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Produced by the NASA Center for Aerospace Information (CASI)
SYSTEM CONFIGURATION DEFINITION MANUAL
FINAL REPORT
SATELLITE FREEZE FORECAST SYSTEM
PHASE VI

SUBMITTED TO
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SECTION ONE

HARDWARE CONFIGURATION

This section consists of equipment listings, interconnection information, and a basic overview of the hardware interaction of the Ruskin HP-1000 computer system. Figure 1-1 illustrates an overall block diagram of the major components of S.F.F.S. hardware. The DS/1000 line referred to in figure 1-1 is a dedicated telephone line from the NWS at Ruskin, Fla. to the Climatology HP/1000 computer located in Gainesville, Florida. This line is operated at a data rate of 9600 baud.

Figure 1-1. Block diagram of the S.F.F.S. system located in Ruskin, Florida at the National Weather Service office. Included are the major components of the system.
The central item in the S.F.F.S. system configuration is a Hewlett-Packard computer model 2112A, serial #1709A01703, one of the HP/1000 series, which is sometimes referred to as a 21MX-M mini-computer. This machine is configured with the following components, all considered to be a "part" of the computer.

1 HP 2102A Memory controller module
6 HP 13187A 32 kbyte memory modules
1 HP 12976A Dynamic mapping system ROM set
1 HP 12897A Dual-channel port controller module
1 HP 12539C Time base generator (clock) module
1 HP 91740A DS/1000 Firmware ROM set
1 HP 92068A RTE-IVB Firmware ROM set
1 HP 12991A Power-fail recovery system
1 HP 12892A Memory protect module
1 HP 12977A Fast FORTRAN processor ROM set

The technical specifications for the 2112A computer may be found in Hewlett-Packard reference manual 21MX Computer Series, HP part # 02108-90002

The second major component of the S.F.F.S. is a Hewlett-Packard input-output extender model 12979B, serial number 1820A00670. This device is also referenced in the above HP manual and this device contains:

1 HP 12898A Dual-channel port controller for I/O extender.

The computer and I/O extender house all interface modules to the peripherals which constitute the S.F.F.S. These modules are positioned in the computer and I/O extender in a pre-planned configuration based on the interrupt priority required of the device. The I/O configuration of the computer system is outlined below, with the first column indicating the octal select code (physical position) of the printed circuit card, the second column the HP part number, and the third column a description of the device to which the card connects.

10 12773A DS/1000 Distributed System Interface
11 12620A Privileged Interrupt Card for DS/1000 Interface
12 12539C Time Base Generator (system clock)
13 13175A 7905 Disc Subsystem Interface
14 12966A 2645A CRT Terminal Asynchronous Serial Interface
15 12331D 733 Texas Instruments Terminal Interface
16 13181A 79708 Digital Mag. Tape Interface (Data Card)
17 13181B 79708 Digital Magnetic Tape Interface (Control Card)
20 12966A VA3415 Vadic 1200 baud Modem Interface
21 12966A VA305 Vadic 300 baud Modem Interface
Each of the above components, with the exception of the 12539C and the 12620A, are cabled from the interface card to an external device. Each cable hood is labeled with the interface card number and external device to which it is to be connected. Cable part numbers may be obtained from the respective peripheral device service and installation manuals.

The S.F.F.S. computer, I/O extender, Vadic modems chassis, Disc subsystem, and magnetic tape drive are housed in a Hewlett-Packard model 29402B system of cabinets. This racking system consists of two cabinets. Each cabinet allows 56 inches of vertical racking space, contains a power control module, a power service strip with nine NEMA 5-15R receptacles, and a ventilation fan. The computer, I/O extender, Vadic modems chassis and spare cables are mounted in the left cabinet and the magnetic tape drive and disc subsystem are in the right cabinet. External to the cabinets are the HP model 2645 CRT terminal, the Conrac color television monitor, and the Texas Instruments printer/terminal.

