STA 4
AUG 25 1994

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 600611

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	IRM Chemical & Waste Management Software Support	159986
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
62610	D. A. Barnes	N/A
8. Originator Remarks: Tank Monitor and Control System (TMACS) Software Test Procedures TP011 and TP012, for approval/release. See related TMACS Test Procedures in ECN 196862.		**9. Equip./Component No.:** N/A **10. System/Bldg./Facility:** TMACS/2750E/200E
11. Receiver Remarks:		**12. Major Assm. Dwg. No.:** N/A **13. Permit/Permit Application No.:** N/A **14. Required Response Date:** 5/31/94

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-TRP-201	ALL	0	TP011: TMACS Panalarm Interface	Q	1	1	
2	WHC-SD-WM-TRP-202	ALL	0	TP012: Panalarm Software Bridge	Q	1	1	

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog. Eng. DA Barnes	David Barnes	6/6/94		IRM Manager RB Bass	RB Bass	6/3/94 RI-01		1	1
1	1	Cog. Mgr. JS Schofield	J.S. Schofield	6/6/94		V&V Independent Reviewer JR Freer				1	
1	1	User, IF Operations R Ni	R Ni	6/16/94		I&C CC Scaief	C.C. Scaief III	6-7-94		1	1
1	1	QA JA Warren	J A Warren	6/7/94		Software Project Manager DG Spurling	Dave Spurling	6/3/94 RI-01		1	1
		Safety									
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required) Ltr. No.
Dave Spurling 6/3/94 Signature of EDT Originator / Date	David Barnes 6/6/94 Authorized Representative for Receiving Organization / Date	J.S. Schofield 6/6/94 Cognizant/Project Engineer's Manager / Date	☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments

MASTER

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RELEASE AUTHORIZATION

Document Number:	WHC-SD-WM-TRP-202, REV 0
Document Title:	TMACS TEST PROCEDURE TP012: PANALARM SOFTWARE BRIDGE
Release Date:	8/25/94

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This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * * * * * * * * * * *

WHC Information Release Administration Specialist:

Kara Broz — 8/25/94

(Signature) — (Date)

SUPPORTING DOCUMENT

1. Total Pages 16

2. Title	3. Number	4. Rev No.
TMACS Test Procedure TP012: Panalarm Software Bridge	WHC-SD-WM-TRP-202	0

5. Key Words

Software, Test Procedure, Tank Monitor and Control System, TMACS Software Project

APPROVED FOR
KMB 8/25/94 PUBLIC RELEASE

6. Author

Name: S. J. Washburn

Steven J Washburn
Signature

Organization/Charge Code 62610/N46G1

7. Abstract

The TMACS Software Test Procedures translate the project's acceptance criteria into test steps. The TMACS Test Plan (WHC-SD-WM-TP-148) is fulfilled when all Test Cases are approved.

This Test Procedure tests the TMACS Panalarm Interface functions.

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9. Impact Level Q

10. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE AUG 25 1994
STA 4
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TANK MONITOR AND CONTROL SYSTEM

(TMACS)

SOFTWARE PROJECT

TEST PROCEDURE TP012:

PANALARM SOFTWARE BRIDGE

Steven J. Washburn

IRM Chemical & Waste Management
Software Support

SIGN OFF:

C.C. Scaief III		6-7-94
CC Scaief TMACS Program Engineer	signature	Date
David Barnes	David Barnes	5/26/94
DA Barnes TMACS Cognizant Engineer	signature	Date
John Freer		5/26/94
WJ Jones IRM Software V&V	signature	Date
Dave Spurling	Dave Spurling	5/26/94
DC Spurling TMACS Project Manager	signature	Date
RB Bass	RB Bass	6/3/94
RB Bass IRM Manager	signature	Date

1.0 TEST ITEMS

This Test Procedure addresses the testing of the functionality of the TMACS Panalarm bridge software. The features to be tested are given in the test case below:

Table 1. Test Cases

2.0 ACCEPTANCE CRITERIA AND REQUIREMENTS

The acceptance criteria for this Test Procedure are taken from the requirements section of the Panalarm Bridge Software Action Plan.

Note: Verification of Test Cases 5.4 and 5.5 can not be performed since emulation capability does not currently exist. Those Test Cases will be waived to a later date.

3.0 TESTER INFORMATION

The TMACS system is an application built using the G2 Real-Time Expert System. The instructions for using the mouse, mouse buttons, and keyboard are given below.

