



# REVISIONS

LTR	ECO	DESCRIPTION	DATE	APPROVED

8411200448 841105  
PDR ADOCK 05000280  
F PDR

SIGNATURE		DATE	TITLE Qualification Test Report, Surge Withstand Capability (SWC) Tests, MC170AD-Q2 & MC370AD-Q2	
PREPARED BY				
ENGINEERING	<i>R. Black</i>	4/21/83		
QUAL CONTROL	<i>G. Marshall</i>	4-21-83		
			NUMBER	REV
			QTR 82-003	
			SHEET 1 OF 5	

## QUALIFICATION TEST REPORT

### SURGE WITHSTAND CAPABILITY (SWC) TESTS

Model MC170AD-Q2 & MC370AD-Q2

Remote Multiplexer/Module Cases

#### 1. SCOPE

The Surge Withstand Capability (SWC) tests were carried out in accordance with the IEEE STD 472-1974. The tests were done on the input connectors of the MC170AD-Q2 and MC370AD-Q2 with and without the signal conditioners and power supplies plugged in. The signal conditioners subjected to SWC tests were the CD173-Q2, PT174-Q2, DI325-Q2, BA332-Q2, PC202-Q2, CM249-Q2 and TC292-Q2. The PS171-Q2 and PS294-Q2 were also plugged in during the SWC Test. Tests were performed at Validyne in February, 1982.

The surge generator was constructed according to the schematic shown in Figure 1. (Same as recommended by IEEE STD 472-1974.)

The SWC test wave is an oscillatory wave, frequency range of 1.0 MHz to 1.5 MHz, voltage range of 2.5 kV to 3.0 kV crest value of the first half cycle peak, envelope decaying to 50 percent of the crest value of the first peak in not less than 6  $\mu$ s from the start of the wave.

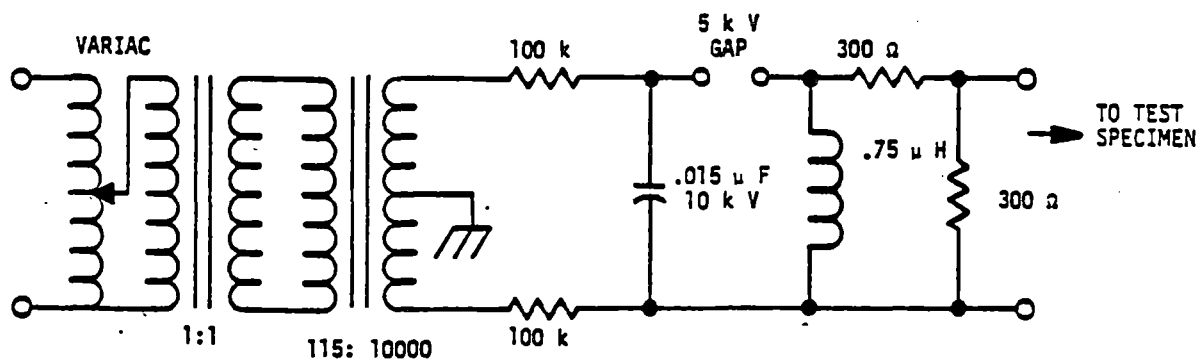


FIGURE 1. SWC TEST GENERATOR

NUMBER	REV
QTR 82-003	
SHEET 2 OF 5	

## 2. CONNECTION MODES

The SWC tests were done with the test generator connected in common and transverse (differential) modes with each test specimen. The common mode and transverse mode connections were as shown in Figures 2 and 3 respectively.