The magnetic tape drive is a model 7970B, 9-track, 800 bpi, 45 ips drive capable of storing approximately 12 mbytes of digital data on a 2400 ft reel of magnetic tape. Specifications and technical information on this peripheral device may be found in the HP manuals: 7970A Digital Magnetic Tape Unit Operating and Service Manual, 7970 Series Magnetic Tape Drives Operators Manual, 13181A Digital Magnetic Tape Unit Interface Kit Operating and Service Manual, part numbers 7970-90620, 7970-90885, and 13181-90000 respectively.

The disc subsystem is a model 12962A (7905A) 15 mbyte disc drive containing two disc cartridges, one of which is removable. This drive features a data transfer rate to 937.5k bytes/second. Specifications and technical information on this peripheral device may be found in the HP manuals: 7905A Disc Drive Installation Manual, part number 7905-90007, and 7905A Disc Drive Operators Manual, part number 7905-90009.

The color television monitor is a model 5211 Conrac RGB type monitor which meets NTSC industry standards as a high-resolution device.

The CRT terminal is a HP model 2645A, containing the following components:
Specifications and technical information on the CRT terminal may be found in HP manuals: 2645A Users Manual, 2645A/S & 2641A Reference Manual, part numbers 2645-90001 and 2645-90005 respectively.

The modem chassis is a model 1616A manufactured by the VADIC company. This chassis is designed to be rack-mounted in a ventilated cabinet and accommodates up to 16 single-board modems/dialers/DAAs. The chassis at the Ruskin site contains the following components:

1 3415D Vadic 1200 bps 2-wire voice grade, full-duplex modem
1 305D Vadic 300 bps 2-wire voice grade, full-duplex modem
2 801A Vadic Automatic Telephone Dialers

Specifications and technical information on the Vadic products outlined above may be found in the following Vadic manuals: VA1616A/B/H Chassis Configuration Guide, Operation & Service Manual For VA3415A/C/D/V 1200 BPS Modems, Operation & Service Manual For VA305C/D/V 300 BPS Modems, and Operation & Service Manual For VA801A/C Automatic Dialers. These manual part numbers are, respectively: 18008-192, 18008-130, 18008-003, and 18008-015.
SECTION TWO

SOFTWARE CONFIGURATION

Section Two is a listing of the generation answer file used to create the RTE-IVB operating system currently resident in the Ruskin HP-1000 computer system. For a complete listing of the Generation, please refer to file "LMXM4:44. A descriptive narrative of the operation of the "ON LINE GENERATOR", which uses this answer file to build the RTE-IVB operating system may be found in the following HP manuals: "RTE-IVB SYSTEM MANAGER'S MANUAL" and "RTE-IVB ON-LINE GENERATOR REFERENCE MANUAL", HP part numbers 92068-90006 and 92068-90007 respectively.

==============================================================================================================================

*FILE....... "AMXM4:RS:32767.... LAST EDITED: <830412.2218>
*
* RTE-IVB On-Line Generation
*
* Initialization Phase
*
"LMXM4:RS:32767   * List file for HP-1000 (M) system
YES  * Echo listing on system console

*****************************************************************************
*
* RTE-IVB Configuration for 21MX-M (448 KBYTE) computer
* located at NATIONAL WEA. SERVICE OFFICE, Ruskin, Fla. *
* Generated (30 Nov., 1982 - 2010 CUT) at CLIM. Lab., *
* Fruit Crops Department, I.F.A.S., Gainesville, Florida *
* using the On-Line-Generator (RT4GN) and Grandfather *
* RTE-IVB (92068A) Rev. 2140, DS/1000-IV (91750A), Rev. *
* 2140, FORTRAN-4X (92834A) Rev. 2140 and programs by *
* Fruit Crops Dept. (Climatology), Univ. of Fla., M.I.T. *
* Haystack Observatory library, and "CSL/1000" library *
* of the H.P. International User's Group. *
*
*****************************************************************************

2-1
Target Disc type
System Disc select code
*DSC  #TRKS CYL HD SURF UNIT SPARE SUBCHANNEL #
7905, 203, 0, 2, 1, 0, 3 *SUBCHANNEL 0
7905, 203, 206, 2, 1, 0, 2 *SUBCHANNEL 1
7905, 203, 0, 0, 2, 0, 3 *SUBCHANNEL 2
7905, 203, 103, 0, 2, 0, 3 *SUBCHANNEL 3
7905, 203, 206, 0, 2, 0, 3 *SUBCHANNEL 4
7905, 203, 309, 0, 2, 0, 1 *SUBCHANNEL 5

