Frequency Reference Unit

FRU-SAASM

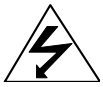
P/N: 900000144

Revision C

FOR OFFICIAL USE ONLY

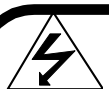
For Brandywine Communications products with the following Part Numbers: 0011001XX

Safety Warnings



WARNING:

This unit contains lethal AC voltages. Disconnect the unit from the AC supply before removing the cover.



WARNING:

The lightning flash with an arrowhead inside of an equilateral triangle is intended to alert the user to the presence of un-insulated “dangerous voltage” within the product’s enclosure. The “dangerous voltage” may be of sufficient magnitude to constitute a risk of electrical shock to people. Do not attempt to repair the unit without first unplugging it.

CAUTION:

The exclamation point inside of an equilateral triangle is intended to alert the user to the presence of important operation and maintenance instructions in the user guide. Only qualified personnel should repair this unit. Several board assemblies contain static sensitive devices. Appropriate procedures must be used when handling these board assemblies.

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Revision History

Revision	Date	Changes
A	9/30/14	Initial Release
B	5/9/17	Added additional information about Front Panel connectors
C	10/25/17	Added SAASM Keying and Zeroize information

1 Introduction

Figure 1 - FRU-SAASM

The FRU-SAASM is a state of the art; high-precision frequency standard capable of outputting ten isolated precision 10MHz frequency reference outputs. The FRU uses an internal GPS receiver to control a precision oscillator with accuracy up to 1 x 10-12 and excellent short-term stability

The FRU-SAASM meets the frequency stability requirements of MIL-STD- 188-164A for SHF terminals.

A particular feature of the FRU is the ultra-high isolation (>100dB) between the 10MHz outputs, eliminating interaction between 10MHz outputs when they are loaded/unloaded.

The FRU-SAASM incorporates a 12-channel GPS receiver with Selective Availability Anti-Spoofing Module. This GPS Wing–approved receiver provides enhanced GPS operation in the presence of GPS jamming or spoofing.

Dual Ethernet ports are used for both monitoring/control of the FRU using Simple Network Monitoring Protocol (SNMP) as well as providing Network Time Protocol (NTP) to clients.

A Brandywine supplied user application may also be used to provide a Graphical User Interface to the FRU.

The FRU is available is a number of configurations to support specific applications. A Mobile Application version features a special vibration isolated oscillator that provides isolation of the reference source from portable generator induced phase noise. The High Performance version uses a rubidium oscillator.

2 Specifications

Input:

GPS Antenna Input		
Connector	BNC	
1PPS input		
Connector	DB-15	
Level	0-10V_{pk}	
Impedance	50 Ω	
HAVEQUICK Input	DB-15	
Level	0-5V_{pk}	
Impedance	2 kΩ	

Outputs:

10MHz outputs		
No of Outputs	10	
Frequency	10MHz	
Accuracy	1X10^{-12} (24hr avg.)	
Amplitude	+13dBm	
Harmonics	<40dBc	
Non Harmonic	<90dBc	
Isolation	<-100dBc when adjacent channel is opened or shorted	
Phase Noise	(dBc/√Hz)	
	Static	Vibration*
10Hz	-120	-120
100Hz	-140	-90
1kHz	-150	-130
10kHz	-150	-150
100kHz	-155	-155
Phase perturbation <5mdeg. in 0.2sec		
1PPS Output		
Accuracy	±50ns	
	Connector	DB-15
Level	0-10V_{pk}	
Impedance	50 Ω	
HAVEQUICK Output	DB-15	
	Level	0-5V_{pk}

Power: 90 VAC to 260 VAC
<15 Watts.
Dual Redundant Power (opt)

Control and Status:

Type	10/100BaseT Ethernet
No of Ports	2 independent
Protocol	IPV4, IPV6
	SNMPv1, V3 (opt)
	NTPV3, V4 (opt)
Graphical Interface	BWC Application

GPS Receiver

Receiver Type	GB-GRAM
Frequency	L1, L2 Dual Frequency
Satellite Code	C/A, P(Y)
Receiver Type	Parallel 12 Channel
Pos. Accuracy	16m SEP
Warm start	<120 seconds with Almanac, CV loaded
Anti-spoofing	Accuracy maintained in spoofing environment to 10db> satellite signal in space
Jamming:	Operates with 34dB J/S at both L1 and L2
CV Fill:	DS101, DS102
Zeroize	Push button, SNMP

Reliability: MTBF >70,000 hours

Physical

Size	1U 19”x1.72x14” depth

Environmental

Humidity:	95% non-condensing.
Temperature:	0 to +50ºC operating
	-40 to +85ºC non-operating.
Temp. Shock	-20 to +70 ºC 3 ºC/min
Vibration*	1.5g peak. 50-2000Hz
Shock*	MIL-STD-188-164A
	para. 5.1.2.16.c

* Mobile Application Version only

2.1 List of Rear Panel Connectors

Port	Output
J1	Antenna
J2	Console / Alarm
J3	Keyfill DS101
J4	10/100 Ethernet
J5	10/100 Ethernet
J6	10 MHz Out
J7	10 MHz Out
J8	10 MHz Out
J9	10 MHz Out
J10	10 MHz Out
J11	10 MHz Out
J12	10 MHz Out
J13	10 MHz Out
J14	10 MHz Out
J15	10 MHz Out
J16	AC Power

Table 1 - Table of Output Connectors

2.2 List of Front Panel Connectors

Port	Function
10 MHz Out	10 MHz Output
KEYFILL	SAASM Key Fill
MPE-S COM1	HaveQuick and 1PPS I/O Port
Pin 1	PPS In Raw
Pin 2	GND
Pin 3	GND
Pin 4	-
Pin 5	-
Pin 6	PPS Output
Pin 7	HQ Output
Pin 8	-
Pin 9	-
Pin 10	-
Pin 11	GND
Pin 12	HaveQuick In Raw
Pin 13	-
Pin 14	SAASM Tx DB15
Pin 15	SAASM Rx DB15

Table 2 - Front Panel Connectors

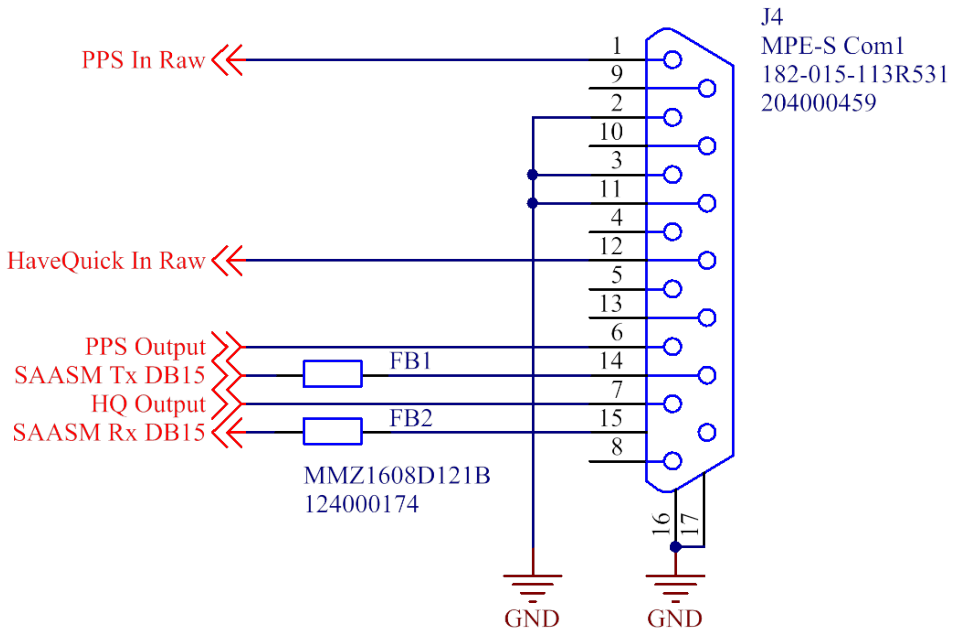


Figure 2 - MPE-S COM1 Pin Layout Diagram

4 Setup

Remove the FRU-SAASM from the shipping carton. The following items should be included in the shipment.

