



TECHNICAL NOTE TN-1145

TM8200 and TM9100 Control Head Component change

31 January 2006

Applicability

This Technical Note details a change to the TM8200 and TM9100 Control Heads - TMAC40-0T and TMAC41-1T respectively.

1. Description

The failure of R119 in the TM8200 and TM9100 control heads has been reported recently on several occasions.

All of these failures appear to have occurred during some sort of communications via the control head's microphone serial port.

Initial investigations revealed that on the 17th June 2005 (ECO 102200497), R119 was changed from 68 Ω to 10 Ω as part of a design change to address noise problems with the (TMAA03-05) remote kit and (TMAA02-08) keypad microphone.

The 10 Ω resistor chosen was a fusible type (IPN 036-12100-22) whereas the previous 68 Ω resistor had been a standard type (IPN 036-02680-02).

Tests were instigated to ensure a standard 10 Ω resistor would not fail in a similar way.

It was thought that there might be a link between these failures and the use of the new TPA-SV-006 programming lead. This lead is required for the newer TP9100 portable but can be used for any programming duty.

Investigation revealed that failures were occurring on benches using both the TPA-SV-006 or T2000-A19 programming leads. However, the test results would indicate that failures of R119 would be more likely when using the TPA-SV-006.

Both steady state and transient currents in R119 were monitored with both the T2000-A19 and TPA-SV-006. This testing revealed that R119 is being exposed to a current pulse, when a programming lead is plugged-in, to a powered-up radio.

The pulses also occur, but to an acceptably lower level, when the radio is powered-up with the programming connector already plugged in. There are no pulses during a soft reset.

2. Test Results

Steady State Current

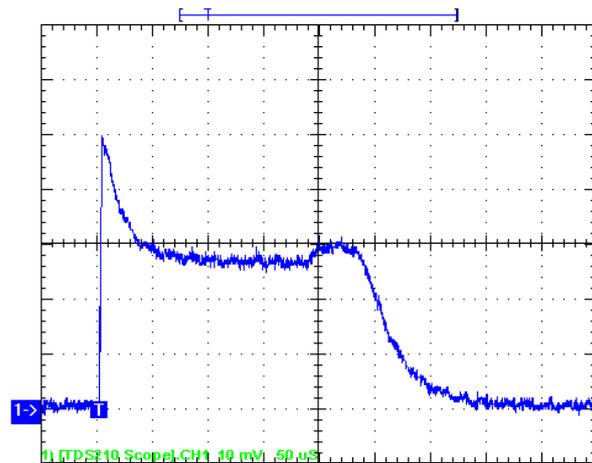
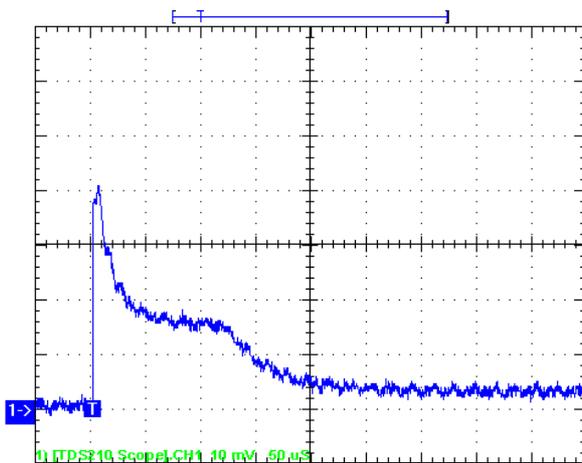
The measured current through R119 during a radio read/write cycle.

Lead Type	Steady State Current (mA)
T2000-A19	12.7
TPA-SV-006	16

This level is well within the limits of R119.

Plugging in a T2000-A19 Programming Lead

Plugging in a TPA-SV-006 Programming Lead



Pulse Length		Current Measured	Stated Current Limits		Result
			<i>Fusible Type</i>	<i>Standard Type</i>	
T2000-A19	10uS	800mA (= 6.4W)	707mA (5W)	1000mA (10W)	R119 Fail
	120uS	300mA (= 0.9W)	539mA (2.9W)	707mA (5W)	Pass
TPA-SV-006	10uS	950mA (= 9W)	707mA (5W)	1000mA (10W)	R119 Fail
	230uS	550mA (= 3W)	500mA (2.5W)	671mA (4.5W)	R119 Fail

Conclusion

It can be seen when using the TPA-SV-006 that both the 10 μ S or 230 μ S areas of the pulse, and the 10 μ S pulse of the T2000-A19, are above the allowable limit for pulse power in the fusible type resistor but below the allowable limit for a standard type resistor. These pulses are caused by the capacitor on the supply line of the programming lead RS232 circuitry.

The T2000-A19 capacitor is 1 μ F and the TPA-SV-006 has a 2.2 μ F.

Note that pulses as high as 1.3A were observed during testing. These high pulses were generated when the RJ45 plug was inserted on an angle and in such a way that the 13.8V line was connected before the ground line. This is not considered normal operation but may occur if the programming lead entering the head was the (6-pin) RJ12 of the basic programming lead and not the RJ12 to RJ45 adaptor TMAA20-04.

ECO Change

This will be processed through the line under ECO 102200621.

Applies To: TMAC40-0T and TMAC41-1T

Change R119:

From: IPN 036-12100-22 - RES 1206 10R 5% Fusible

To: IPN 036-02100-02 - RES 1206 10R 5% 0.25W

Compliance Issues None.

CSO Instruction Inform all service staff and dealers of the released information.

3. Issuing Authority

Name and Position of Issuing Officer Graham Brenchley
Technical Support Engineer

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