* System Subchannel
* Auxiliary Disc
* Auxiliary Disc Subchannel
* Time base generator select code
* Privileged interrupt card
* Privileged drivers to access common
* FG Core lock
* EG Core lock
* Swap delay
* Memory size in 1000’s of words
* No BOOT file

**** Program Input Phase ****

MAP ALL
Map MODULES and GLOBALS
LINKS IN CURRENT
Command to use current page linking

***** RTE-IVB Operating System *****

REL,%CR4S1:RT:32767 * Core resident operating System
REL,%CR4S2:RT:32767 * Core resident operating System

***** Special System Software *****

REL,%CNFX:RT:32767 * Configurator Extension

***** DS/1000-IV Memory Residents *****

REL,%WHDS:RT:32767 * DS/1000-IV WHZAT program
REL,%QCLM:RT:32767 * DS/1000-IV Error message logger
REL,%GRPM:RT:32767 * DS/1000-IV Request/Reply Pre-processor
REL,%QUEU:RT:32767 * DS/1000-IV Interrupt Request Handler
REL,%RTY:RT:32767 * DS/1000-IV Comm. line retry processor
REL,%UPLIN:RT:32767 * DS/1000-IV Network watchdog monitor

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2-2
S.F.F.S. System Configuration Manual

Software Configuration

ORIGINAL PAGE IS
OF POOR QUALITY

** System Utility Memory Residents **

REL, %OVHD:RT:32767 * "System Overhead" switch register display
REL, %FLUSH:RT:32767 * PLUSR program to auto. flush partitions

** System I/O Drivers **

REL, %DVR32:RT:32767 * 7905 Disk Driver
REL, %DVR23:RT:32767 * 7970 Magnetic Tape Driver
REL, %DVR00:RT:32767 * 'OLD VERSION' Terminal/Modem Driver
REL, %DVFO0:RT:32767 * 'Special' driver for 12966A (M.I.T.)
REL, %DVFR51:RT:32767 * 12589A Auto-Dialer driver (LOCUS)
REL, %DVA13:RT:32767 * CRT Terminal/Minicartridge Driver
REL, %DVA65:RT:32767 * Television System Driver
REL, %MV00:RT:32767 * DS/1000-IV Comm. Driver for 12773A modem card
REL, %MP43:RT:32767 * POWER-FAIL Driver

** Turn off Mapping **

** Map Modules only **

MAP OFF, MODULES

** System 'User' programs and utilities **

REL, %AUTR:RT:32767 * POWER-FAIL AUTO-RESTART Program
REL, %LDR:RT:32767 * RTE-IVB Relocating loader
REL, %BMPG1:RT:32767 * RTE-IVB File Manager (FMGR) Session monitor
REL, %BMPG2:RT:32767 * Directory Manager (FMGR)
REL, %BUF:RT:32767 * D.RTR Directory Buffer
REL, %SMON1:RT:32767 * Session Monitor Program part 1
REL, %SMON2:RT:32767 * Session Monitor Program part 2
REL, %ACCTS:RT:32767 * ACCOUNTS program
REL, %IDLER:RT:32767 * System overhead counter program
REL, %T5IDM:RT:32767 * Type 5 program segment loader
**DS/1000-IV MODULES**