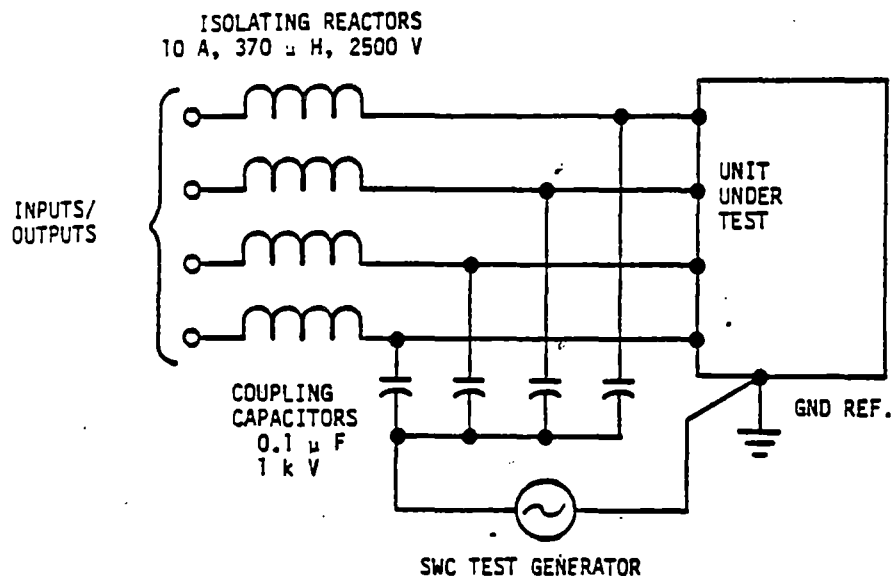


FIGURE 2. COMMON MODE

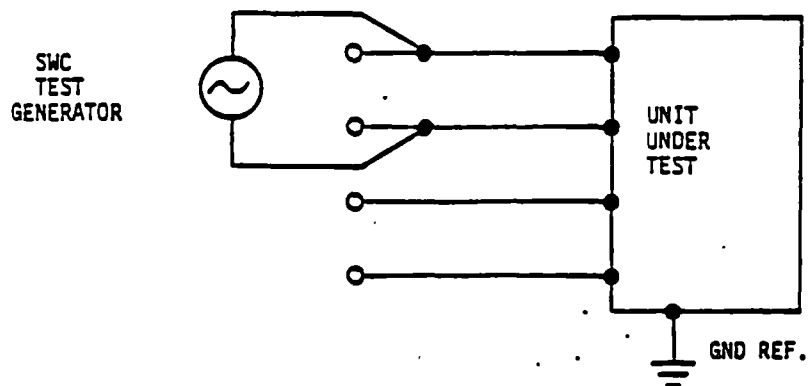


FIGURE 3. TRANSVERSE (DIFFERENTIAL) MODE

NUMBER	REV
QTR 82-003	
SHEET 3 OF 5	

### 3. PROCEDURE

Functional Tests were performed on the plug-ins and power supplies. Then each plug-in was subjected to SWC test for 2 seconds with common mode connection. In transverse (differential) mode connection the duration of each SWC test was 2 seconds for each pair of connections. The MC170AD-Q2 and MC370AD-Q2 had the power on during SWC tests.

The units were functionally retested after SWC exposure and were operating normally.

The MC170AD-Q2 and MC370AD-Q2 chassis were also subjected to SWC test without plug-in. The units were working normally after the SWC test.

The signal conditioners subjected to the SWC test were as follows:

CD173-Q2	Input Pins:	15/16, 17/18, 19/20, 21/22
	CAL Command Pins:	27/28
	Output Pins:	25/26
	Signal Ground:	23/24
CM249-Q2	Input Pins:	+, -, Bias
	Output Pins:	SIGN. RTN
	Excitation Pins:	Ø1, Ø2
DI325-Q2	Input Pins:	13/14, 15/16, 17/18, 19/20, 21/22
	Output Pins:	25/26
	Signal Ground:	23/24
BA332-Q2	Input Pins:	19/20, 21/22
	Excitation Pins:	15/16, 17/18
	CAL. Command:	27/28
	Output Pins:	25/26
	Signal Ground:	23/24
PC202-Q2	Input Pins:	19/20, 21/22
	Excitation Pins:	15/16, 17/18
	CAL Command	27/28
	Output Pins:	25/26
	Signal Ground:	23/24
TC292-Q2	Input Pins:	19/20, 21/22
	Temp. Compensation	15/16
	Output Pins:	25/26
	Signal Ground:	17/18, 23/24

NUMBER	REV
QTR 82-003	
SHEET 4	OF 5

3. PROCEDURE (Continued)

PS171-Q2 117 VAC Input Pins

PS294-Q2 117 VAC Input Pins

4. CONCLUSIONS

1. The signal conditioners functioned normally after being subjected to SWC test.
2. The MC170AD-Q2 and MC370AD-Q2 chassis did not have any degradation because of SWC test.
3. The PS171-Q2 and PS294-Q2 were functioning normally after being subjected to SWC test.

NUMBER	REV
QTR 82-003	
SHEET 5 OF 5	

ADDENDUM 1 to QTR82-003

Two additional signal conditioner units are also manufactured by Validyne as qualified to the SWC requirements of IEEE STD 472-1974. These units are:

- (a) DI338-Q2 (or DI338-XXX-Q2) and
- (b) BA332-1829-Q2

Both of these signal conditioners have equivalent configuration to other units which were directly tested in the February, 1982 tests. The BA332-1829-Q2 is identical to the BA332-Q2, with the addition of a single gain setting resistor. The added resistor is located in a part of the circuit which is not directly exposed to the SWC transients.

The DI332-Q2 and DI338-Q2 comparisons have been explained in QTR82-002, Addendum II. Those factors affected by the SWC stresses are also equivalent between the DI325-Q2 and DI338-Q2 models:

- (a) Spacing between input circuits is the same,
- (b) Components directly exposed to SWC transients are the same,
- (c) Functional and fail-safe criteria are the same, isolation between input and output circuits is maintained.

Validyne has concluded that the comparisons of all SWC-significant characteristics are sufficient to warrant designation of both DI338-XXX-Q2 and BA332-1829-Q2 modules as complying with the IEEE STD 472-1974 requirements.

Other modules are contained within the Remote Multiplexer unit, but are not normally exposed to the SWC transients "seen" by the signal conditioner units. Validyne does not envision a need to qualify these modules to the SWC requirements. The modules to be exempted from SWC qualification are:

AB295-Q2, containing 9860-XXX-Q2 plug-ins  
AD296-1-Q2  
AD296-2-Q2

NUMBER	QTR82-003	REV
	Addendum I	
SHEET	1	OF 1