MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GENERAL ELECTRIC

IS200TAMBH1ACB

ACOUSTIC MONITORING TERMINAL BOARD

Used with the applicable Mark VI TAMB Acoustic Monitoring configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

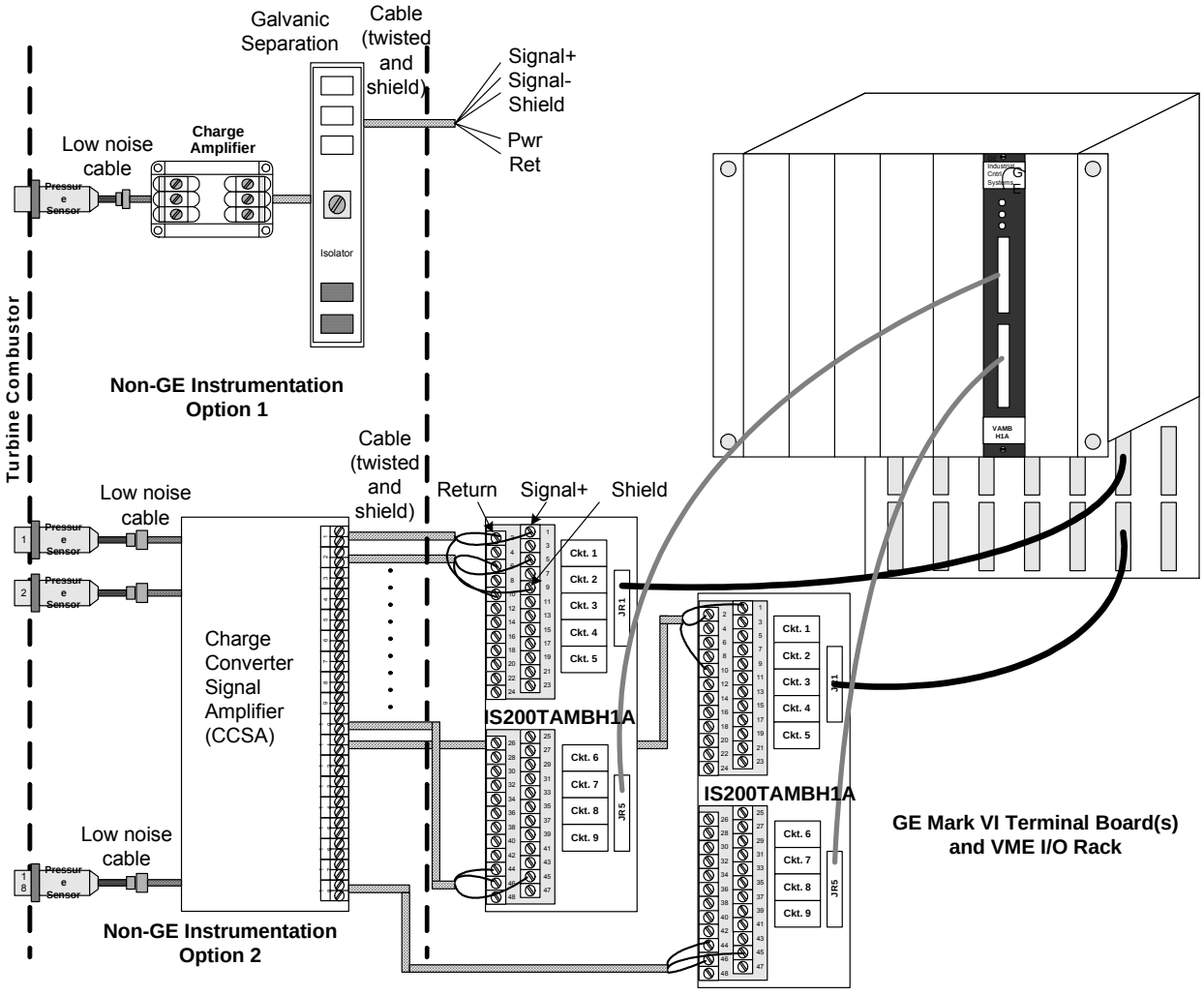
Source: Original GEH-6421M VAMB section, TAMB board specifications p.89; third-party mirror, supplied cover excluded

VAMB Acoustic Monitoring Input

VAMB Acoustic Monitoring

Functional Description

The Acoustic Monitoring (VAMB) board provides 18 channels of signal conditioning through two nine channel acoustic monitoring terminal boards IS200TAMB (TAMB) and one 18 channel I/O acoustic monitoring sub-assembly IS215VAMB (VAMB). The TAMB supports third party vendors such as, Bentley-Nevada®, Vibro-meter®, GE/Reuter-Stokes®, and others.



System Overview

The selected product combination determines the system requirements as follows:

- 18 channels of signal conditioning for sensing dynamic pressure output from third party charge amplifiers
  - Bentley-Nevada, Vibro-meter, PCB Piezotronics®, GE PS CCSA and GE/Reuter-Stokes vendors are supported
  - Differential inputs and adjustable gains
  - Fast synchronous-sampled analog/digital with 8x over-sampling capability to minimize analog filtering
  - Field Programmable Gate Array (FPGA) pre-processor with Finite Impulse Response (FIR) filters
  - Open wire detection
- Analysis capability per channel
  - Proprietary functions
  - RMS value for the ac input signal
  - Alarm detection if peak amplitude exceeds configurable level
  - List captures capability for all 18-channels if an alarm is detected

The acoustic monitoring function for the frame 6, 7, or 9 size gas turbines is supported by the VAMB and either one or two TAMB terminal boards. The TAMB receives an mV output from the CCSA or a third party charge amplifier. Power for the charge amplifier is supplied by the TAMB using a current limited +24V or -24V supply or from an external source. Other than electro-magnetic transient suppression, the differential input signal is routed directly to the VAMB through a cable with 18 twisted-pairs to the Versa Module Eurocard (VME) card front edge.

Gas Turbine Frame Size	No. of Combustors	No. of Flame Detectors	No. of VAMB I/O	No. of TAMB	Max. No. of channels supported
6FA	6	4	1	1	9
7EA	10	8	1	2	18
7FA, 7FB	14	4	1	2	18
9FA	18	4	1	2	18

Installation

Note A GE field service technician should install the VAMB. Technicians should refer to *GII-100014, VAMB Acoustic Monitoring Module*, for complete installation instructions.

The figure TAMB Acoustic Monitoring Terminal Board shows the functionality of one of the nine channels supported on the TAMB. Each channel provides current limited +24 V dc and +24 V dc power supply outputs. A constant current source is connected to the SIGx line for the PCB sensors. The input signal, CCSELx, is False when the signal is a logic-level low through an output on the VAMB. At power-up, the output must be False (logic-level low), leaving the constant current output deselected until the configuration parameters are loaded.

Each channel provides a hardware jumper, JPx, where x equals an even number, which selects a current input, I_IN, or a voltage input, V_IN. The current input provides a 250 W burden resistor for any 4-20 mA circuits connected to that channel.

Each channel has a jumper, JPx, where x equals an odd number, which checks whether the return line, RETx, is tied to the terminal board's power common, PCOM. If JPx= PCOM, then the RETx line is tied to PCOM. If JPx= OPEN, then the RETx line is not tied to PCOM.

A high impedance dc bias allows the VAMB to detect an open connection between the charge amplifier or sensor and the TAMB. The dc bias control provides three options:

- 28 V bias or ground applied to the signal line
- SIGx and return line
- RETx

These inputs are activated or the signal select is True if the Mark* VI I/O board outputs a logic-level low signal from the TTL output. The table shows the selections:

BIASxP	BIASxN	SIGx/RETx Biased to
True	True	Illegal combination. Bias circuit protects power supplies from shorting
True	False	+28 V bias selected
False	True	-28 V bias selected
False	False	No bias selected, but both SIGx and RETx are pulled to ground to keep the unused input electrically quiet.

The sensor or charge amplifier signal output is connected to the terminal board point, SIGx, and the Kelvin or low-current return is connected to RETx. The terminal board provides signal suppression and EMI protection and passes the signal on to the VAMB through a 37-pin connector.

Each channel provides a buffered BNC output. The buffered signal is the input signal minus the dc bias.

Specifications

Signal Input Accuracy

Requirement	Limits
RMS Calculation Accuracy for Gain = 1, 2, 4 or 8 volts / volt	±2.0% full scale
Peak-to-Peak FFT Calculation Accuracy for Gains = 1, 2, 4 or 8 volts / volt	±0.5% full scale from 0 to 1600 Hz ±1.5% full scale from 1601 to 3200 Hz

Power Supply

Requirement	Limits
Number of P24 dual-mode outputs (one current-limit output, P24 Vx and one constant current output tied to SIGx selectable through CCSELx)	9 (one per channel)
P24 V (current-limit mode selected)	+22.8 to +25.2 V dc
P24 nominal current (current-limit mode selected)	44 mA ±10%
(due to standing current of IPC 704 on GSI 122/130)	
P24 minimum/maximum peak current range (current-limit mode selected)	20 – 60 mA
(due to ±5 mA ac signal component plus some over range riding on top of standing current of IPC 704 connected to GSI 122/130 from Vibro-meter)	
P24 V (constant current mode selected with supply tied to SIGx)	+20 to +30 V dc
P24 nominal current (constant current mode selected)	3.5 mA ±10%
Constant current input type	TTL
Constant current selection logic level for TRUE state. (TAMB ckt. provides a pull-up for the input.)	High
Number of N24 current-limited outputs	9 (one per channel)
N24 V	-18.85 to -26 V dc
N24 nominal current	20 mA
N24 maximum load current	30 mA

Jumper Selections

Requirement	Limits
Number of JPx (even) 3-pin jumpers with one side tied to the signal line, SIGx and the opposite side left open with the center pin tied to the 250 W burden resistor.	9 (one per channel)
Silk screen label for connection from signal line, SIGx to the 250 W burden resistor.	I_IN
Silk screen label for connection from the 250 Ω burden resistor to no-connect pin (open).	V_IN
Number of JPx (odd)3-pin jumpers with one side tied to the return signal, RETx , and the opposite side left open with the center pin tied to PCOM.	9 (one per channel)
Silk screen label for connection from signal return, RETx to PCOM	PCOM
Silk screen label for connection from PCOM to no connect pin.	OPEN

Bias Control

Requirement	Limits
Number of TAMB channels with bias control.	9 (one per channel)
Control input signal type	TTL
Bias control input true state	Logic high
Dc error to dynamic signal channel produced by the bias control.	< 0.5 %

Constant Current Select for P24

Requirement	Limits
Number of constant current control inputs	9 (one per channel)
Control input signal type	TTL

Buffered BNC Outputs

Requirement	Limits
Number of buffered BNC outputs	9 (one per channel)
Dc gain (Dc bias is removed from signal)	1 ±0.5 %
Allowable offset	30 mV ±10%
Output impedance	40 Ω ±50%
J6 connector type for QC	25-pin D shell

Diagnostics

Three LEDs at the top of the VAMB front panel provide status information. The normal RUN condition is a flashing green, and FAIL is a solid red. The third LED is normally off but displays a steady orange if a diagnostic alarm exists in the board.

Each input has system limit checking based on two configurable levels. These limits can be configured for enable/disable, >= or <=, and as latching/nonlatching. RESET_SYS resets the out of limits. If this limit is exceeded a system limit logic signal is set.

Each input has sensor limit checking, open circuit detection, and dc bias autonulling and excessive dc bias detection. Alarms will be generated for these diagnostics. Refer to *I/O Board Alarms and Point Configuration*. RESET_SYS resets these alarms.

The TAMB terminal board has its own ID device, which is interrogated by the I/O board. The board is coded into a read-only chip containing the terminal board serial number, board type, revision number, and the JR, JS, JT connector location. This ID is checked as part of the power-up diagnostics.