- REL,$DINIS:RT:32767 * DS/1000-IV Initialization with shutdown
- REL,$DLIS1:RT:32767 * Directory List Disc-based FMP
- REL,$DSINF:RT:32767 * DS/1000-IV Information utility
- REL,$DSMOD:RT:32767 * DS/1000-IV Network modification
- REL,$EDITD:RT:32767 * DS/1000-IV Editor
- REL,$EXECW:RT:32767 * Remote EXEC request monitor
- REL,$EXECW:RT:32767 * Remote EXEC W/Wait monitor
- REL,$IOMAP:RT:32767 * Module for remote I/O mapping
- REL,$LUMAP:RT:32767 * Module for remote I/O mapping
- REL,$LUQUE:RT:32767 * Buffering for remote I/O mapping
- REL,$OPERM:RT:32767 * Remote operator request monitor (IVB)
- REL,$PLOG:RT:32767 * Trace capability for RTE-RTE
- REL,$PTOPM:RT:32767 * PTOP Comm. management monitor
- REL,$REMAN:RT:32767 * Network operator I/F RTE-IVB
- REL,$RFAM2:RT:32767 * RFA Monitor - Multiple DCB module
- REL,$REMAN:RT:32767 * Remote session monitor
- REL,$SYSAT:RT:32767 * System attention module I/O mapping
- REL,$TLOG:RT:32767 * PLOG trace data logger RTE-RTE

**LIBRARIES**

- REL,$4SYLB:RT:32767 * RTE-IVB System library
- REL,$LDRLB:RT:32767 * RTE-IVB Loader library
- REL,$MLLIB1:RT:32767 * RTE-IVB System Independent Library - part 1
- REL,$MLLIB2:RT:32767 * RTE-IVB System Independent Library - part 2
- REL,$MLLIB3:RT:32767 * RTE-IVB System Independent Library - part 3
- REL,$TVLIB:RT:32767 * Television System library
- REL,$BMPG3:RT:32767 * Batch Monitor Library
- REL,$DECAR:RT:32767 * DECIMAL-STRING Library
- REL,$DBUGR:RT:32767 * DBUGR subroutine
- REL,$ERROR:RT:32767 * Disc Error Return routine (CLIM. Library)
- REL,$NUMAS:RT:32767 * NUMBER TO ASCII conv. routine (CLIM. Library)
- REL,$FDSL1:RT:32767 * Mathematics library (DS/IV)

**DS/1000-IV LIBRARIES**

- REL,$DLSL1:RT:32767 * DS/1000-IV Base Library
- REL,$DLSL2:RT:32767 * DS/1000-IV HP 1000 to HP 1000 Library
- REL,$DLSL3:RT:32767 * DS/1000-IV HP 1000 to HP 1000 'ONLY' Library
- REL,$DLSL4:RT:32767 * DS/1000-IV All except RTE-MIII Library
- REL,$DMSXL:RT:32767 * DS/1000-IV Library for M-E-F series
- REL,$DSMA:RT:32767 * DS/1000-IV Message Accounting Library
- REL,$DSSM:RT:32767 * DS/1000-IV RTE-IVB Nodes with Session
***** System Utility SSGA Entry points *****

REL,%#OVHD:RT:32767  * System overhead program counter holder.

***** DS/1000-IV SSGA Entry points *****

REL,%#RESSM:RT:32767  * SSGA entry point library RTE-IVB
REL,%#SPLU:RT:32767  * Remote I/O map entry point (RTE-IVB)

***** PARAMETER INPUT PHASE *****

QCLM,17,28
FLUSH,1,30
D.RTR,2,1
ERROR,7
NUMAS,7

ENTRY POINT CHANGES FOR 21MX-M SERIES PROCESSOR

INTEGER ARITHMETIC ENTRY POINTS
(Supplied by module RPLIB)

E.A.U. ENTRY POINTS
(Supplied by module RPLIB)

MOVE & COMPARE WORDS
(Supplied by module RPLIB)

BIT & BYTE INSTRUCTIONS
(Supplied by module RPLIB)

CLRIO Unconditional skip).