The majority of user control of the system involves pointing at objects on the computer screen using the POINTER. The pointer is an arrow that is pointing to the upper left of the screen. When a user moves the mouse, the pointer moves on the screen.

The G2 system treats the left and right mouse buttons as if they were a single button. Whenever the use of a mouse button is required the user is free to use either of these buttons.

The following terms are used to describe actions performed with the mouse:

- To move the pointer, slide the mouse with no buttons pressed.
- To point to a push-button or object, move the pointer to the appropriate place on the screen.
- To click on an object, first move your mouse so that the screen pointer rests on the object. Then, press the mouse button and release immediately without moving the mouse.
- To drag an object with the mouse, first move the mouse so that the screen pointer rests on the object. Then, press the mouse button and move the mouse without releasing the button. The object moves along with the screen pointer as you move the mouse. Release the button when the object is in the desired place. To drag a window in TMACS place the

mouse in a blank area around the margin of the window and drag. (Note: the drag function is not provided for all windows.)

If the G2 screen becomes unreadable or objects overwrite each other the screen can be redrawn by typing Control-C. (Hold down the "Control" key while typing the letter C).

4.0 PRE-TEST INSPECTION AND SETUP REQUIREMENTS

This Test Procedure uses G2 software developed for production use, and can be identified in three parts as "/home/G2/TMACS/prod/TMACS_Release_x_x.KB" (where x_x refers to the current revision number, with only one file in the directory matching the template), "/home/G2/BRIDGE/acromag_brg" (Acromag driver), "/home/G2/BRIDGE/panalm_brg" (Panalarm driver), "/home/G2/BRIDGE/printer_brg" (alarm printer driver) and on the SACS Sybase production machine (tfs8) the G2 Sybase bridge "/local/G2/sybase/gsisyb3".

This Test Procedure interacts with one local Panalarm cabinet (number 1) which is connected to line 0 of a code operated switch through port 7 of the serial multiplexor attached to the TMACS slave workstation.

It is assumed that at least an 8 port serial multiplexor is attached to the "Slave" workstation and that the Panalarm bridge can function through each of its ports.

To communicate with the local Panalarm cabinet the Test Administrator, hereafter referred to as TA, must perform the following steps:

1. Make sure the TMACS Slave workstation which runs the Panalarm bridge software is connected to local Panalarm unit corresponding to port 7 of the serial multiplexer.

2. Connect the PC serial analyzer software into the communication link between the Sun workstation multiplexer and the Panalarm unit. Start the analyzer running so that both the Received and Transmitted data streams are displayed.

3. Start the Panalarm bridge from a Unix command tool on the TMACS Slave workstation. To do this you must go to the directory "/home/G2/BRIDGE/PANALM" and enter the command "panalm_brg 23007".

5.0 TEST STEPS WITH EXPECTED RESULTS

STEP	DESCRIPTION	VERIFY
	5.1 Bridge Initialization Options	
1	Select the PANALARM-WS workspace from the Main G2 Menu. Then select the PANALARM-PRODUCTION-INTERFACES subworkspace. Examine the PANALARM-INTERFACE-1 object and verify that the GSI Interface Connection string is as follows: "tcp-ip host 'tfs10' port number 23007". This indicates that communication between the bridge and device is through tcp-ip and the host computer is Slave workstation tfs10 communicating through serial port 23007. Also verify that the remote process initialization string on the Panalarm GSI interface object is as follows: "-d /dev/cuc7 -s 9600 -p n -b 8 -h 1 -j 0 -t n -q n -n 0 -e y -r 1". This indicates that the device name is /dev/cuc7, the baud rate is 9600, the parity is none, bits per character is 8, stop bits are 1, parity is not being used, no time stamping, no debug mode, return sensor value to G2 only when it has changed from previous value (exception reporting) and finally perform only 1 retry after command response rejection or checksum error.	JRF
2	The verify that the remote process initialization string on the Panalarm GSI interface object is as follows: "-d /dev/cuc7 -s 9600 -p n -b 8 -h 1 -j 0 -t n -q n -n 0 -e y -r 1". This indicates that the device name is /dev/cuc7, the baud rate is 9600, the parity is none, bits per character is 8, stop bits are 1, parity is not being used, no time stamping, no debug mode, return sensor value to G2 only when it has changed from previous value (exception reporting) and finally perform only 1 retry after command response rejection or checksum error.	JRF