- 1x FRU-SAASM
- 1x Power Cable
- 1x GPS Antenna
- 1x GPS Antenna Cable
- 1x CD-ROM containing the User Manual and Utility Software.

4.1 Mounting

The FRU-SAASM is installed into a standard 19” rack using the four rack-mounting holes on the front panel of the unit.

4.2 Power

Insert the power cord of the FRU-SAASM (J16) into an electrical socket to power up the unit.

4.3 GPS Antenna Connection

The antenna connector is a BNC Socket (50 ohm) found at port J1 the rear of the unit and its connections are shown below.

Inner	GPS Signal 1.6GHz (& +5v antenna amplifier power)
Outer	GPS Return.

Table 3 - Antenna Connections

4.4 10 MHz Outputs

The 10 MHz output connectors (J6- J15) on the rear of the unit use a SMA connector. Connect these from the FRU-SAASM to your timing and frequency system.

4.5 Ethernet Connection

The FRU-SAASM has two 10/100 Ethernet ports on the rear of the unit, (J4 and J5) there ports are used for remote access and control of the unit.

SNMP v1 and NTP v3 are supported via this connection.

4.6 RS232 Console Port

An RS232 console port is provided at J2 for access and debugging purposes. The parameters of this port are:

115200 Baud, No Parity, 1 stop bit, 8 bit/character, no flow control.

5 Operation

To control the FRU-SAASM, use the included BWIPSetup and WinTView applications that came bundled with the system.

5.1 Finding your IP Address

Use the included “BWIPSetup” program on a Windows PC to locate the FRU-SAASM on your local network. Once you have the address, enter it into the included WinTView application.

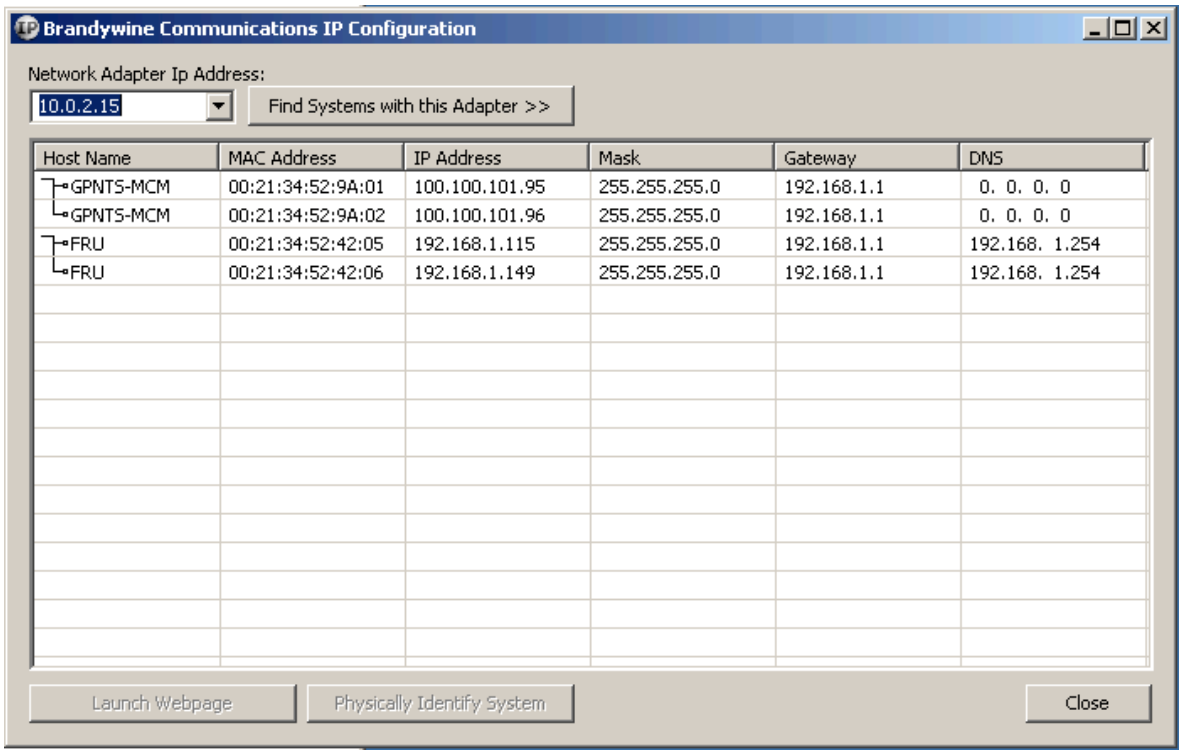


Figure 3 - BWIPSetup Program

5.2 Launch WinTView

Launch the WinTView.exe and type the unit's IP address (ex: "192.168.1.120") to the IP Address box. Check the Enable Auto Connect if necessary. Click OK button to connect to the unit.

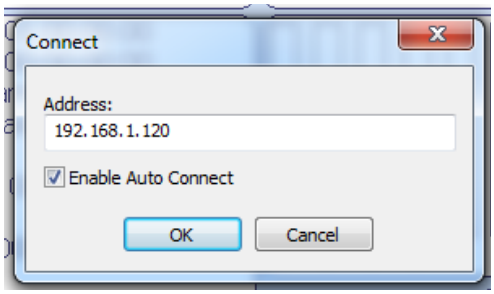


Figure 4 - Connection to the Frequency Reference Unit

If the connection was made successfully, the WinTView shows all the detail information of the unit. The Front Panel Status tab is the default tab. This tab shows some general information about the unit, and it also shows detail information about satellite tracking information.