CLRIO,RP,2001
***** FAST FORTRAN ENTRY POINTS *****

* DBLE,RP,105201 * Convert REAL to EXTENDED REAL
SNGL,RP,105202 * Convert EXTENDED REAL to REAL
.DEER,RP,105205 * 3 word move (EXTENDED REAL transfer)
.XPAK,RP,105206 * NORMALIZE, ROUND and PACK with EXPONENT
* an EXTENDED REAL MANTISSA
.XCOM,RP,105215 * COMPLEMENT an EXTENDED REAL UNPACKED
* MANTISSA in place
.DCM,RP,105216 * COMPLEMENT an EXTENDED REAL
.DINT,RP,105217 * TRUNCATE an EXTENDED REAL
.XFER,RP,105220 * 3 word MOVE (EXTENDED REAL TRANSFER)
.GOTO,RP,105221 * Transfer control to location
.MAP,RP,105222 * Compute the address of a 2 or 3D array element
.ENTR,RP,105223 * Transfer the true address of parameters used
* in a subroutine call
.ENTP,RP,105224 * Same as .ENTR, except must be third
* instruction after the entry point
.PWR2,RP,105225 * Calculate REAL X and INTEGER N, Y=X*2**N
.FLUN,RP,105226 * Unpack REAL (EXPONENT in A, lower part
* of MANTISSA in B)
.SETP,RP,105227 * Set up a list of pointers (Obsolete - Use $SETP)
$SETP,RP,105227 * Set up a list of pointers (Newest version)
.PACK,RP,105230 * Convert signed MANTISSA of REAL into
* normalize REAL format
.CFER,RP,105231 * Move 4 words (complex transfer)
.XADD,RP,105213 * Extended REAL ADDITION
.XSUB,RP,105214 * Extended REAL SUBTRACTION
.XMPI,RP,105203 * Extended REAL MULTIPLY
.XDIV,RP,105204 * Extended REAL DIVIDE
.XADD,RP,105207 * Extended REAL ADDITION (for FORTRAN)
.XSUB,RP,105210 * Extended REAL SUBTRACTION (for FORTRAN)
.XMPI,RP,105211 * Extended REAL MULTIPLICATION (for FORTRAN)
.XDIV,RP,105212 * Extended REAL DIVIDE (for FORTRAN)

**** Provide for DOUBLE PRECISION of 4 words ****

* Z$DBL,AB,4
/E
## TABLE GENERATION PHASE

### EQUIPMENT TABLES (EQT)

1. **EQT 1** - 13175A 7905 Disc subsystem
2. **EQT 2** - TEXAS INSTRUMENTS System console
3. **EQT 3** - 12773A DS/1000-IV Modem interface
4. **EQT 4** - Power-Fail driver
5. **EQT 5** - 12966A M.I.T. special (AFOS line)
7. **EQT 7** - 12966A M.I.T. special (Apple)
8. **EQT 8** - 13181A 7970E Magnetic Tape Drive
9. **EQT 9** - 91200B Television (Master card)
10. **EQT 10** - 12589A Auto-dialer (1200 baud)
11. **EQT 11** - 12589A Auto-dialer (300 baud)
12. **EQT 12** - 12966A M.I.T. special (1200 baud)
13. **EQT 13** - 12966A M.I.T. special (300 baud)
14. **EQT 14** - DS/1000-IV Remote I/O Map (Reserved)
15. **EQT 15** - DS/1000-IV Remote I/O Map EQT
16. **EQT 16** - DS/1000-IV Remote I/O Map EQT
### DEVICE REFERENCE TABLES

| 2,1   | LU 1 - System Console (T.I. 733 Terminal) |
| 1,0   | LU 2 - System Disc (7905 Disc Subchannel 0) |
| 1,1   | LU 3 - Auxiliary Disc (7905 Disc Subchannel 1) |
| 6,1   | LU 4 - 2645A (LU-16) Left mini-cartridge |
| 6,2   | LU 5 - 2645A (LU-16) Right mini-cartridge |
| 2,1   | LU 6 - 12531D Printer (same as Sys. Console) |
| 7,0   | LU 7 - 12966A MIT (DVFOO) (Auto-answer) |
| 8,0   | LU 8 - Magnetic tape, UNIT 0, (H.P. 7970B) |
| 9,0   | LU 9 - 91200B Television System |
| 10,0  | LU 10 - 12589A AUTO-DIALER (1200 baud) |
| 11,0  | LU 11 - 12589A AUTO-DIALER (300 baud) |
| 12,8  | LU 12 - 12966A MIT (DVFOO) (1200 baud) |
| 13,8  | LU 13 - 12966A MIT (DVFCO) (300 baud) |
| 5,0   | LU 14 - 12966A MIT (DVFOO) (AFOS line - 1200 baud) |
| 0,0   | LU 15 - Spare LU |
| 6,0   | LU 16 - 12966A (DVROS) CRT Terminal W/Carts. |
| 3,0   | LU 17 - DS/1000 Subchannel 0 |
| 3,1   | LU 18 - DS/1000 Subchannel 1 |
| 1,2   | LU 19 - 7905 Disc Subchannel 2 |
| 1,3   | LU 20 - 7905 Disc Subchannel 3 |
| 1,4   | LU 21 - 7905 Disc Subchannel 4 |
| 1,5   | LU 22 - 7905 Disc Subchannel 5 |
| 14,0  | LU 23 - DS/1000-IV Remote I/O mapping (Reserved) |
| 15,0  | LU 24 - DS/1000-IV Remote I/O mapping |
| 16,0  | LU 25 - DS/1000-IV Remote I/O mapping |
| 0,0   | LU 26 - Spare LU |
| 0,0   | LU 27 - Spare LU |
| 0,0   | LU 28 - Spare LU |
| 0,0   | LU 29 - Spare LU |
| 4,0   | LU 30 - Powerfail LU |