STEP	DESCRIPTION	VERIFY
	5.2 Bridge Communication	
3	Verify on the serial analyzer that <u>commands sent</u> by the Panalarm bridge to the Panalarm cabinet are in the form of hexadecimal (hex) binary digits: [AC][LINE][BL][CC][FCN][CS] where [AC] is the code operated switch arming character (which should be 01), [LINE] is the ASCII representation of the code switch line number to use (which should be 30, ASCII zero), [BL] is a 2 hex block length of the command in bytes, [CC] is a 2 hex digit Panalarm cabinet number (01), [FCN] is the Panalarm function number (23), [data....] is the hex digit data for each Panalarm alarm panel, and [CS] is the two hex digit checksum value of the command. A typical line should look as follows: [01][30][02][01][23][DC] where the square brackets are included to improve readability but should not appear in the command. Verify that the <u>command responses</u> from the Panalarm annunciator to the Panalarm bridge are in the form of hexadecimal digits as given below: [BL][CC][FCN][CPCNT][RCS][HCPS]...[CS] where [BL] is the block length of the response in bytes, [CC] is the cabinet number, [FCN] is the Panalarm function number data is being returned for, [CPCNT] is the number of CP cards in the cabinet, [RCS] is the number of rows and columns in, [HCPS]... is a stream of two hexadecimal digits representing the value for each card, and [CS] is the two digit hexadecimal checksum value of the command response. A typical line should look as follows: [54][01][23][50][2A][10][00][00][00]...[E2] where the square brackets are included to improve readability but should not appear in the command response.	JMF JMF JMF

STEP	DESCRIPTION	VERIFY
4	Have the TA select the PANALARM-DEVELOPMENT-CABINETS subworkspace of the PANALARM-WS. Then get the subworkspace of DEV-CAB-1 to pull up the Test Control Panel #1. Verify that all 8 sensors are green and not flashing and that their last recorded values are "0, valid indefinitely".	JMF
5	Have the test administrator change the state of 3 sensors on the local Panalarm Annunciator to be in alarm. Record the names of the three sensors here: Sensor Name #1: Test-R1-C3 Sensor Name #2: Test-R1-C5 Sensor Name #3: Test-R2-C3 Verify that the states of these sensors change by observing that they turn to flashing red and their last recorded value is "1, valid indefinitely". Also observe that data agrees on the PC serial analyzer.	JMF
6	Have the test administrator change the state of the above 3 sensors on the local Panalarm Annunciator to normal. Verify that the states of these sensors change by observing that they turn to flashing green and their last recorded value is now "0, valid indefinitely".	JMF

5.3 Bridge Performance

7	From the PANALARM-WS workspace select the Panalarm-development cabinet subworkspace. On this workspace you will see several Panalarm cabinet objects set up for the development mode. Select one of the cabinets to examine and verify that the last recorded value attribute is 1 and has not expired. Also verify that the time of the last recorded value when updated does not increase by more than 3 seconds. This is with the Acromag bridge (port 5) running. With the bridge not running the update time will increase by less than 3 seconds.	JMF

STEP	DESCRIPTION	VERIFY
	5.4 Testing Checksum Errors	
8	Set up the Panalarm emulator to generate single checksum errors at a fixed time interval. Verify that every time a checksum is generated the Panalarm bridge does a retry.	See Exception Page 11a.
9	Set the emulator to generate two consecutive checksum errors for the same data request. Verify that when two consecutive checksum errors are sent for the same sensor that a white alarm stating a Checksum error has occurred is displayed on the G2 MOST RECENT ALARM window. Because of G2 internal data verification an internal alarm message will be generated stating TMACS has lost communication with that cabinet. This message will supersede the checksum error message on the "MOST RECENT ALARM" window. Therefore, to see the first white alarm (from the Bridge) you will need to get into the alarm summary paging mode by clicking on the "CURRENT ALARMS" button on the CONTROL PANEL. Then you will need to page through the alarms until you see the specified checksum error message.	
	5.5 Testing Command Reject Errors	
10	Set up the Panalarm emulator to generate a single command reject errors at a fixed time interval. Choose the error to be generated by examining the Appendix. Record the reject code to be tested _____. Verify that every time this reject error is generated by the emulator the Panalarm bridge does a retry.	See Exception Page 11b.

