nos. 10 and 11: Measure the B-Deck ±12-V supplies. These power the A/D, RS-232 I/O, internal monitor, etc. Suggested alarm limits: ±12.00 ± 0.60.

Subchannel No. 12: Measures the "ISO-5 V" supply for Model 10BIO-16 Universal Logic I/O Cards. This supply is factory-set for 6.00 V (the extra volt is for the burden of the overcurrent protection circuit on each 10BIO-16). Suggested alarm limits: 6.00 ± 0.30.

Subchannel No. 13: Measures the EEPROM Enable signal on the B Deck. This signal is active low.

Subchannel Nos. 14, 15, and 16: Measure the state of the "handshake" lines among the B-Deck cards. These active low lines toggle briefly when messages move from board to board. A persisting logic low (> 0.7 V) indicates internal communications problems or one or more external devices that are not ready to receive data from the System 10.

Subchannel Nos. 17, 18, and 19: These channels are "stretched" versions of Nos. 14, 15, and 16 and are used to verify that messages are being properly sent.

Subchannel Nos. 20 and 21: B-Deck counterparts of Nos. 7 and 8, above. Note that somewhat looser tolerances are in order on the B Deck.