5.3 Status Tabs

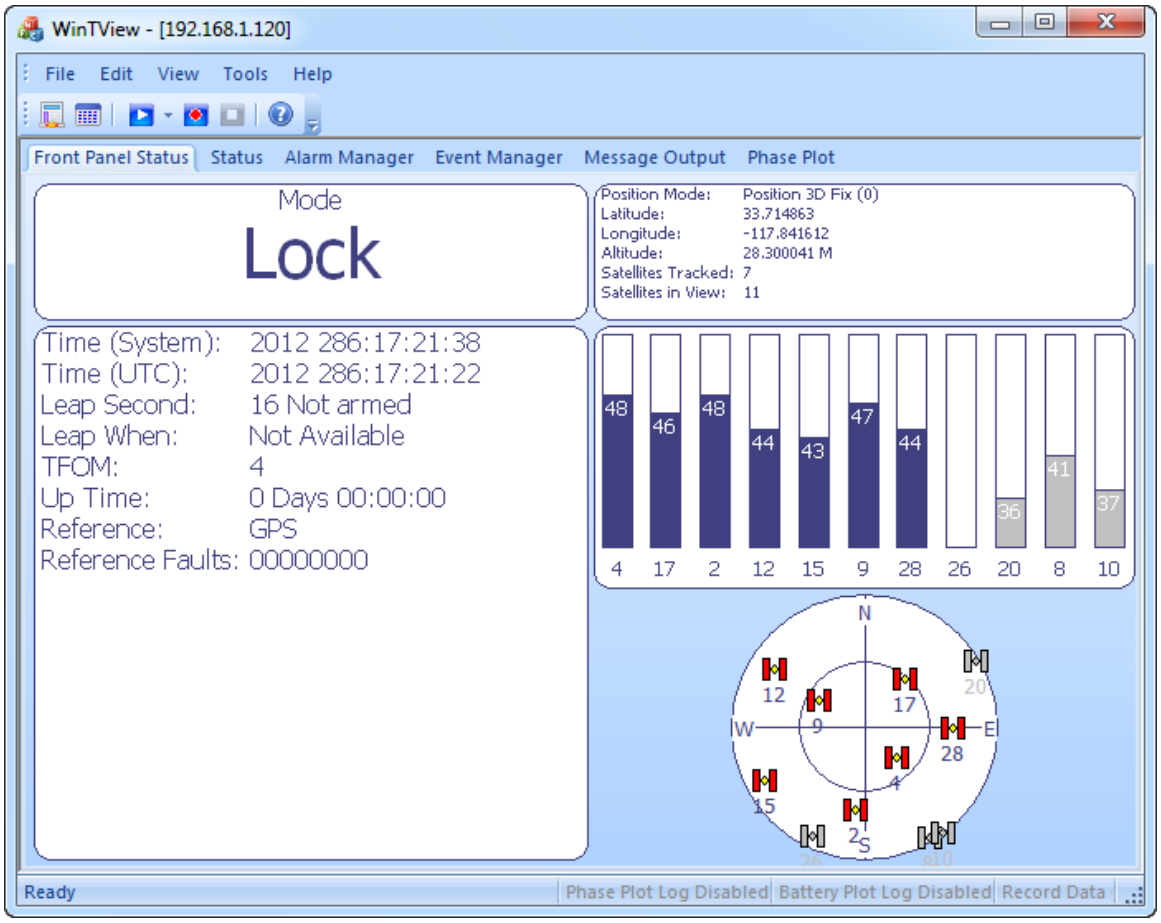


Figure 5 - The Front Panel Status tab shows at a glance information about the FRU

5.3.1 Front Panel Status

The front panel status tab (Figure 5) shows at-a-glance information about the unit, such as the current mode of the unit's GPS receiver, the current system time and UTC time, Leap Second Status, Time Figure of Merit, Up time, current reference and the reference faults.

On the right-hand side of the Front Panel Status screen, the GPS status is displayed, showing the current Position Mode, Latitude, Longitude and Altitude, and current satellites tracked and in view, as well as the signal strength for each satellite.

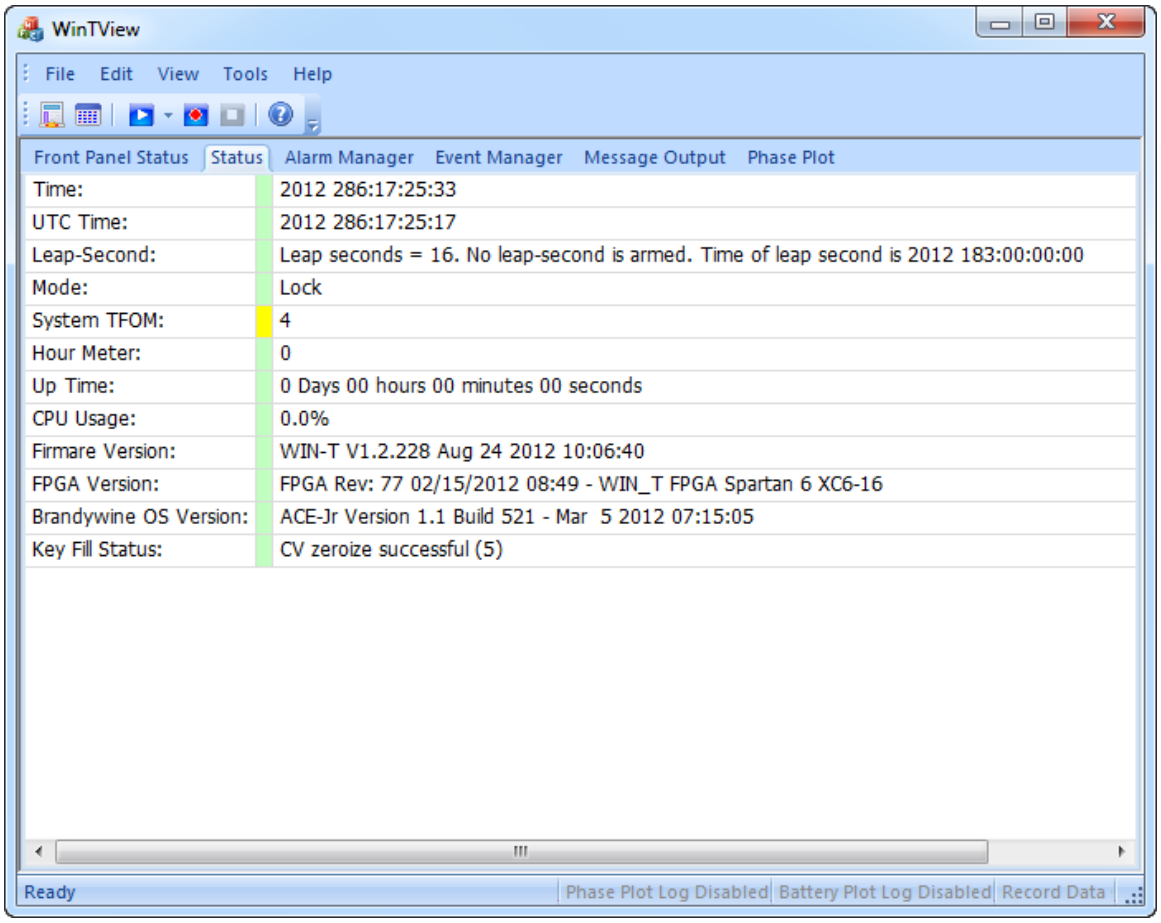


Figure 6 - The Status tab shows more details about the unit

5.3.2 Status Tab

The status tab shows a more detailed breakdown of the unit's current status. From here, the user can view the current system time and UTC time, Leap Second Status, GPS Mode, Time Figure of Merit, Hour Meter, Up time, CPU Usage, Firmware Version, FPGA Version and Brandywine OS Version.

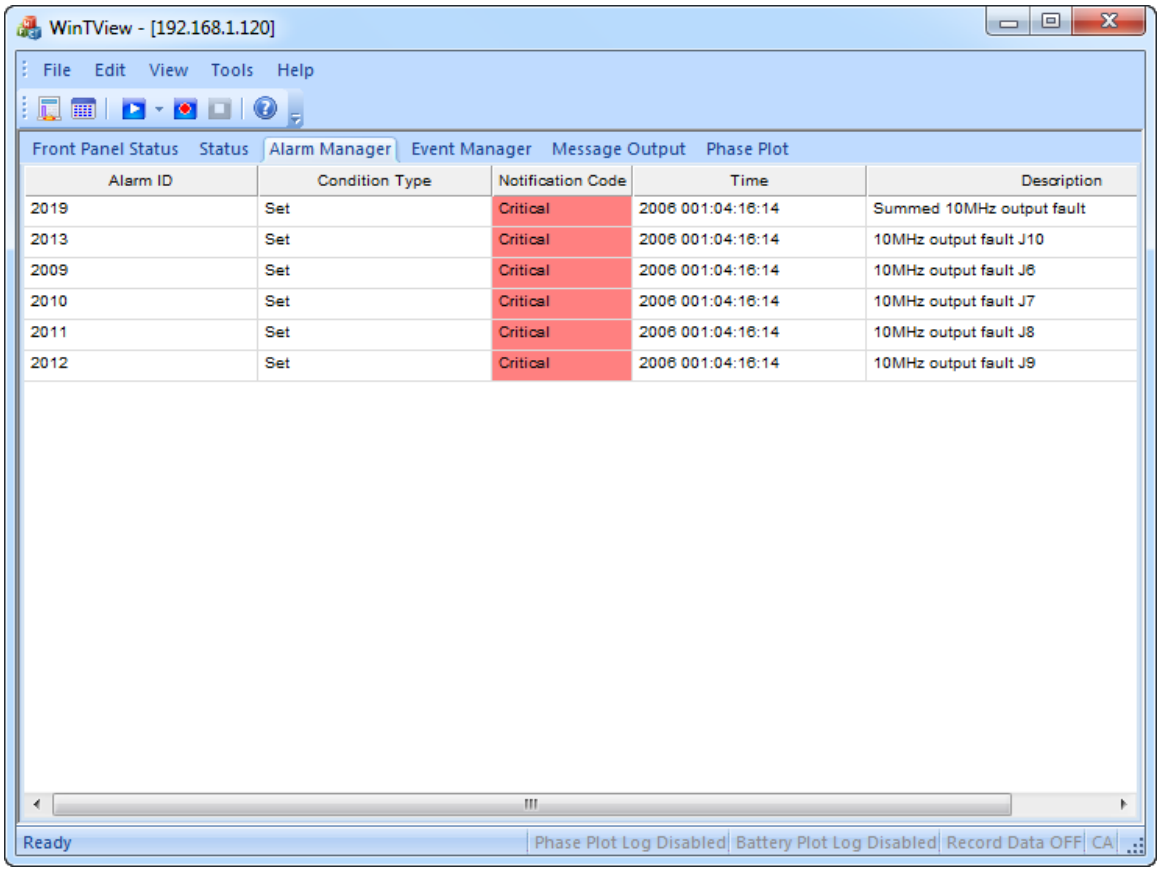


Figure 7 - The Alarm Manager tab shows the alarm history of the unit

5.3.3 Alarm Manager Tab

The Alarm Manager tab shows the current alarms that the unit is generating, as well as the alarm history of the unit. Columns in this tab are the Alarm ID, Condition Type, Notification Code, the time the Alarm was generated, and a description of the Alarm.

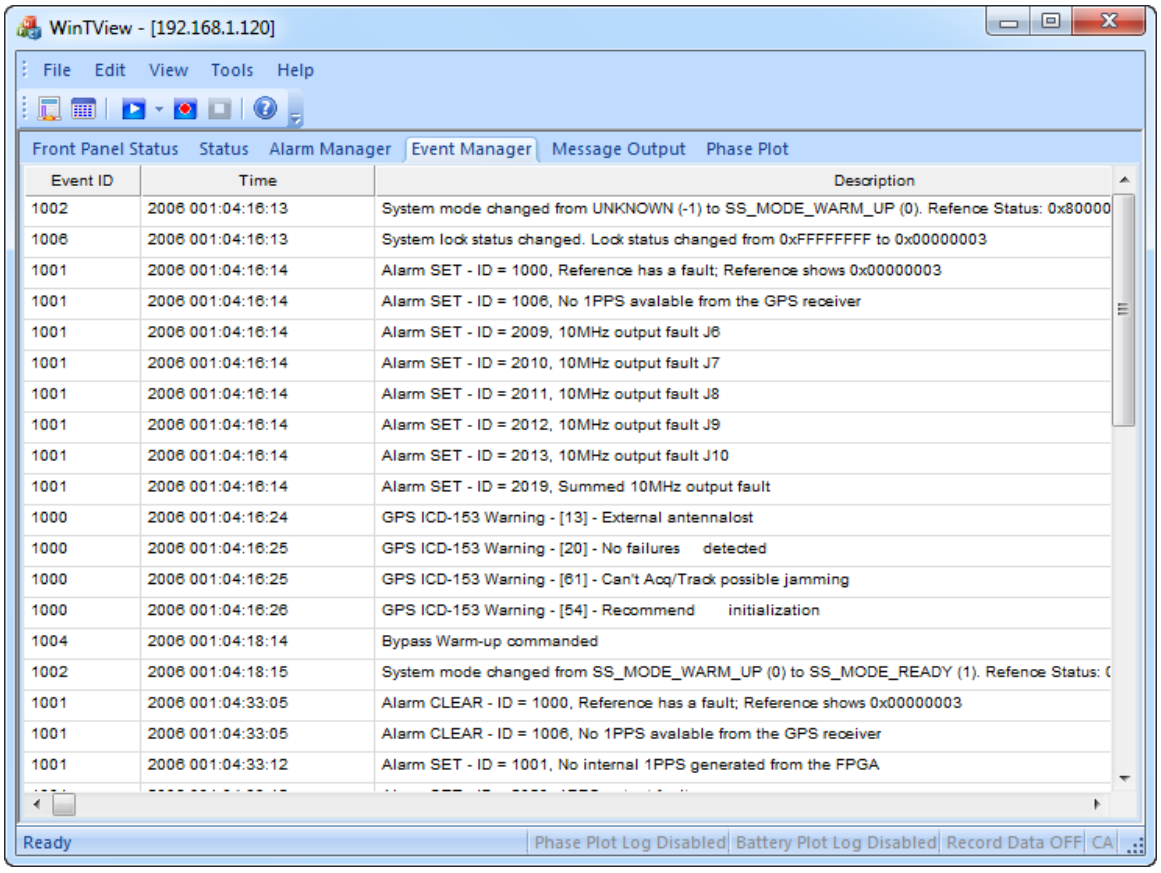


Figure 8 - The Event Manager tab shows the event history of the unit

5.3.4 Event Manager Tab

The Event Manager tab shows the user a list of system events for diagnostic purposes.

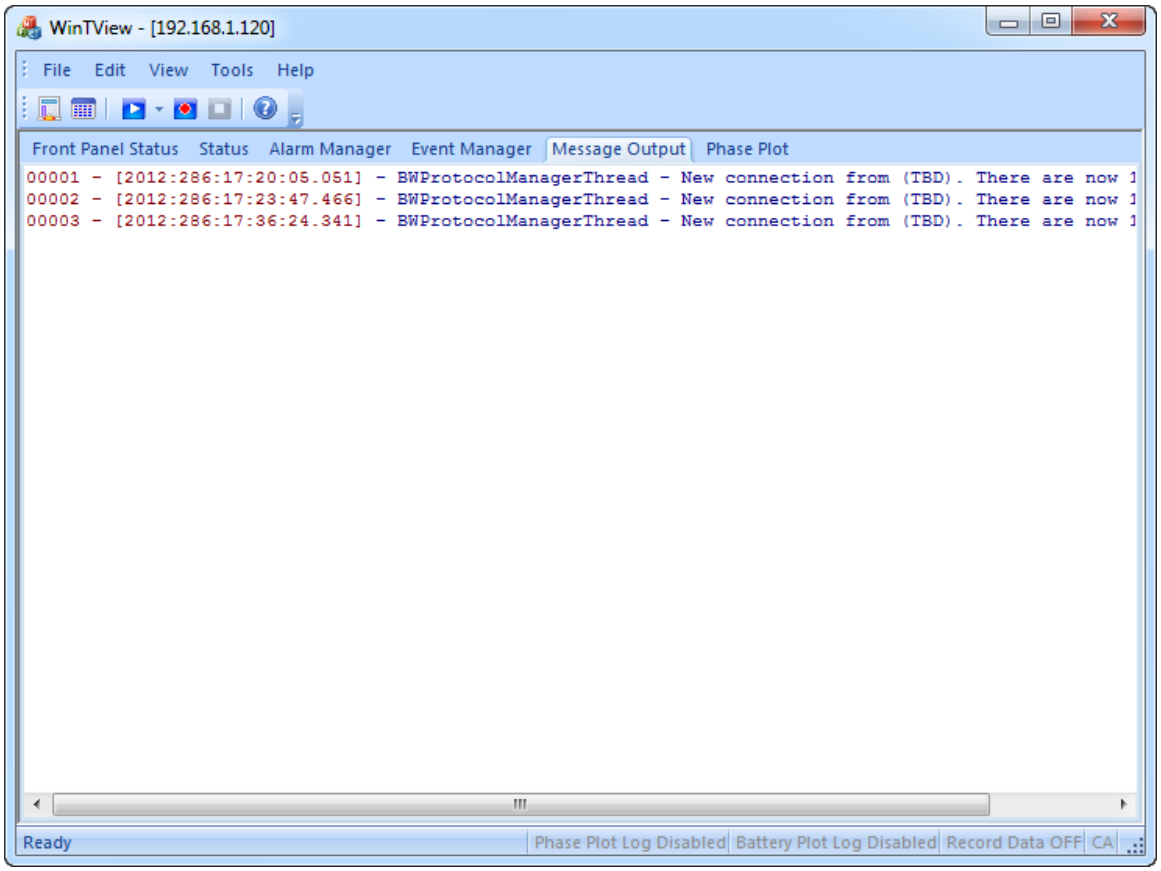


Figure 9 - The Message Output tab shows all debug messages from the unit. (For debug purposes only)

5.3.5 Message Output Tab

This tab shows the user the debug output from the unit. This tab is only used for debugging purposes.

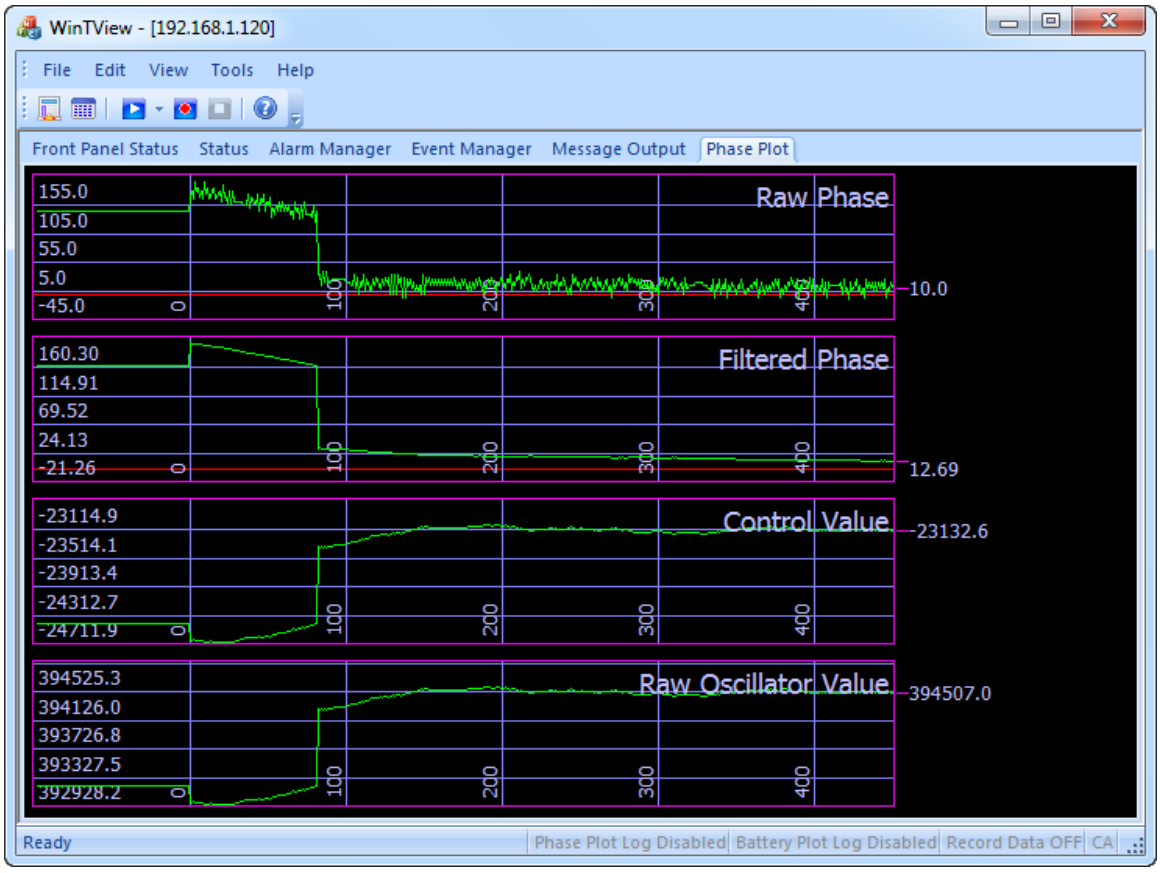


Figure 10 - The Phase Plot Tab shows the frequency control loop inputs and outputs

5.3.6 Phase Plot

The Phase Plot tab (Figure 10) shows the frequency control loop inputs and outputs.

5.4 Key Loading and Zeroizing from Front Panel

The Crypto Variables (CV) in the SAASM GPS receiver can be zeroized and filled via the FRU front panel.

Table 4 - Keyfill and Zeroize Display shows how the front panel LED array for Keyfill and Zeroize status is arranged: (In this table, each of the four LEDs is represented by an O.)

KEYFILL		CV ZEROIZE
O	FAILED	O
O	SUCCESSFUL	O

Table 4 - Keyfill and Zeroize Display

Table 5 shows the relationship between CV status received from the SAASM GPS receiver and what is indicated on the front panel LED array.

(FOR OFFICIAL USE ONLY) **SA/A-S Status**	(FOR OFFICIAL USE ONLY) **Meaning**	**Keyfill & CV Zeroize LEDs** (o =off, * =on)
unauthorized (not keyed)		oo o*
no key for today	The key loaded is invalid or expired.	*o oo
contains today's key	Has a valid key loaded, and it is a current key.	oo *o
today's key incorrect		*o oo
waiting for SV data	Not enough satellite data has been loaded to generate the daily key.	No change in LEDs
CV zeroize successful	The crypto variables were successfully zeroized.	oo o*
CV zeroize failed	The crypto variables were not successfully zeroized.	o* oo
key loaded	This status occurs for approximately 2 seconds when loading the key.	No change in LEDs

Table 5 - Received SA/A-S Message Status and Resulting LED Display

5.4.1 Zeroizing CV

To zeroize the Crypto Variables, you might have to try pressing the CV Zeroize push button switch more than once. It is recommended to use the following procedure:

1. Ensure that the antenna is connected and that satellites are being tracked.
2. Press the CV Zeroize push button for two seconds.
3. Wait for up to 20 seconds to see the four LEDs displayed as shown in the “CV zeroize successful” row.
4. If “CV zeroize successful” LED display *DOES NOT* occur, then start again at step 1.
    - For example, the first button push might result in the LEDs displayed as shown in the “no key for today” row. A second button push will then usually succeed.
5. If “CV zeroize successful” LED display *DOES* occur, then Power Cycle the FRU. Wait for up to 2 minutes to see that this LED display *OCCURS AGAIN*. If it *DOES NOT*, then start again at step 1.

5.4.2 Loading the Crypto Variables (Keyfill)

It is recommended to use the following procedure:

1. Ensure that the antenna is connected and that satellites are being tracked.
2. Make sure that the tape reader's cable is properly connected at both ends.
3. Load BKAUPD.
4. Wait for 5 seconds.
5. Load BGUV.
6. Wait for up to 2 minutes.
7. Repeat until you get the four LEDs displayed as shown in the "contains today's key" row.

If this procedure fails repeatedly, power cycle the FRU and wait for up to 2 minutes. You might then see the desired "contains today's key" LEDs display, indicating that the Keyfill did succeed after all.

5.4.3 Graphical User Interface

For both Zeroizing and Keyfill, if you have access to the FRU GUI, you can look at entries on the GPSWarningLog.htm page to see your progress in performing these tasks. You will need to hit the browser's Refresh button to see new messages as they come in.

During Zeroize, the warning message "All keys zeroized" will appear upon successfully zeroizing the Crypto Variables.

During Keyfill, the warning message "Valid key entered" is logged after BKAUPD is successfully read. (You might see this message logged twice.) After BGUV is successfully read, the warning message "Got Todays key" will appear. You might also see the additional message "Got Tomorrows key".

5.5 Recording and Playing back status and performance data

Recording and Playing back FRU status and performance data

From the WinTView's toolbar, click the Record icon  . From the Save As dialog, type a file name (default filename is RecordedBPWData.bwp) and click Save button to start recording.

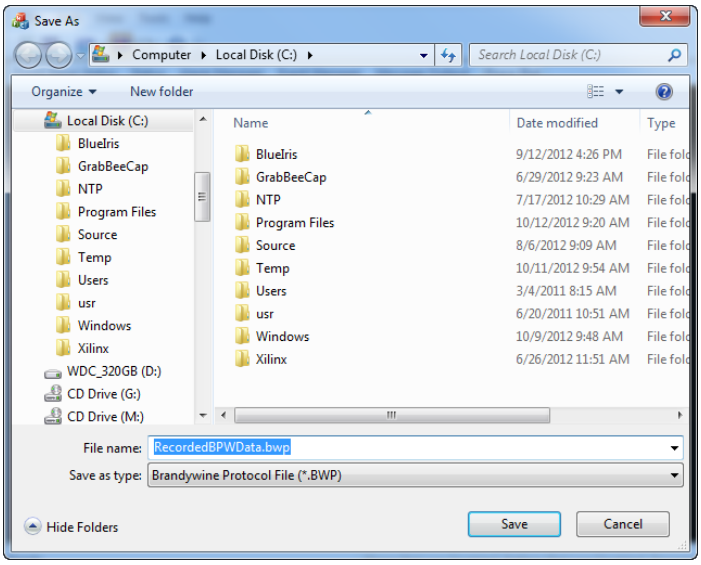


Figure 11 - FRU Recording Save-As Dialog

Make sure the recording has started by checking the Play and Record buttons are dimmed out. To stop collecting the data, click the Stop icon .

To play the recorded file, click the Stop icon , then click the Play icon and select the recorded file.

After finish playing the recorded file, click the Connect icon to connect back to the unit.

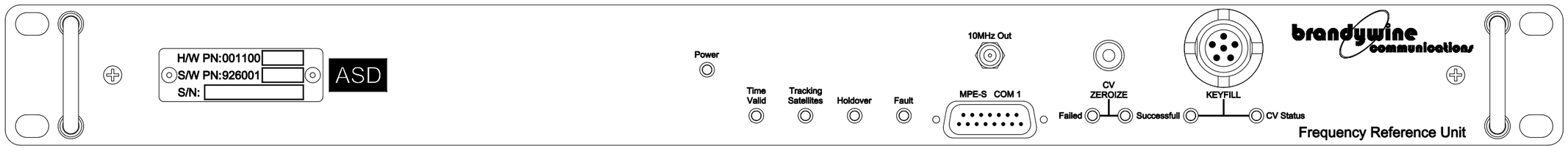
6 Support Information

All Brandywine Communications products come with a one-year warranty.

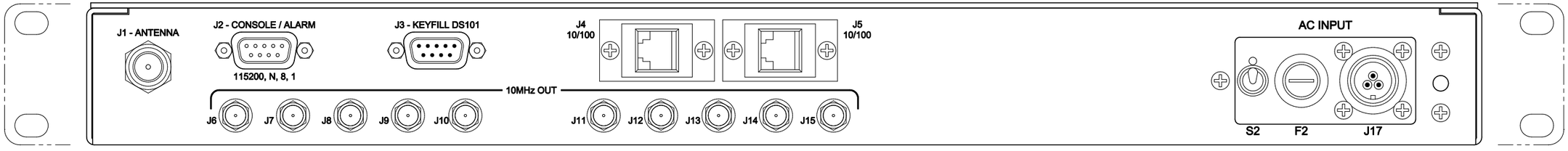
If your unit is still exhibiting problems not covered by the above troubleshooting guide, please contact us for technical support at support@brandywinecomm.com or call us at 714-755-1050.

If it becomes necessary to return your unit to the factory for repairs, please call us at 714-755-1050 extension 113 to arrange an RMA

7 Front Panel Drawing



8 Rear Panel Drawing



9 SNMP Management Information Base

```
--
-- Brandywine Communications Frequency Reference Unit (FRU), internal name Win-T
-- $Revision: 14 $
--

BRANDYWINECOMM-FRU DEFINITIONS ::= BEGIN

IMPORTS
enterprises
       FROM RFC1155-SMI

OBJECT-TYPE
       FROM RFC-1212;

-- ////////////////////////////////////////////////////////////////////////////
--
-- Brandywine Communications OIDs
--
-- Range Time Translator = Product ID of 112
--
BrandywineComm    OBJECT IDENTIFIER ::=   { enterprises 18954     }
fru               OBJECT IDENTIFIER ::=   { BrandywineComm 112    }
system            OBJECT IDENTIFIER ::=   { fru 1                 }
snmp              OBJECT IDENTIFIER ::=   { fru 2                 }
inventory         OBJECT IDENTIFIER ::=   { fru 3                 }

-------------------------------------------------------------------------------
-- System
-------------------------------------------------------------------------------
--
-- System State - The system mode describes the current state the system is
-- in. Current modes that are supported are as follows:
--    0 = Warm-up -  The system is in power up reset and waiting for the
--                   oscillators to warm-up.
--    1 = Ready -    The ready state is where the system is ready to
--                   discipline the oscillators but does not have a
--                   valid reference.
--    2 = Acquire -  The Acquire state is where the system is acquiring
--                   the synchronization signal but its outputs are
--                   not to specification.
--    3 = Lock -     Lock is where the outputs are to specification, there
--                   are no errors and the system is disciplining to the
--                   current reference.
--    4 = Holdover - This mode indicated that the system was locked at one
--                   point then the reference because unusable and now is
--                   in holdover where the oscillator is freewheling.
--
nSystemState        OBJECT-TYPE
       SYNTAX          INTEGER
       ACCESS          read-only
       STATUS          mandatory
       DESCRIPTION     "System Mode - The system mode shows the current state
                                  that the system is in. 0 = Warm-up, 1 = Ready, 2 =
                                  Acquire and 3 = Lock"
       ::= { system  1 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- System Time - Holds the current system time (UTC). The format of this
```

```
-- time is  POSIX time, is a system for describing points in time, defined
-- as the number of seconds elapsed since midnight Coordinated Universal
-- Time (UTC) of January 1, 1970, not counting leap seconds.
--
--   Example: 1278448474 (2010-07-06 20:34:34Z)
--
-- The time is formatted as a 32 bit number represented as an ASCII string.
--
szTime              OBJECT-TYPE
       SYNTAX          OCTET STRING (SIZE (0..10))
       ACCESS          read-only
       STATUS          mandatory
       DESCRIPTION     "System time formatted as a 32 bit ASCII string
                                representing the time in seconds from 1/1/1970"
       ::= { system  2 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- System TFOM - The system TFOM is the time synchronization difference
-- between the input reference and the output 1PPS value.
--      3 = Accuracy < 100ns
--      4 = Accuracy < 1us
--      5 = Accuracy < 10us
--      6 = Accuracy < 100us
--      7 = Accuracy < 1ms
--      8 = Accuracy < 10ms
--      9 = Accuracy >= 10ms
--
nSystemTFOM         OBJECT-TYPE
       SYNTAX          INTEGER
       ACCESS          read-only
       STATUS          mandatory
       DESCRIPTION     "Reports the system TFOM. TFOM 3 < 100ns, 4 < 1us,
                                5 < 10us, 6 < 100us, 7 < 1ms, 8 < 10ms, 9 >= 10ms"
       ::= { system  3 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- Reference Select - The reference select will select the current input
-- reference. Some reference inputs may contain multiple inputs such as the
-- IRIG-B and the external together as a complete reference source.
--
-- This is a ASCII formatted comma separated command where the format is
-- as follows:
--
-- Write Command:
--
--      REF_SEL,SAVE_TO_NVM
--
--      REF_SEL -       Reference select where 0 = none 1 = GPS1, 2 = IRIG,
--                      3 = HAVE QUICK + Ext 1PPS, 4 = IRIG-B + Ext 1PPS,
--                      5 = Ext 1PPS
--      SAVE_TO_NVM -   1 = Save the value to non-volatile memory so that
--                      this value will be restored on the next POR.
--                      0 = Do not store to NVM
--
--      Example: "2,0"
--      This example sets the reference to HAVE QUICK combined with the
--      external 1PPS and the state is not saved into non-volatile memory.
--
-- Read Command
--
--      REF_SEL
--
```

```
--      REF_SEL -       Reference select where 0 = none 1 = GPS1, 2 = HAVE,
--                      QUICK + 1PPS input, 3 = Ext 1PPS + manual time
--
szReferenceSelect   OBJECT-TYPE
       SYNTAX          OCTET STRING (SIZE (0..32))
       ACCESS          read-write
       STATUS          mandatory
       DESCRIPTION     "Selects the current reference input using a comma
                               separated ASCII command of REF_SEL,SAVE_TO_NVM"
       ::= { system  4 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- Reset - Resets the system by command a software reset to the CPU. This
-- is similar to a power up reset. To reset the device, a value of 21930
-- must be passed as the integer.
--
nReset              OBJECT-TYPE
       SYNTAX          INTEGER
       ACCESS          write-only
       STATUS          mandatory
       DESCRIPTION     "Commands the unit to reset, similar to a power up
                               reset. To reset the device, a value of 21930 must be
                               passed as the integer"
       ::= { system  5 }

-- ////////////////////////////////////////////////////////////////////////////

alarmStatusTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF AlarmStatusEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "A list of Alarm Status Items."
    ::= { system 6 }

alarmStatusEntry OBJECT-TYPE
    SYNTAX  AlarmStatusEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "Alarm Status entry."
    INDEX   { szAlarmStatusItem }
    ::= { alarmStatusTable 1 }

AlarmStatusEntry ::=
       SEQUENCE
       {
              szAlarmStatusItem
              OCTET STRING
       }

--
-- Alarm Status Table Item - This is an ASCII comma separated string formatted
-- as follows:
--
--      ID,TIME,SEQ,CC,DESC
--
--      ID -            Alarm unique ID - Identifies the alarm
--      TIME -          The time that the alarm occurred (POSIX formatted).
--      SEQ -           Sequence number - This is a consecutive number that
--                      simply counts alarms.
--      CC -            Condition Code - This is the alarm severity.
--                      Possible values are as follows: 0 = No alarm,
```

```
--                      1 = Minor alarm, 2 = Major alarm and 3 = critical
--                      alarm.
--      DESC -          Description - The description is surrounded with
--                      quotation marks (ASCII value 0x22, " ) to mark the
--                      beginning and end of description.
--
--      Example:           1001,1322734990,4,2,"Reference has a fault"
--
--      The example above shows a table item read which shows that an alarm 1001
(Reference has a fault)
--           occurred at time of 12/1/2011 10:23:10.
--
szAlarmStatusItem OBJECT-TYPE
    SYNTAX  OCTET STRING (SIZE (0..10))
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "Alarm Status Item."
    ::= { alarmStatusEntry 1 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- Total # of Items in Alarm Status List
--
-- Read command:
--
--       Returns the total number of Items in Alarm Status List.
--
-- Write command:
--
--     Write "0" to clear the Alarm Status List
--
nAlarmStatusItemsTotal OBJECT-TYPE
    SYNTAX  INTEGER
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "Total number of Alarm Status Items."
    ::= { system 7 }

-- ////////////////////////////////////////////////////////////////////////////

eventTable OBJECT-TYPE
    SYNTAX  SEQUENCE OF EventEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "A list of Event Items."
    ::= { system 8 }

eventEntry OBJECT-TYPE
    SYNTAX  EventEntry
    ACCESS  not-accessible
    STATUS  mandatory
    DESCRIPTION
        "Event entry."
    INDEX   { szEventItem }
    ::= { eventTable 1 }

EventEntry ::=
       SEQUENCE
       {
              szEventItem
              OCTET STRING
```

```
        }

--
-- Event Table Item - This is an ASCII comma separated string formatted
-- as follows:
--
--      ID,TIME,DESC
--
--      ID -            Event ID - Identifies the event
--      TIME -          The time that the event occurred (POSIX formatted).
--      DESC -          Description - The description is surrounded with
--                      quotation marks (ASCII value 0x22, " ) to mark the
--                      beginning and end of description.
--
--      Example:           1001,1322734990,"Reference has a fault"
--
--      The example above shows a table item read which shows that an event 1001
(Reference has a fault)
--            occurred at time of 12/1/2011 10:23:10.
--
szEventItem OBJECT-TYPE
    SYNTAX  OCTET STRING (SIZE (0..10))
    ACCESS  read-only
    STATUS  mandatory
    DESCRIPTION
        "Event Item."
    ::= { eventEntry 1 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- Total # of Items in Event List
--
-- Read command:
--
--        Returns the total number of Items in Event List.
--
-- Write command:
--
--     Write "0" to clear the Event List
--
nEventItemsTotal OBJECT-TYPE
    SYNTAX  INTEGER
    ACCESS  read-write
    STATUS  mandatory
    DESCRIPTION
        "Total number of Event Items."
    ::= { system 9 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- GPS Data
-- The GPS Data contains GPS position, altitude and status data. The data
-- items are organized in a comma separated ASCII string as indicated
-- below.
--
--      LAT,LON,ALT,SATS_TRCK,NAV,HDOP,VDOP[,P,S,A,E,U,C] X 24
--
--      LAT -           Latitude -  Degrees Latitude valid values are
--                      from -90.0 to 90.0 degrees.
--      LON -           Longitude -  Degrees Longitude valid values are
--                      from -180.0 to 180.0 degrees.
--      ALT -           Altitude mean sea level
--      SATS -          Satellites tracked (0 to 24)
--      NAV -           GPS is tracking satellites and capable of
```

```
--                      navigation and time transfer. Where:
--                          1 = Usable for navigation and time transfer
--                          0 = Not usable
--      HDOP            Horizontal DOP format is ASCII floating
--                      point x.xx
--      VDOP            Horizontal DOP format is ASCII floating
--                      point x.xx
--
--      24 sets of the following [,P,S,A,E,U,C] where:
--
--      P -             Satellite PRN
--      S -             Signal quality - 0 to 55
--      A -             Satellite azimuth (0 - 259)
--      E -             Satellite elevation (0 - 89)
--      U -             Satellite mode where:
--                          0 = Not used for navigation
--                          1 = Used for navigation
--      C -             Code type where 1=C/A-code, 2=P(Y)-code
--
szGPSData           OBJECT-TYPE
       SYNTAX          OCTET STRING (SIZE (0..768))
       ACCESS          read-only
       STATUS          mandatory
       DESCRIPTION     "Retrieves GPS status information"
       ::= { system  10 }

-- ////////////////////////////////////////////////////////////////////////////
--
-- Zeroize SA/A-S Keys (F O U O)
-- Sends the SA/A-S zeroize command to the GPS receiver. The system will
-- verify this command by its string parameter. This parameter must be set
-- to ASCII ZEROIZE_GPS for the system to accept the zeroize command.
--
-- When read, the ICD-GPS-153 interface zeroize status is returned.
--
-- Write:   ASCII ZEROIZE_GPS - This command will zeroize the SA/A-S crypto
--          keys in the system.
--
-- Read:    Zeroize status as read from the ICD-GPS-153 interface message
--          5040 - (FOUO) SA/A-S Message 78 where ASCII HEX value of:
--             0 = unauthorized (not keyed)
--             1 = no key for today
--             2 = contains today's key
--             3 = today's key incorrect
--             4 = waiting for SV data
--             5 = CV zeroize successful
--             6 = CV zeroize failed
--             7 = key loaded
--             8 - 15 = Not Used
--
szZeroizeKeys       OBJECT-TYPE
       SYNTAX          OCTET STRING (SIZE (0..32))
       ACCESS          read-write
       STATUS          mandatory
       DESCRIPTION     "Sends the SA/A-S zeroize command to the GPS receiver"
       ::= { system  11 }

-------------------------------------------------------------------------------
-- SNMP Section - This section defines the standard SNMP settings for this
-- system.
-------------------------------------------------------------------------------

szReadCommunity     OBJECT-TYPE
             SYNTAX OCTET STRING (SIZE(1..255))
```

```
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
                        "Description: ReadCommunity name"
        ::= {snmp 1}

-- ////////////////////////////////////////////////////////////////////////////

szWriteCommunity    OBJECT-TYPE
                SYNTAX OCTET STRING (SIZE(1..255))
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
                        "Description: ReadCommunity name"
        ::= {snmp 2}

-----------------------------------------------------------------------------
-- Inventory - This section has all of the system inventory information
-----------------------------------------------------------------------------
--
-- firmware Version Number - Reports the current software revision. This is a
-- ASZII string containing the version, compile date and time.
--
szVersion       OBJECT-TYPE
                SYNTAX OCTET STRING (SIZE(1..255))
                ACCESS read-only
                STATUS mandatory
                DESCRIPTION
                        "Software revision information"
        ::= {inventory 1}

-- ////////////////////////////////////////////////////////////////////////////
--
-- FPGA Version Number - Reports the current FPGA revision. This is a
-- ASZII string containing the version, compile date and time.
--
szFPGAVersion   OBJECT-TYPE
                SYNTAX OCTET STRING (SIZE(1..255))
                ACCESS read-only
                STATUS mandatory
                DESCRIPTION
                        "FPGA revision information"
        ::= {inventory 2}

-- ////////////////////////////////////////////////////////////////////////////
--
-- Unit serial number - Contains the factory assigned serial number.
--
szSerialNumber  OBJECT-TYPE
                SYNTAX OCTET STRING (SIZE(1..64))
                ACCESS read-only
                STATUS mandatory
                DESCRIPTION
                        "Contains the factory assigned serial number"
        ::= {inventory 3}

-- ////////////////////////////////////////////////////////////////////////////
--
-- System model name - currently this variable will return the system model name.
--
szModelName         OBJECT-TYPE
    SYNTAX          OCTET STRING (SIZE (0..64))
    ACCESS          read-only
    STATUS          mandatory
```

```
    DESCRIPTION     "System model name. Shows the friendly name for the unit."
    ::= { inventory 4 }

-------------------------------------------------------------------------------

END
```