STEP	DESCRIPTION	VERIFY
11	Set the emulator to generate two consecutive reject errors for the same data request. Verify that when two consecutive reject errors are sent for the same sensor that a white alarm stating a reject error has occurred is displayed on the G2 MOST RECENT ALARM window. Because of G2 internal data verification an internal alarm message will be generated stating TMACS has lost communication with that cabinet. This message will supersede the reject error message on the "MOST RECENT ALARM" window. Therefore, to see the first white alarm (from the Bridge) you will need to get into the alarm summary paging mode by clicking on the "CURRENT ALARMS" button on the CONTROL PANEL. Then you will need to page through the alarms until you see the specified reject error message.	See Exception p. 11 b

Observed JLF

6.0 REFERENCES

[1] *RS422 Communications Option - Installation, Programming and Operating Instructions*, 1988, Document # 900316, Revision 10 (ECN 10623-02), Ametek Inc., Panalarm Division, Skokie, Illinois.

[2] *Panalarm Series 90 Annunciator Systems Instruction and Operating Manual*, August 1992, Document # 900250, Revision 8 (ECN 11105), Ametek Inc., Panalarm Division, Skokie, Illinois.

[3] *Code Operated Switch II*, December 1992, Document # SW590A-R2, Black Box Corp., Pittsburgh, Pennsylvania.

7.0 ATTACHMENTS

Appendix: Panalarm ERROR CODES/MESSAGES
Acceptance Sheet
Exception Sheets
Data/Verification Sheet
Test Log

APPENDIX: Panalarm Error Codes/Messages

Error Code	Error Message
01	[Panalarm Error]:01: The 90CPX Card in this Cabinet is not responding
02	[Panalarm Error]:02: Undefined Host Computer Request
03	[Panalarm Error]:03: The Hosts Command Checksum was in Error
04	[Panalarm Error]:04: 90CPC Transmit Fault, checksum or format
05	[Panalarm Error]:05: Requested FCN lost, no 90CPX RAM available
06	[Panalarm Error]:06: Not enough 90CPX RAM to store all data
07	[Panalarm Error]:07: Analog card clear, point monitoring down
08	[Panalarm Error]:08: 90CPX Checksum Fault detected by 90CPC
09	[Panalarm Error]:09: Cabinet PRIORITY mode enabled
10	[Panalarm Error]:10: Not Used - No Error
11	[Panalarm Error]:11: CP status not received on 2 consecutive polls
12	[Panalarm Error]:12: Invalid Error Code
13	[Panalarm Error]:13: Invalid Error Code
14	[Panalarm Error]:14: Invalid Error Code
15	[G2 Init Error]:15: Too Many Connections between G2 and Bridge
16	[G2 Init Error]:16: Invalid Acknowledge Checksum Specification
17	[G2 Init Error]:17: Invalid Max. Bits Per Character Specification
18	[G2 Init Error]:18: Invalid Exception Reporting Specification
19	[G2 Init Error]:19: Invalid Number of Stop Bits Specification
20	[G2 Init Error]:20: Invalid Parity Request Specification
21	[G2 Init Error]:21: Invalid Naptime Specification
22	[G2 Init Error]:22: Invalid Parity Type Specification
23	[G2 Init Error]:23: Invalid Debug Request Specification
24	[G2 Init Error]:24: Invalid Number of Retries Specification
25	[G2 Init Error]:25: Invalid Baud Rate Specification
26	[G2 Init Error]:26: Invalid Timestamping Request Specification

Error Code	Error Message
27	[G2 Init Error]:27: Invalid Watchdog time Specification
28	[G2 Init Error]:28: Invalid Switch Setting Specified
29	[G2 Init Error]:29: Attempt to Connect to Port Failed
30	[G2 Error]:30: Illegal Code Switch Line Number Received
31	[G2 Error]:31: Illegal Panalarm Cabinet Number Received
32	[G2 Error]:32: Illegal Panalarm Row Number Received
33	[G2 Error]:33: Illegal Panalarm Column Number Received
34	[G2 Error]:34: Illegal Panalarm Slot Number Received
35	[G2 Error]:35: Creation of Panalarm Object Failed
36	[G2 Error]:36: Invalid Error Code
37	[G2 Error]:37: Invalid Error Code
38	[G2 Error]:38: Invalid Error Code
39	[G2 Error]:39: Invalid Error Code
40	[G2 Error]:40: Bad Read - unable to interpret Panalarm data
41	[G2 Error]:41: No GSI Object to correspond with this Object Index
42	[G2 Error]:42: The TMACS COULD NOT Communicate with this Cabinet
43	[G2 Error]:43: No Panalarm Object Defined for this GSI variable
44	[G2 Error]:44: Bad Unit
45	[G2 Error]:45: Failure in Accessing Cabinet: Check Cabinet Power
46	[G2 Error]:46: Checksum Error Received from Panalarm Cabinet
47	[G2 Error]:47: Unrecognized Function Code returned by Panalarm
48	[G2 Error]:48: Invalid Error Code
49	[G2 Error]:49: Invalid Error Code
50	[G2 Error]:50: Invalid Error Code