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2-8
* INTERRUPT TABLE *

4, ENT, $POW^R  * (DVP43) Power-fail
10, EQT, 3    * 12773A (DVA65) DS/1000
13, EQT, 1    * 13210A (DVR32) 7905 Disc interface
14, PRG, PRMPT  * 12966A (DVR05) 2645A CRT terminal w/minicarts.
15, PRG, PRMPT  * 12531D (DVR00) TI 733 System Console & Printer
16, EQT, 8    * 13181A (DVR23) 7970B Magtape interface
17, EQT, 8    * 13181B (DVR23) 7970B Magtape interface
20, PRG, PRMPT  * 12966A (DVF00) MIT 1200 Baud Full Duplex
21, PRG, PRMPT  * 12966A (DVF00) MIT 300 Baud Full Duplex
22, PRG, PRMPT  * 12966A (DVF00) MIT 1200 Baud Half Duplex
23, PRG, PRMPT  * 12966A (DVF00) MIT 9600 Baud Full Duplex
24, EQT, 10   * 12589A (DVR51) 1200 Baud auto-dialer
25, EQT, 11   * 12589A (DVR51) 300 Baud auto-dialer
30, EQT, 9    * 91200B (DVA13) Television Subsystem
31, PRG, PRMPT  * 12773A (DVF00) DS/1000-IV Remote I/O mapping
/E

***** SYSTEM BOUNDARIES PHASE *****

0    * CHANGE Driver PNT?
0    * CHANGE RT COMMON
1    * CHANGE BG COMMON

***** SYSTEM AND PROGRAM LOADING PHASE *****

***** I/O CLASSES / LU MAPPINGS / RESOURCE NUMBERS *****

40    * # OF CLASS NUMBERS
10    * # OF LU MAPPINGS
40    * # OF RESOURCE NUMBERS

***** BUFFER LIMITS / LONG ID'S / SHORT ID'S / EMA EXT'S. *****

100, 400    * BUFFER LIMITS
30    * LONG ADDITIONAL ID SEGMENTS
20    * SHORT ADDITIONAL ID SEGMENTS
5     * ID SEGMENT EXTENSION (EMA)
S.F.F.S. System Configuration Manual Software Configuration

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***** PARTITION DEFINITION PHASE *****
*
20  * TOTAL PARTITIONS
50  * 1ST PARTITION PAGE
10,RTR * PARTITION 1 (RESERVED FOR D.RTR)
6,RTR * PARTITION 2
28,BG * PARTITION 3
22,BG * PARTITION 4
11,BG * PARTITION 5
9,BG  * PARTITION 6
28,BGM * PARTITION 7
28,S  * PARTITION 8
22,S  * PARTITION 9
12,S  * PARTITION 10
12,S  * PARTITION 11
9,S  * PARTITION 12
5,S  * PARTITION 13
/E
*
***** MODIFY PROGRAM PAGE REQUIREMENTS *****
*
LOADR,28
FMGR,22
/E
*
***** ASSIGN PROGRAM PARTITIONS *****
*
D.RTR,1
/E
*
***** END OF GENERATION *****
*

2-10