EXCEPTION SHEET

Testing Checksum Errors

TEST PROCEDURE NUMBER: TP012 **STEP#:** 5.4 steps **DATE:** 5/26/94

DESCRIPTION:

Panalarm emulator does not exist - so testing could not be run

RESOLUTION: **DATE RESOLVED:** 5/26/94

This feature will be tested in a future release. A Panalarm emulator program is being developed similar to the Acromag emulator program.
Note: This exception is not a result of a failure, but of an inability to verify correct functionality.

APPROVAL:

Patrick Scanlan — 5/26/94
TMACS Software Test Procedure Tester — Date

John Freer — 5/26/94
TMACS Software Test Procedure Witness — Date

Steven J Washburn — 5/26/94
SJ Washburn, TMACS Test Procedure Software Engineer — Date

Dave Spurling — 5/26/94
DG Spurling, TMACS Software Project Manager — Date

May 24, 1994 TP012 Rev. 0

EXCEPTION SHEET

TEST PROCEDURE NUMBER: TP012 STEP#: 5.5 Testing (command Reject ERRORS steps 10-11 DATE: 5/26/94

DESCRIPTION:

Panalarm emulator does not exist - so testing could not be run.

RESOLUTION: DATE RESOLVED: 5/26/94

This feature could not be verified, since Panalarm communication can not be emulated. This will be tested in a future release.

APPROVAL:

PATRICK SCANLAN Patrick K Scanlan 5/26/94
TMACS Software Test Procedure Tester Date

John Freer 5/26/94
TMACS Software Test Procedure Witness Date

Steven J Washburn 5/26/94
SJ Washburn, TMACS Test Procedure Software Engineer Date

Dave Spurling 5/26/94
DG Spurling, TMACS Software Project Manager Date

Note: Test Cases 5.4 (Checksum Testing) and 5.5 (Command Reject Errors) are being deferred to later release.

ACCEPTANCE SHEET

TEST PROCEDURE NUMBER: TP012 **DATE:** 5/26/94

ORGANIZATION NAME: Chem + Waste Mgmt S/W Sppt. **ORG#:** 62610

EXCEPTION SHEETS FOR THIS TEST PROCEDURE:

TESTER	WITNESS	STEP	DATE	RESOLVED
~~PKS~~	~~JRF~~			
PKS	JRF	8-9	5/26/94	
PKS	JRF	10-11	5/26/94	

COMMENTS:
All of the test steps of this test procedure have been tested and exception sheets for this test procedure have been resolved.

APPROVAL:

Patrick K. Scanlan 5/26/94
TMACS Software Test Procedure Tester Date

John Freer JRF 5/26/94
TMACS Software Test Procedure Witness Date

Steven J Washburn 5/26/94
SJ Washburn, TMACS Test Procedure Software Engineer Date

Dave Spurling 5/26/94
DG Spurling, TMACS Software Project Manager Date

C.C. Scaief III 6-7-94
CC Scaief, TMACS Program Engineer Date

DATA/VERIFICATION SHEET

This Sheet provides a record of Personnel who are involved in testing, data recording, verifying, and evaluating the Test Procedure. This form needs to be completed before a formal test is begun.

DIRECTIONS:

Print the name, sign, initial, and date the below lines of the participants.

TEST PROCEDURE NUMBER: TP012

PAT SCANLAN Patrick K Scanlan	Tester / Organization	PKS	5/26/94
John Freer	Witness / Organization	JRF	5/26/94
Steven J Washburn	SJ Washburn, TMACS Test Procedure Software Engineer	SJW	5/26/94
Dave Spurling	DG Spurling, TMACS Software Project Manager	DS	5/26/94
	Name / Organization	Initials	Date
	Name / Organization	Initials	Date
	Name / Organization	Initials	Date

TEST LOG

TEST PROCEDURE NUMBER: TP012 **Date:** 5/26/94

TESTER: Patrick Sanders

WITNESS: JM

TEST LOG NOTES:

Unable to run steps 8, 9, 10 & 11 because no emulator exists.

COMMENTS: