Instruction Manual

Tektronix

TSG130A
Multiformat Signal Generator
SN B020000 to B039999

070-8664-05

Warning
The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If a product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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***** **This phone number is toll free in North America. After office hours, please leave a voice mail message.
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.**

Service Assurance

If you have not already purchased Service Assurance for this product, you may do so at any time during the product's warranty period. Service Assurance provides Repair Protection and Calibration Services to meet your needs.

Repair Protection extends priority repair services beyond the product's warranty period; you may purchase up to three years of Repair Protection.

Calibration Services provide annual calibration of your product, standards compliance and required audit documentation, recall assurance, and reminder notification of scheduled calibration. Coverage begins upon registration; you may purchase up to five years of Calibration Services.

Service Assurance Advantages

- Priced well below the cost of a single repair or calibration
- Avoid delays for service by eliminating the need for separate purchase authorizations from your company
- Eliminates unexpected service expenses

For Information and Ordering

For more information or to order Service Assurance, contact your Tektronix representative and provide the information below. Service Assurance may not be available in locations outside the United States of America.

Name	VISA or Master Card number and expiration
Company	date or purchase order number
Address	Repair Protection (1,2, or 3 years)
City, State, Postal code	Calibration Services (1,2,3,4, or 5 years)
Country	Instrument model and serial number
Phone	Instrument purchase date

Table of Contents

Maintenance

Replaceable Electrical Parts

Diagrams

Replaceable Mechanical Parts

List of Figures

List of Tables

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

Use Proper Voltage Setting. Before applying power, ensure that the line selector is in the proper position for the power source being used.

Connect and Disconnect Properly. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

Use Proper AC Adapter. Use only the AC adapter specified for this product.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. The following symbols may appear on the product:

WARNING High Voltage	Protective Ground (Earth) Terminal	CAUTION Refer to Manual	Double Insulated

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

Do Not Service Alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect Power. To avoid electric shock, disconnect the mains power by means of the power cord or, if provided, the power switch.

Use Caution When Servicing the CRT. To avoid electric shock or injury, use extreme caution when handling the CRT. Only qualified personnel familiar with CRT servicing procedures and precautions should remove or install the CRT.

CRTs retain hazardous voltages for long periods of time after power is turned off. Before attempting any servicing, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode. Rough handling may cause the CRT to implode. Do not nick or scratch the glass or subject it to undue pressure when removing or installing it. When handling the CRT, wear safety goggles and heavy gloves for protection.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

X-Radiation. To avoid x-radiation exposure, do not modify or otherwise alter the high-voltage circuitry or the CRT enclosure. X-ray emissions generated within this product have been sufficiently shielded.

Getting Started

Getting Started

The TSG130A Multiformat Signal Generator is a simple, cost-effective test signal generator designed for the service environment. The TSG130A digitally generates a full complement of test signals in four different formats: NTSC/YC; Y, B-Y, R-Y; Y, CTDM; and GBR.

Table 1–1 lists the test signals available from the TSG130A and Table 1–2 lists what is available from each rear panel output in each of the four modes. The rest of the tables, Tables 1–3 through 1–12 list the special signals and outputs available from each of the various options.

Besides a full complement of video signals in four formats, the TSG130A supplies two channels of a balanced 1 kHz XLR-audio tone with a jumper-selectable ID click. The ID click frequency is also adjustable. See Figures 1–1 and 1–2 for views of the front and rear panels.

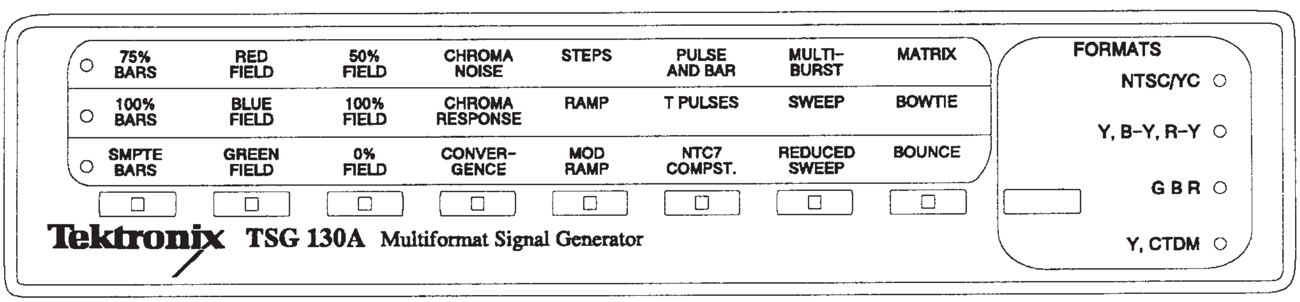


Figure 1–1: TSG130A front panel

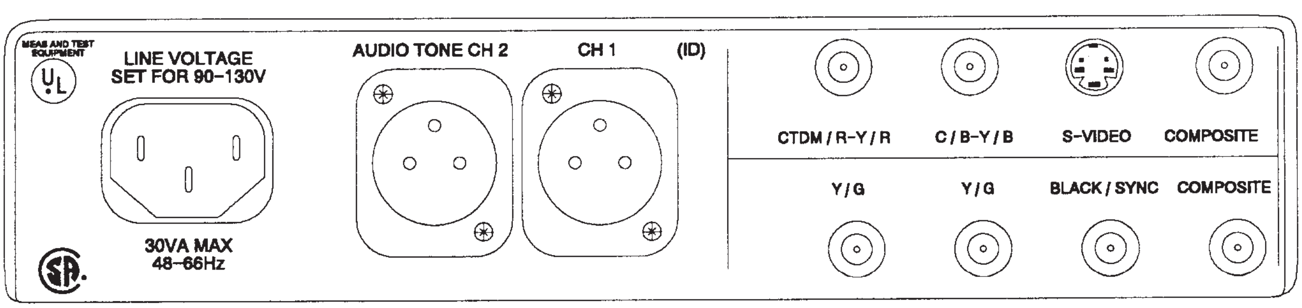


Figure 1–2: TSG130A rear panel

Physical Description

The signal generator consists of five circuit boards and five cables in a rectangular sheet-aluminum chassis with a removeable top cover. The major internal components are:

1. A main board that performs most of the signal generator's functions.
2. A front panel board that decodes front panel button selections.
3. A ribbon cable that feeds decoded front panel information to the main board.
4. A ribbon cable that supplies signals from the main board to the top BNC connector mounting board.
5. Two BNC connector mounting boards: the top board contains one SVHS and three BNC connectors; the bottom board contains four BNC connectors.
6. A ribbon cable that supplies signals from the main board to the bottom BNC connector mounting board.

Table 1–1: TSG130A test signal summary, for standard and Option 02 (black burst)

Format	1	2	3	4	5	6	7	8
NTSC/YC	75% color bars	Red Field	50 IRE flat field	Chrominance Noise	5-step	Pulse & bar	Multiburst	Matrix
	100% color bars	Green field	100 IRE flat field	Chrominance frequency response	Ramp		Sweep	
	SMPTE bars	Blue field	0 IRE flat field	Convergence	Mod ramp	NTC7 composite		Bounce
Y, B-Y, R-Y (Betacam 3 wire)	75% color bars		50% flat field		Valid 5-step	Pulse & bar with window	Multiburst	Matrix
	100% color bars		100% flat field			T pulses	60% sweep	Bowtie
			0% flat field				50% reduced sweep	
G B R	75% color bars	Red field			10-step	Pulse & bar	Multiburst	
	100% color bars	Green field					Sweep	Bowtie
		Blue field		Convergence				

Table 1–1: TSG130A test signal summary, for standard and Option 02 (black burst) (cont.)

Format	1	2	3	4	5	6	7	8
Y, CTDM (Betacam 2 wire)	75% color bars		50% flat field					
	100% color bars		100% flat field				Sweep	Bowtie
			0% flat field					

Table 1–2: Available outputs for standard TSG130A in various output formats

	Rear panel output					
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G**	**CTDM/R-Y/R**
NTSC/YC	NTSC	Y/C	No output	C	Y	0 Volts
Y, B-Y, R-Y (Betacam)	Illegal signal (Y + B-Y)	Y/B-Y	No output	B-Y	Y	R-Y
G B R	Illegal signal (G + B)	G/B	No output	B	G (with sync/no sync)	R
Y, CTDM (Betacam)	Y	Y/0 Volts	No output	0 Volts	Y	CTDM

Table 1–3: Available outputs for TSG130A Option 2

	Rear panel output					
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G**	**CTDM/R-Y/R**
NTSC/YC	NTSC	Y/C	Black burst or comp sync	C	Y	0 Volts
Y, B-Y, R-Y (Betacam)	Illegal signal (Y + B-Y)	Y/B-Y	Black burst or comp sync	B-Y	Y	R-Y
G B R	Illegal signal (G + B)	G/B	Black burst or comp sync	B	G (with sync/no sync)	R
Y, CTDM (Betacam)	Y	Y/0 Volts	Black burst or comp sync	0 Volts	Y	CTDM

Table 1–4: TSG130A test signal summary, for Option 01 and 01/02 MII signals

Format	1	2	3	4	5	6	7	8
NTSC/YC	75% color bars	Red field	50 IRE flat field	Chrominance noise	5-step	Pulse & bar	Multiburst	Matrix
	100% color bars	Green field	100 IRE flat field	Chrominance frequency response	Ramp		Sweep	
	SMPTE bars	Blue field	0 IRE flat field	Convergence	Mod ramp	NTC7 composite		Bounce
Y, B-Y, R-Y (MII 3 wire)	75% color bars		50% flat field		Valid 5-step	Pulse & bar with window	60% multiburst	Matrix
	100% color bars with clamp detector		100% flat field			T pulses	60% sweep	Bowtie
			0% flat field				250 mV sweep	
G B R	75% color bars	Red field			10-step	Pulse & bar	Multiburst	
	100% color bars	Green field					Sweep	Bowtie
		Blue field		Convergence				
Y, CTDM (MII 2 wire)	75% color bars		50% flat field					
	100% color bars		100% flat field				Sweep	Bowtie
			0% flat field					

Table 1–5: Available outputs for TSG130A Option 01

	Rear panel output					
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G**	**CTDM/R-Y/R**
NTSC/YC	NTSC	Y/C	No output	C	Y	0 Volts
Y, B-Y, R-Y (MII)	Illegal signal (Y + B-Y)	Y/B-Y	No output	B-Y	Y	R-Y
G B R	Illegal signal (G + B)	G/B	No output	B	G (with/without sync)	R
Y, CTDM (MII)	Y	Y/0 Volts	No output	0 Volts	Y	CTDM

Table 1–6: Available outputs for TSG130A, opt 01/02

Format	Rear panel output					
	Composite	S-video	Black/Sync	C/B-Y/B	Y/G	CTDM/R-Y/R
NTSC/YC	NTSC	Y/C	Black burst or comp sync	C	Y	0 Volts
Y, B-Y, R-Y (MII)	Illegal signal (Y + B-Y)	Y/B-Y	Black burst or comp sync	B-Y	Y	R-Y
G B R	Illegal signal (G + B)	G/B	Black burst or comp sync	B	G (with/without sync)	R
Y, CTDM (MII)	Y	Y/0 Volts	Black burst or comp sync	0 Volts	Y	CTDM

Table 1–7: TSG130A test signal summary, for Option 2J signals

Format	1	2	3	4	5	6	7	8
NTSC/YC	75% color bars with no setup	Red Field with no set-up	50 IRE flat field	Chromi-nance Noise	5-step	Pulse & bar	Multiburst	Matrix with no setup
	100% color bars with no setup	Green field with no set-up	100 IRE flat field	Chromi-nance fre-quency re-sponse	Ramp		Sweep	
	SMPTE bars with no set-up	Blue field with no set-up	0 IRE flat field	Conver-gence	Mod ramp	NTC7 com-posite		Bounce
Y, B-Y, R-Y (Betacam 3 wire)	75% color bars with no setup		50% flat field		Valid 5-step	Pulse & bar with window	Multiburst	Matrix
	100% color bars with no setup		100% flat field			T pulses	60% sweep	Bowtie
	SMPTE bars with no set-up		0% flat field				50% re-duced sweep	
G B R	75% color bars	Red field			10-step	Pulse & bar	Multiburst	
	100% color bars	Green field					Sweep	Bowtie
		Blue field		Conver-gence				

Table 1–7: TSG130A test signal summary, for Option 2J signals (cont.)

Format	1	2	3	4	5	6	7	8
Y, CTDM (Betacam 2 wire)	75% color bars		50% flat field					
	100% color bars		100% flat field					Bowtie
			0% flat field					

Table 1–8: TSG130A rear panel output, in various formats, for Option 2J

	Rear panel output					
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G**	**CTDM/R-Y/R**
NTSC/YC	NTSC (no setup)	Y/C	Black burst (no setup) or comp sync	C	Y	Black burst (no setup)
Y, B-Y, R-Y (Betacam)	Illegal signal (Y + B-Y)	Y/B-Y	Black burst (no setup) or comp sync	B-Y	Y	R-Y
G B R	Illegal signal (G + B)	G/B	Black burst (no setup) or comp sync	B	G (with/without sync)	R
Y, CTDM (Betacam)	Y	Y/0 Volts	Black burst (no setup) or comp sync	0 Volts	Y	CTDM

Table 1–9: TSG130A test signal summary, for Option 03 signals, with black burst output

Format	1	2	3	4	5	6	7	8
NTSC/YC	75% color bars	Red Field	50 IRE flat field	Chromi-nance Noise	5-step	Pulse & bar	Multiburst	Matrix
	100% color bars	Green field	100 IRE flat field	Chromi-nance fre-quency re-sponse	Ramp		Sweep	
	SMPTE bars	Blue field	0 IRE flat field	Conver-gence	Mod ramp	NTC7 com-posite		Bounce

Table 1–9: TSG130A test signal summary, for Option 03 signals, with black burst output (cont.)

Format	1	2	3	4	5	6	7	8
Y, B-Y, R-Y (Betacam 3 wire)	75% color bars		350 mV on Y		5-step	Pulse & bar with window	60% Multi-burst	Matrix
	100% color bars		350 mV on all channels	Sin x/x	Quad phase	T pulses	100% narrow sweep	Bowtie w/12.5T pulses
			0% flat field			“Line 17”	60% narrow sweep	
G B R	75% color bars	Red field			10-step	Pulse & bar	Multiburst	
	100% color bars	Green field					Sweep	Bowtie
		Blue field		Convergence				
Y, CTDM (Betacam 2 wire)	75% color bars							

Table 1–10: TSG130A rear panel output, in various formats, for Option 03

	Rear panel output						
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G (left)**	**Y/G (right)**	**CTDM/R-Y/R**
NTSC/YC	NTSC	Y/C	Black burst or comp sync	C	Y	Color flag reference pulse	Black burst
Y, B-Y, R-Y (Betacam)	Illegal signal (Y + B-Y)	Y/B-Y	Black burst or comp sync	B-Y	Y	Color flag reference pulse	R-Y
G B R	Illegal signal (G + B)	G/B	Black burst or comp sync	B	G (with/without sync)	Color flag reference pulse	R
Y, CTDM (Betacam)	Y	Y/0 Volts	Black burst or comp sync	0 Volts	Y	Color flag reference pulse	CTDM

Table 1–11: TSG130A test signal summary, for Option 04 MII signals, with comp sync on the optional output

Format	1	2	3	4	5	6	7	8
NTSC/YC	75% color bars	Red Field	50 IRE flat field	Chrominance Noise	5-step	Pulse & bar	Multiburst	Matrix
	100% color bars	Green field	100 IRE flat field	Chrominance response	Ramp		Sweep	
	SMPTE bars	Blue field	0 IRE flat field	Convergence	0 to 80 IRE on Y	NTC7 composite		Bounce
Y, B-Y, R-Y (Betacam 3 wire)	75% color bars		50% flat field		5-step	Pulse & bar with window		100% bowtie
	100% color bars with clamp detector		100% flat field			2T & 5T in Y, 100% of 5T in B-Y & R-Y	100% narrow sweep	50% Bowtie
	SMPTE bars with level reference		0% flat field				60% narrow sweep	
G B R	75% color bars	Red field			10-step	Pulse & bar	Multiburst	
	100% color bars	Green field					Sweep	Bowtie
		Blue field		Convergence				
Y, CTDM (Betacam 2 wire)	75% color bars		50% flat field					
			100% flat field					
			0% flat field					

Table 1–12: TSG130A rear panel outputs, in various formats, for Option 04

Format	Rear panel output						
	Composite	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G (left)**	**Y/G (right)**	**CTDM/R-Y/R**
NTSC/YC	NTSC	Y/C	Comp sync (TTL video)	C	Y	Color frame square wave	0 Volts
Y, B-Y, R-Y (MII)	Illegal signal (Y + B-Y)	Y/B-Y	Comp sync (TTL video)	B-Y	Y	Color frame square wave	R-Y

Table 1–12: TSG130A rear panel outputs, in various formats, for Option 04 (cont.)

	Rear panel output						
Format	**Composite**	**S-video**	**Black/Sync**	**C/B-Y/B**	**Y/G (left)**	**Y/G (right)**	**CTDM/R-Y/R**
G B R	Illegal signal (G + B)	G/B	Comp sync (TTL video)	B	G (with/without sync)	Color frame square wave	R
Y, CTDM (MII)	Y	Y/0 Volts	Comp sync (TTL video)	0 Volts	Y	Color frame square wave	CTDM

Configuration Options

A summary of these options is given below and in Table 1–13, which gives a quick comparison between the various options.

For Options 01, 02, 01/02, 2J, 03, and 04 the information needed for the performance check and the adjustment procedures is given along with the standard procedures.

Option 01

This option changes the component signal format from standard Betacam to MII.

Option 02

This option adds black burst or composite sync (selectable by internal jumper) from the black/sync output, to the standard instrument.

Option 2J

The dominant feature of the 2J option is the 0 IRE setup level. It also has black burst or composite sync from the black/sync output and a second black burst or composite sync signal from the CTDM/R-Y/R output. It also has a special Betacam signal set.

Option 01/02

This option combines Options 01 and 02. The result is an MII component signal set and black burst or composite sync from the black/sync output.

Option 03

Option 03 has a longer blanking width (11.2 μs) and a color flag reference pulse from one of the Y/G outputs. It has a black burst or composite sync output. It also has a custom signal set for both composite and Betacam component signals.

Option 04

Option 04 has VIR on line 19 and only composite sync from the black/sync output. There is a color frame square wave from one of the Y/G outputs. It also has custom signal sets for both composite and MII component signal sets.

Table 1–13: TSG130A option signal comparison

	Standard	01	02	01/02	2J	03	04
Signal format	Betacam	MII	Betacam	MII	Betacam	Betacam	MII
Output	—	—	Black burst[1] or –4 V comp sync[2]	Black burst[1] or –4 V comp sync[2]	Black burst[1] or –4 V comp sync[2]	Black burst[1] or –4 V comp sync[2]	Composite sync
Blanking width	10.9 µs	10.9 µs	10.9 µs	10.9 µs	10.9 µs	11.2 µs	10.9 µs
Second black burst	—	—	—	—	From CTDM/ R-Y/R output	—	—
Color flag reference pulse	—	—	—	—	—	From one Y/G output (F1L11)	—
Color frame square wave	—	—	—	—	—	—	From one Y/G output (low F1&2, high F3&4)
Setup level	7.5 IRE	7.5 IRE	7.5 IRE	7.5 IRE	0 IRE	7.5 IRE	7.5 IRE
VIR on line 19	—	—	—	—	—	—	Yes
Composite signal set	Standard	Standard	Standard	Standard	Special (standard with no setup)	Special	Special
Component signal set	Standard Betacam set	Standard MII set	Standard Betacam set	Standard MII set	Special	Special	Special

1 **With F1L10 reference pulse**

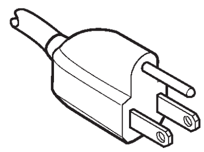
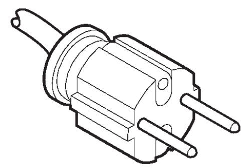
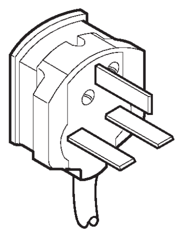
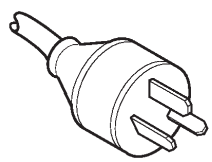
2 **Jumper selectable**

Power Cord Options

The standard TSG130A power cord is a 120 V, 15 Amp cord equipped with the standard North American three-prong power plug as shown in Table 1–14. The signal generator may be ordered with the other power-cord options shown in table 1–14. These are:

- Option A1, a 220 V, 16 Amp rated power cord with the universal European three-prong power plug.
- Option A2, a 240 V, 15 Amp rated power cord with the United Kingdom three-prong power plug.
- Option A3, a 240 V, 10 Amp rated power cord with the Australian three-prong power plug.

Table 1–14: Power cord identification

Plug configuration	Normal usage	Option number
	North America 115 V	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3

Operating Basics

Operating Basics

This section describes the front panel controls, the rear panel connectors, and how to use them.

For information on configuring the internal jumpers see TSG 130A Jumper List, Table 7–2.

For information on configuring the power supply for 110 VAC or 220 VAC operation, see *Selecting the Power Supply Mains Voltage*, page 7–1.

CAUTION. *The signal generator is shipped from the factory configured for 110 VAC operation. Attempting to operate the signal generator at any other voltage without reconfiguring the power supply may cause damage. Refer to* Selecting the Power Supply Mains Voltage, page 7–1, *for further information.*

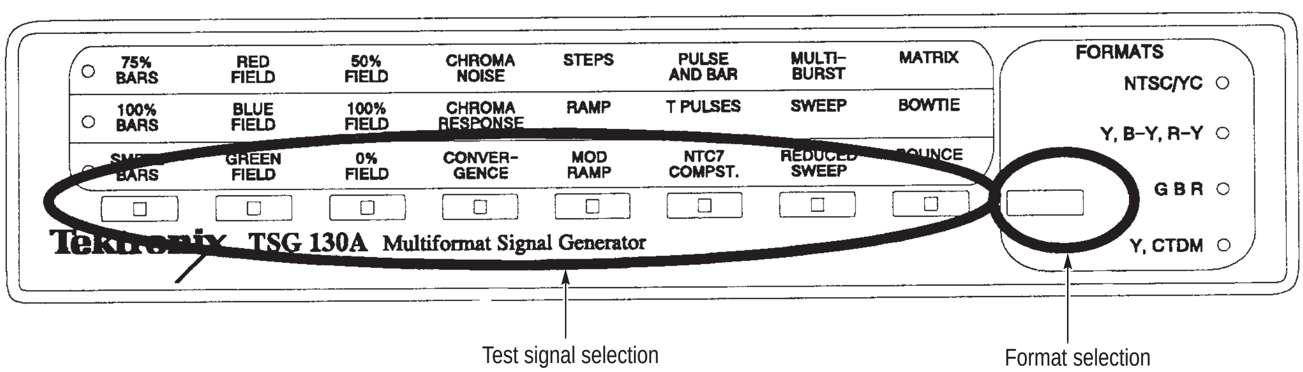


Figure 2–1: TSG130A front panel

Front Panel Controls

The front panel is organized into two sections. The right section is a format selection area. This area contains the format selection button, which selects one of the four video test signal formats. Pressing the button switches between the formats moving from top to bottom. The signal generator powers on in the NTSC/YC format. An LED indicates the signal format selected.

The left section contains eight test signal selection buttons. Above the buttons are three rows of test signal selections, arranged in columns. On the left side are three LEDs, one for each row. These LEDs indicate the test signal row selected.

There is an LED in the center of each Test Signal Selection button. The button lights to indicate which column is selected. To determine which test signal is selected, use the left LEDs to determine which row and the button to identify the column. See Figure 2–2 for an example.

Pressing a test signal selection button for the first time lights the top-row LED, if the signal format selected (for example, Y, B-Y, R-Y) offers that particular test signal. Successive presses of the same button select other test signals in the column above the button. If a test signal is not available in a selected format, the selection indicator moves to the top of the column or first available signal. If the format is changed and no test signals are offered from that column in the selected format, the indicator moves to 75% bars.

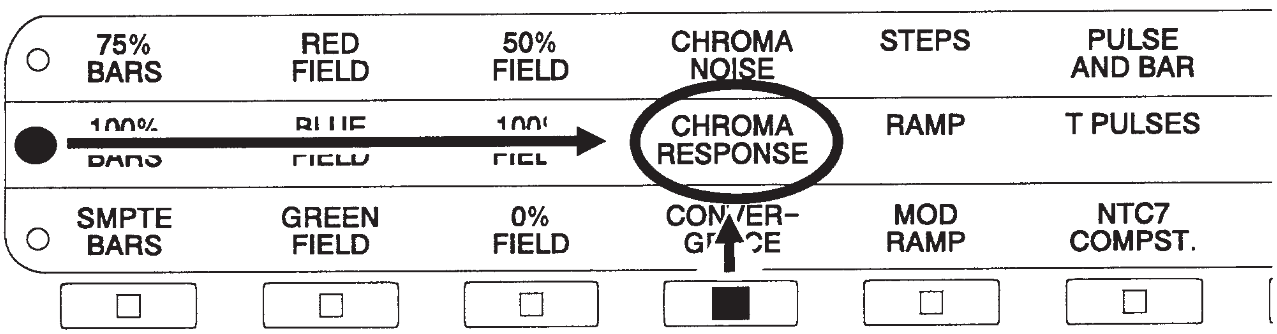


Figure 2–2: Determining the signal selected

Rear Panel Connections

This section describes the signal generator's rear panel connections (see Figure 2–3).

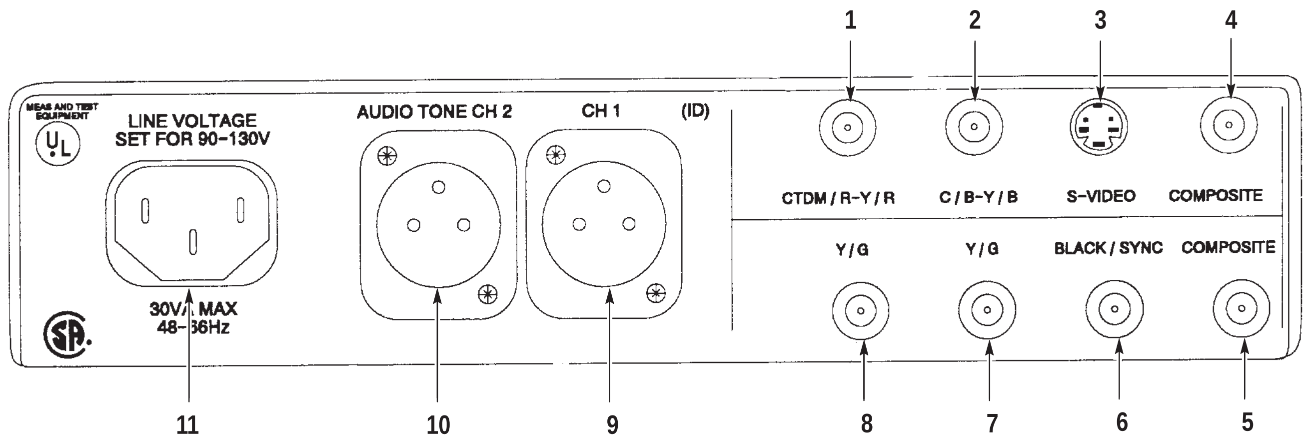


Figure 2–3: TSG130A rear panel

Multi-purpose outputs

***NOTE**. Only the output associated with the active signal set selected from the front panel has a valid signal on it. For example, if NTSC/YC is active there is not a valid signal on the CTDM / R-Y / R output.*

The rear panel provides the following outputs:

1. R-Y output in Y, B-Y, R-Y format; CTDM output in CTDM format; and red in GBR format.
2. Chrominance output (NTSC/YC format); B-Y output in Y, B-Y, R-Y format; blue in GBR format.
3. Y/C output. The signal generator also offers an S-video output as an alternative to the Y and C outputs.
4. NTSC test signal output (NTSC/YC format only).
5. NTSC test signal output (NTSC/YC format only).
6. Optional output. Not used on the standard instrument. Outputs either black burst or comp sync in Options 01/02, 02, 03, and 3J. Outputs only comp sync for Option 04.

7. Luminance output for all formats except GBR, when it outputs green. Outputs only color frame square wave in Option 04. Outputs only color flag reference pulse in Option 03.

8. Luminance output for all formats, except GBR, when it outputs green.

NOTE. *It is recommended that the S-video output not be used simultaneously with the Y and C BNC outputs. Using the S-video output while also using the Y and C BNC outputs will degrade Y-channel output accuracy.*

CAUTION. *The audio tone output is only specified to drive a 600 Ω or greater impedance. It can run down to 150 Ω. Do not use less than 150 Ω. Using a lower impedance termination risks damaging the TSG130A.*

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9. 1 kHz audio tone output with jumper-selectable ID click. The frequency of the ID click may be changed, or the click may be disabled. See *Setting the Internal Jumpers* to disable the click and *Adjustment Procedures* to change the frequency.

10. 1 kHz audio tone output in phase with CH 1. The signal generator's audio tone output is a balanced 1 kHz XLR audio tone. Audio output gain is adjustable via internal potentiometers (see *Adjustment Procedures*).

Power supply

CAUTION. *There is not an ON/OFF switch for the power supply. If the instrument is plugged into a power source it is on.*

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11. Electrical mains input, factory set for 110 VAC (to change the power supply operating voltage, see *Selecting the Power Supply Mains Voltage*, page 7–1.

Using controls and connectors (standard instrument)

For a designated format, the following figures and tables illustrate test signals available and valid rear panel outputs.

Table 2–1: NTSC/YC format available signals

1	2	3	4	5	6	7	8
75% color bars	Red field	50 IRE flat field	Chrominance noise	5-step	Pulse & bar	Multiburst	Matrix
100% color bars	Green field	100 IRE flat field	Chrominance frequency response	Ramp		Sweep	
SMPTE bars	Blue field	0 IRE flat field	Convergence	Mod ramp	NTC7 composite		Bounce

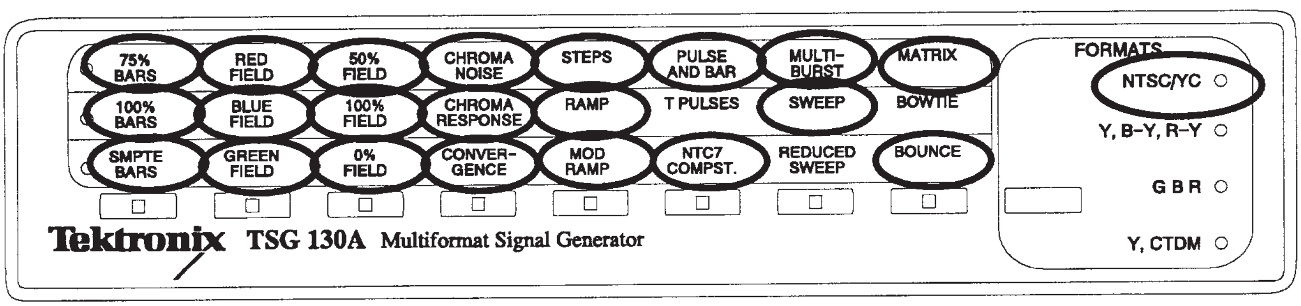


Figure 2–4: NTSC/YC format signal locations

Table 2–2: NTSC/YC format rear panel outputs

Composite	S-video	C/B-Y/B	CTDM/R-Y/R	Black/sync	Y/G
NTSC	Y/C	C	0 volts	No output	Y

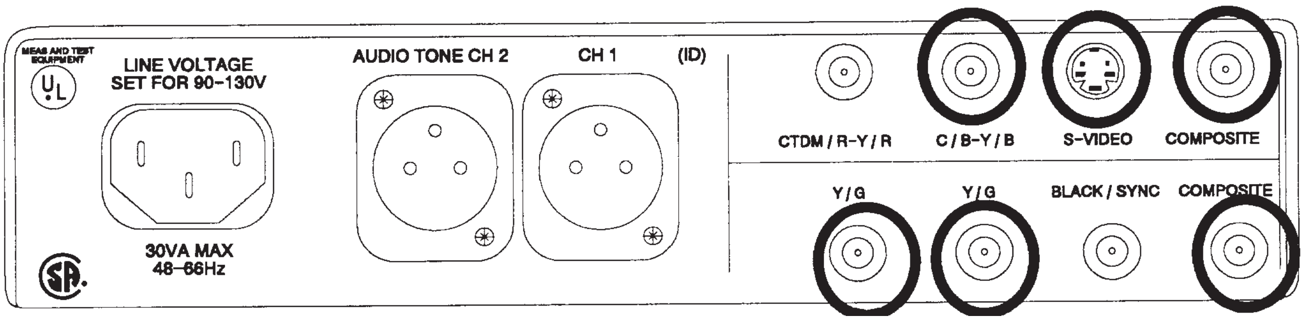


Figure 2–5: NTSC/YC format rear panel signal locations

Table 2–3: Y, B-Y, R-Y format available signals

1	2	3	4	5	6	7	8
75% color bars		50% flat field		Valid 5-step	Pulse & bar with window	Multiburst	
100% color bars		100% flat field			T pulses	60% sweep	Bowtie
		0% flat field				50% reduced sweep	

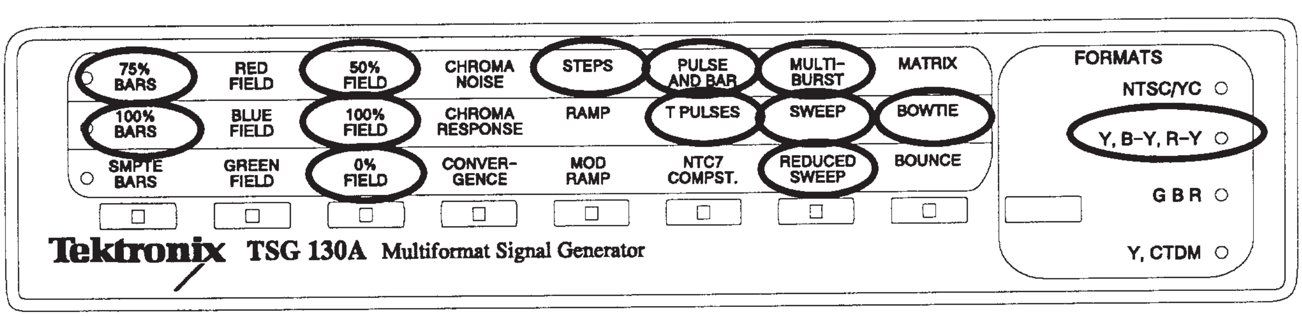


Figure 2–6: Y, B-Y, R-Y format signal locations

Table 2–4: Y, B-Y, R-Y format rear panel outputs

Composite	S-video	C/B-Y/B	CTDM/R-Y/R	Black/sync	Y/G
Illegal signal (Y+B-Y)	Y/B-Y	B-Y	R-Y	No output	Y

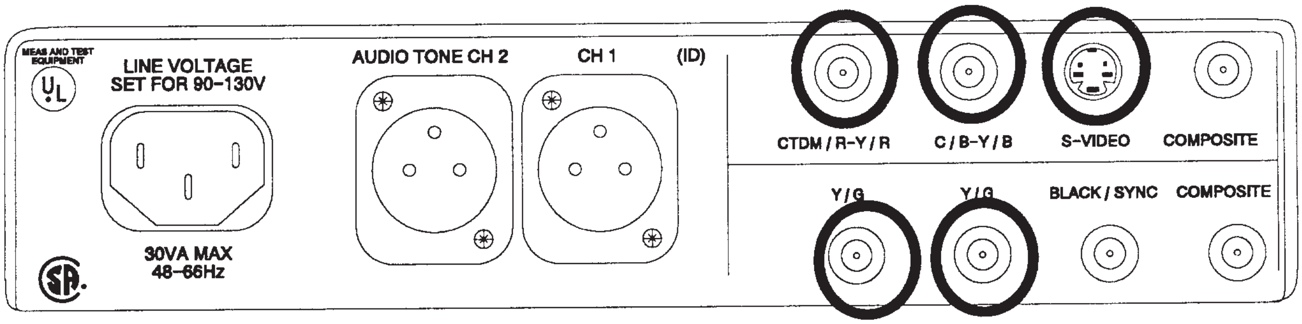


Figure 2–7: Y, B-Y, R-Y format rear panel signal locations

Table 2–5: GBR format available signals

1	2	3	4	5	6	7	8
75% color bars	Red field			10-step	Pulse & bar	Multiburst	
100% color bars	Green field					Sweep	Bowtie
	Blue filed		Convergence				

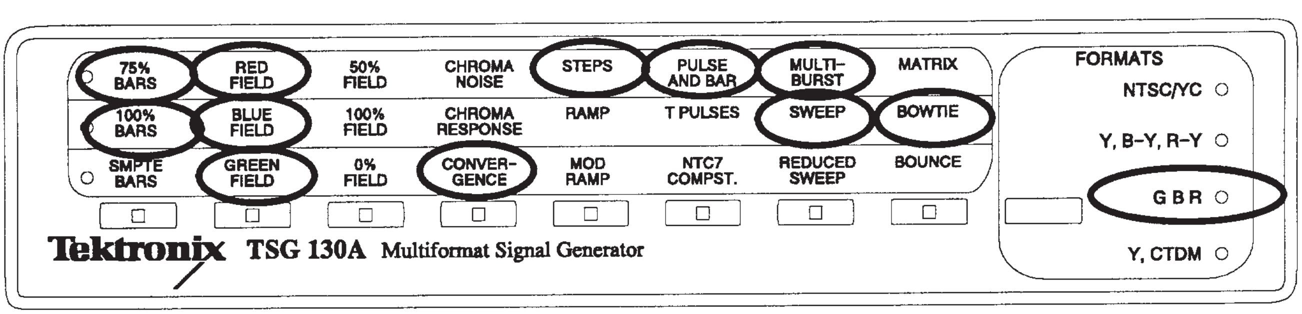


Figure 2–8: GBR format signal locations

Table 2–6: GBR format rear panel outputs

Composite	S-video	C/B-Y/B	CTDM/R-Y/R	Black/sync	Y/G
Illegal signal (G+B)	G/B	B	R	No output	G

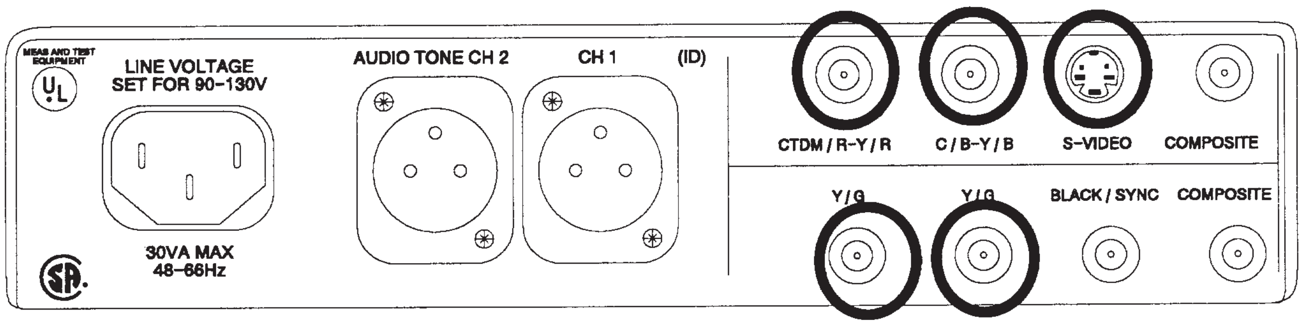


Figure 2–9: GBR format rear panel signal locations

Table 2–7: Y-CTDM format available signals

1	2	3	4	5	6	7	8
75% color bars		50% flat field					
100% color bars		100% flat field				Sweep	
		0% flat field					

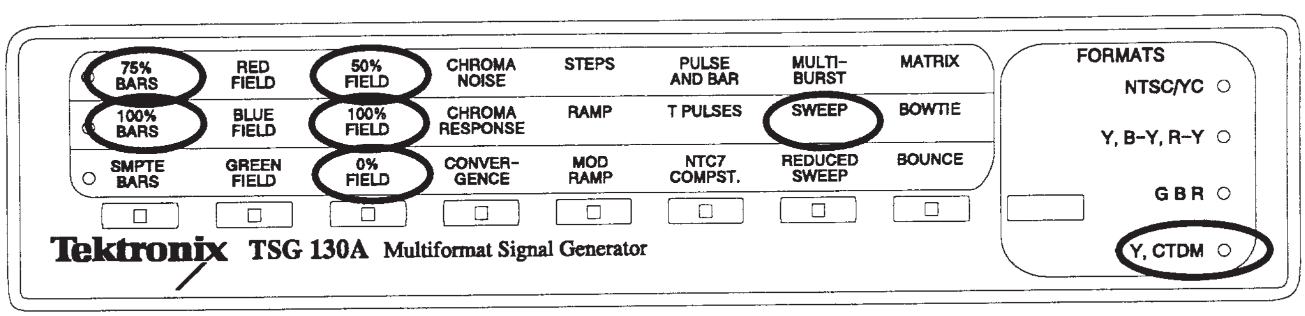


Figure 2–10: Y-CTDM format signal locations

Table 2–8: Y-CTDM format rear panel outputs

Composite	S-video	C/B-Y/B	CTDM/R-Y/R	Black/sync	Y/G
Y	Y/0 volts	0 volts	CTDM	No output	Y

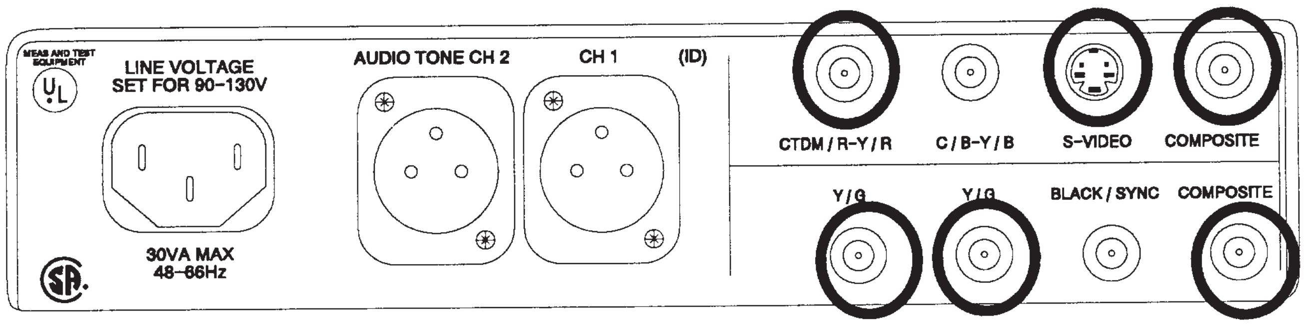


Figure 2–11: Y-CTDM format rear panel signal locations

Specifications

Specifications

Material in this section is organized into two groupings: the specifications and the supporting figures. The specifications include:

1. General test signal specifications for all formats.
2. NTSC/YC general and test signal specifications.
3. Component test signal specifications.
4. GBR test signal specifications.
5. CTDM test signal specifications.
6. Signal level specifications.
7. Power supply, physical, and environmental specifications.

Supporting figures (waveforms and related data) follow the specifications.

Performance Conditions

The performance requirements are valid within the environmental limits if the instrument is adjusted at 25° C ± 5° C and a minimum warmup time of 20 minutes is allowed.

Safety Standards

The following safety standards apply to the signal generator:

Table 3–1: Certifications and compliances

Category	Description
Safety Standards	
U.S. Nationally Recognized Laboratory Listing	UL1244 Standard for Electrical and Electronic Measuring and Testing Equipment.
Canadian Certification	CAN/CSA C22.2 No. 231 CSA Safety Requirements for Electrical and Electronic Measuring and Test Equipment.
European Union Compliance	Low Voltage Directive 73/23/EEC, Amended by 93/68/EEC. EN61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Additional Compliance	IEC1010-1 Safety Requirements for Electrical for Measurement, Control, and Laboratory Use.
Safety Certification Compliance	
Temperature, operating	+5 to +40° C
Altitude (maximum operating)	2000 meters
Equipment Type	Test and measuring
Safety Class	Class I (as defined in IEC 1010–1, Annex H) – grounded product
Overvoltage Category	Overvoltage Category II (as defined in IEC 1010–1, Annex J).
Pollution Degree	Pollution Degree 2 (as defined in IEC 1010–1). Note: rated for indoor use only.

Electrical Characteristics

Betacam component test signals are available on the standard instrument and on the Options 01, 03, and 2J instruments. Mll component test signals are available on the Options 01 and 04 instruments.

***NOTE**. All figures referenced in this section are located after the specifications.*

Table 3–2: General test signal characteristics

Characteristics	Performance requirements	Supplemental information	Performance check step no.
Amplitude			
Accuracy	±1%	Measured using GBR signals. B&R relative to G.	NTSC = 6 Green = 45 Blue = 48 Red = 56 G to B = 62 G to R = 62
Channel matching	±0.5%		
Delay, channel matching	Within 5 ns	B-Y & R-Y relative to Y.	Y to B-Y = 60 Y to R-Y = 61
Frequency response			
Y/G, C/B-Y/B,	Flat to 5.0 MHz ±1%		NTSC = 19 Green = 46 Blue = 49 Red = 54 S-video = 63
CTDM/R-Y/R	Flat to 5.5 MHz ±2%		
Composite	Flat to 4.2 MHz ±2%		
S-video		Flat to 4.2 MHz ±2%	
Rise time			
Luminance	250 ns ±25 ns	Except as otherwise specified	Sync = 15 Y = 16 C = 36 Burst = 35 B-Y = 39 R-Y = 43
Chrominance	400 ns ±40 ns		
Burst	400 ns ±40 ns		
Sync	140 ns ±20 ns		
Color difference	400 ns ±40 ns on color bars 250 ns ±25 ns on other signals		
Sync amplitude			
NTSC/YC	285.7 mV ±2%		NTSC = 3 Y = 23 G = 47
Betacam	285.7 mV ±2%		
MII 3 wire	300.0 mV ±2%		
MII 2 wire	285.7 mV ±2%		
GBR (sync on green only)	300.0 mV ±2%		
Line sync duration		50% amplitude point	NTSC = 14 Y = 24
NTSC/YC	4.7 µs ±50 ns		
Betacam 3 wire	4.7 µs ±50 ns		
Betacam 2 wire	5.0 µs ±50 ns		
MII	4.7 µs ±50 ns		
Front porch duration (525/60)	1.5 µs ±0.1 µs		
Line blanking interval	10.9 µs ±0.2 µs	Measured at 20 IRE points of active video	NTSC = 18
Horizontal sync duration	4.7 µs ±50 ns	50% amplitude point	NTSC = 17 Y = 31
Vertical serration duration	4.7 µs ±50 ns	50% amplitude point	NTSC = 17 Y = 31
Equalizing pulse duration	2.3 µs ±50 ns	50% amplitude point	NTSC = 17 Y = 31
Blanking level	0 VDC ±50 mVDC		NTSC = 2 Y = 22 B-Y = 37 R-Y = 41

Table 3–2: General test signal characteristics (cont.)

Characteristics	Performance requirements	Supplemental information	Performance check step no.
Sine squared pulses accuracy	HADs accurate within 25 ns		NTSC = 13 B-Y = 40 Y = 30 R-Y = 44
Step staircase linearity error	<1%	Relative step matching	NTSC = 5 Blue = 50 Y = 25 Red = 55
Field tilt	<0.5%		NTSC = 10 Blue = 52 Y = 27 Red = 58
Line tilt	<0.5%		NTSC = 9 Blue = 51 Y = 26 Red = 57
Pulse to bar ratio	1:1±1%		NTSC = 12 B = 53 Y = 29 R = 59
2T pulse ringing (K_{2T})	<0.6% (K_{2T})	≤1% peak ringing	NTSC = 11 B-Y = 38 Y = 28 R-Y = 42
Output impedance		75 Ω	
Return loss		≥36 dB to 5 MHz	
Crosstalk		≥60 dB down	
Residual subcarrier		≥60 dB down	
Oscillator frequency stability	14.31818 MHz ±28 Hz Over 5 °C to 35 °C temperature range after 30-minute warmup	Oscillator to be adjusted semiannually (divide by 4 to obtain subcarrier specification)	1

Table 3–3: General NTSC/YC signal characteristics (NTSC/YC formats only)

Characteristics	Performance requirements	Supplemental information	Performance check step no.
Differential gain	0.3% maximum	Typical 0.1%	20
Differential phase	0.3° maximum	Typical 0.1°	20
Chrominance-to-luminance gain	±1%		8
Chrominance accuracy on C output	±1%	Measured with chroma noise signal	7, 32 & 33
Burst amplitude	285.7 mV_{p-p} (40 IRE0 ±2%		4 & 34
Burst			
Delay from sync	5.308 µs ±35 ns	19 subcarrier cycles	
Burst duration	2.51 µs 0.1 µs	9 subcarrier cycles	
Breezeway duration	600 ns ±50 ns		
SC/H phase	0° ±5°		21
Chrominance-to-luminance delay	≤12 ns		8

Table 3–4: NTSC/YC test signal definitions

Characteristics	Signal definitions	Supplemental information
75% bars	75% color bars with 100% flag and 7.5% setup	See Figures 3-3 and 3-4
Option 2J only	No 7.5% setup	See Figures 3–169 and 3–170
100% bars	100% color bars with 7.5% setup	See Figures 3–7 and 3–8
Option 2J only	No 7.5% setup	See Figures 3–171 and 3–172
SMPTE bars	SMPTE bars	See Figures 3-9 to 3-14
Luminance rise time	140 ns on color bar luminance	
Option 2J only	No 7.5% setup	See Figures 3–173 to 3–178
Red field		
Luminance pedestal	201.74 mV (202.2 mV Option 03)	See Figures 3–5 and 3–6
Chrominance amplitude	626.66 mV_{p-p} (630.1 mV Option 03)	
Chrominance phase	103.5° (103.4° Option 03)	
Option 2J only (no setup)		See Figures 3–179 and 3–181 (SN B020000 & up), 3–180 (below)
Luminance amplitude	160.72 mV	
Chrominance amplitude	681.18 mV	
Green field		
Luminance pedestal	344.5 mV (345.9 mV Option 03)	See Figures 3–21 and 3–22
Chrominance amplitude	585.28 mV_{p-p} (588.5 mV Option 03)	
Chrominance phase	240.7° (240.7° Option 03)	
Option 2J only (no setup)		See Figures 3–182 and 3–184 (SN B020000 & up), 3–183 below
Luminance amplitude	316.08 mV	
Chrominance amplitude	626.26 mV	
Blue field		
Luminance pedestal	110.06 mV (108.1 mV Option 03)	See Figures 3–19 and 3–20
Chrominance amplitude	443.76 mV_{p-p} (444.2 mV Option 03)	
Chrominance phase	347.1°	
Option 2J only (no setup)		See Figures 3–185 and 3–187 (SN B020000 & up), 3–186 below
Luminance amplitude	58.83 mV	
Chrominance amplitude	480.24 mV	
Flat field		
50%	357.14 mV (50 IRE)	See Figures 3–25 and 3–26
100%	714.29 mV (100 IRE)	See Figures 3–27 and 3–28
0%	0 mV (0 mV)	See Figures 3–23 and 3–24

Table 3–4: NTSC/YC test signal definitions (cont.)

Characteristics	Signal definitions	Supplemental information
Chrominance noise		
Luminance pedestal	357.14 mV	See Figures 3–29 and 3–30
Chrominance amplitude	714.29 mV_{p-p}	
Chrominance phase	103.5° (red) (60.8° magenta, Option 03)	
Chrominance response, C-channel output (Options 03 & 04 only)	2.58 MHz to 4.58 MHz	Option 03, see Figures 3–209, 3–210, and 3–211 (SN B020000 & up), Figures 3–212, 3–213, 3–214 (below SN B020000); Option 04, see Figures 3–244, 3–243, and 3–242
Chrominance frequency response, C-channel output (Standard, Options 01. 01/10, 02, and 2J)	Five frequency packets: 3.08 MHz, 3.33 MHz, 3.58 MHz, 3.83 MHz, 4.08 MHz	See Figure 3–17 and 3–18
Convergence amplitude Convergence pattern pulse HAD	549.1 mV (76.9 IRE) 225 ns	See Figures 3–43 to 3–45 (for Option 03, see Figures 3–217 and 3–218) 14 lines/field, 17 lines/horizontal
5-step amplitude (grayscale)	714.29 mV (100 IRE)	See Figures 3–33 and 3–34 (for Option 03, see Figures 3–203 and 3–204)
Ramp/modulated ramp		
Luminance amplitude	714.29 mV (100 IRE)	See Figures 3–35 to 3–38 (Option 03, see Figures 3–205 to 3–208; Option 04, see Figures 3–240 and 3–241)
Option 04 modulated ramp	571.43 mV (80 IRE)	
Chrominance amplitude	285.7 mV_{p-p} (40 IRE)	
Pulse & bar window		
2T pulse HAD	250 ns	See Figures 3–31 and 3–32
White bar amplitude	100 IRE	
Window field timing	Lines 72 – 202	
NTC7 composite	100 IRE bar (with 125 ns rise time), 2T and 12.5T mod pulse, 90 IRE 5-step staircase modulated with 40 IRE subcarrier	See Figures 3–15 and 3–16
Multiburst		See Figures 3–39 and 3–40
White reference bar amplitude	500 mV_{p-p} (70 IRE)	
Packet amplitudes	428.6 mV_{p-p} (60 IRE)	Equal width packets
Pedestal	285.7 mV (40 IRE)	
Pedestal	0.5, 1.0, 2.0, 3.0, 3.58, and 4.2 MHz	
Packet frequencies		
Packet rise time 0.5 MHz		140 ns typical (sin^2 shaped packets)
Other packets		400 ns typical (sin^2 shaped packets)

Table 3–4: NTSC/YC test signal definitions (cont.)

Characteristics	Signal definitions		Supplemental information
Line sweep frequency	500 kHz to 5.0 MHz (200 kHz to 5.5 MHz, Option 03)		See Figures 3–41 and 3–42 Markers at 1, 2, 3, and 4 MHz (Option 03 only, see Figures 3–215 and 3–216. Markers at 0.5, 1, 2, 3, and 4 MHz)
Amplitude	714.29 mV_{p-p}		
Bounce amplitude Rate	0 or 100 IRE flat field ≅ 1 sec high, 1 sec low		
Matrix (standard and Options 01, 01/02, 02 and 2J)	*Signal* 75% color bars	*Lines* 21–65	See Figures 3–3 and 3–4 (Option 2J, Figures 3–169 and 3–170)
	50% flat field NTC7 combination Sin x/x NTC7 composite Chroma noise Chroma frequency response	66–110 111–141 142–181 182–201 202–221 222–262	Figures 3–25 and 3–26 Figures 3–46 and 3–47 Figures 3–48 and 3–49 Figures 3–15 and 3–16 Figures 3–29 and 3–30 Figures 3–17 and 3–18
Matrix (Options 03 and 04)	Multiburst, chroma sweep, 50 IRE flat field, chroma noise, 75% color bar, NTC7 composite		
0 – 80 IRE ramp (Option 04)			See Figures 3–240 and 3–241

Betacam component test signals are available on the TSG130A standard instrument and with instrument Options 02, 03, and 2J. MII component test signals are available with TSG130A instrument Options 01 and 04.

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format)

	Signal definitions		Supplemental information	
Characteristics	Betacam	MII	Betacam	MII
75% bars			See Figures 3–50, 3–51, 3–52	See Figures 3–125 to 3–127
Option 2J	No setup		See Figures 3–188, 3–189, 3–190	
Option 04 level reference available		Lines 182–262, Y channel only		See Figure 3–245
100% bars			Figures 3–53, 3–54, 3–55	See Figures 3–128 to 3–130
Option 01		Clip component		See Figures 3–131, 3–132
Option 2J	No setup		See Figures 3–191, 3–192, 3–193	

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format) (cont.)

Characteristics	Signal definitions: Betacam	Signal definitions: MII	Supplemental information: Betacam	Supplemental information: MII
SMPTE bars (Option 2J)	No setup		See Figures 3–194 to 3–202	
Flat field nominal				
Y channel 50%	357.1 mV (not Option 03)	350 mV	See Figure 3–57	Figures 3–133, 3–134
Y channel 100%	714.3 mV (not Option 03)	700 mV	See Figure 3–58	Figures 3–134, 3–136
Y channel 0%	0 mV	0 mV	See Figure 3–56	Figures 3–134, 3–135
50/50/50 (Opt. 03)	350 mV (Y)			
50/100/100 (Opt 03)	350 mV (all)			
Valid 5 step amplitude	714.29 mV staircase Y channel; 700 mV B-Y & R-Y channel staircases	714.29 mV staircase Y channel; 485.63 mV B-Y & R-Y channel staircases	Not Option 03. See Figures 3–59 to 3–61	Not Option 04. See Figures 3–137 to 3–139
5 step Options 03 & 04			See Figures 3–221, 3–222	See Figures 3–246, 3–247
Y channel amplitude	0 to 697.8 mV	0 to 697.8 mV		
B-Y & R-Y amplitude	±350 mV	±350 mV		
Quad phase (Option 03)			See Figures 3–223, 3–224, 3–225	Not available
Y channel 2T bar level	350 mV			
Y channel ramp level	0 to 785 mV			
B-Y & R-Y ramp level	–350 to 350 mV			
Sin x/x (Option 03)			See Figures 3–219, 3–220	Not available
Y channel				
Sin x/x peak	351.1 mV			
Pedestal	219.3 & 495.0 mV			
Reference flag	428.6 mV_{p-p}			
Frequency	4.75 MHz			
B-Y & R-Y channels				
Sin x/x peak	345.1 mV			
Pedestal	–135.1 & 135.1 mV			
Reference flag	420 mV_{p-p}			
Frequency	2.75 MHz			
Slope width	18.16 µs			
Line 17 (Option 03)			See Figures 3–228, 3–229, 3–230	Not available
Mod 5-step staircase				

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format) (cont.)

Characteristics	Signal definitions: Betacam	Signal definitions: MII	Supplemental information: Betacam	Supplemental information: MII
Y level	700 mV			
B-Y level	–231.4 mV			
2T pulse				
Level	714.3 mV			
HAD	250 ns			
Mod 12.5T pulse				
Y level	357.2 mV			
B-Y level	334.6 mV			
R-Y level	334.6 mV			
HAD	1562.5 ns			
2T bar level	714.3 mV			
Pulse and bar			See Figures 3–62 to 3–64, 3–140 to 3–142	
12.5T pulse			Encodes to 12.5T modulated pulse at 60.7°	
HAD	1562.5 ns	1562.5 ns		
Amplitude				
Y channel	357.14 mV	350 mV		
B-Y channel	283 mV	196.33 mV		
R-Y channel	357.7 mV	248.14 mV		
2T pulse HAD	250 ns	250 ns	Y channel	
Bar & inverted pulse amplitude	714.29 mV	700 mV	Y channel	
T pulses			See Figures 3–65, 3–66	See Figures 3–143, 3–144
Y channel pulses			Not Option 03	Option 04. See Figures 3–248, 3–249
2T pulse HAD	250 ns	250 ns		
3T pulse HAD	375 ns	375 ns		
5T pulse HAD	625 ns	625 ns		
B-Y, R-Y pulses				
4T pulse HAD	500 ns	500 ns		
7T pulse HAD	875 ns	875 ns (no Option 04)		
Bar amplitude				
Y channel	0 – 714.29 mV	0 – 700 mV		
B-Y, R-Y	±350 mV	±350 mV		

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format) (cont.)

Characteristics	Signal definitions: Betacam	Signal definitions: MII	Supplemental information: Betacam	Supplemental information: MII
T pulses (Option 03)			See Figures 3–226, 3–227	Not available
Y channel pulses				
2T pulse HAD	250 ns	250 ns		
3T pulse HAD	375 ns	375 ns		
5T pulse HAD	625 ns	625 ns		
B-Y, R-Y pulses				
4T pulse HAD	500 ns	500 ns		
7T pulse HAD	875 ns	875 ns (no Option 04)		
Bar amplitude				
Y channel	0 – 714.29 mV	0 – 700 mV		
B-Y, R-Y	±350 mV	±350 mV		
Line sweep	Std, 02, 2J		See Figures 3–67, 3–68	See Figures 3–145, 3–146
Sweep amplitude				
Y channel	428.6 mV_{p-p}	420 mV_{p-p}		
B-Y, R-Y	420 mV_{p-p}	388.5 mV_{p-p}		
Reduced sweep			See Figures 3–69, 3–70	See Figures 3–147, 3–148
Y channel amplitude	357.14 mV_{p-p}	250 mV_{p-p}		
B-Y, R-Y amplitude	350 mV_{p-p}	250 mV_{p-p}		
Frequency response				
Y channel	200 kHz to 5.5 MHz	200 kHz to 5.5 MHz		
B-Y, R-Y	100 kHz to 2.75 MHz	100 kHz to 2.75 MHz		
Markers				
Y channel	0.5, 1, 2, 3, 4, 5 MHz	0.5, 1, 2, 3, 4, 5 MHz		
B-Y, R-Y	0.25, 0.5, 1, 1.5, 2, 2.5 MHz	0.25, 0.5, 1, 1.5, 2, 2.5 MHz		
Line sweep (Opt 03, 04)			See Figures 3–233, 3–234	See Figures 3–250, 3–251
100% narrow sweep amplitude				
Y channel	700 mV_{p-p}			
B-Y, R-Y	700 mV_{p-p}			
60% narrow sweep			See Figures 3–235, 3–236	See Figures 3–252, 3–253
Y channel amplitude	420 mV_{p-p}			
B-Y, R-Y amplitude	420 mV_{p-p}			
Frequency response				
Y channel	200 kHz to 5.5 MHz			

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format) (cont.)

Characteristics	Signal definitions: Betacam	Signal definitions: MII	Supplemental information: Betacam	Supplemental information: MII
B-Y, R-Y	100 kHz to 2.75 MHz			
Markers				
Y channel	0.5, 1, 2, 3, 4, and 5 MHz			
B-Y, R-Y	0.25, 0.5, 1, 1.5, 2, and 2.5 MHz			
Bowtie			See Figures 3–71 to 3–73	See Figures 3–149 to 3–151
Y channel amplitude	350 mV			
B-Y, R-Y amplitude	±175 mV			
Y channel frequency	500 kHz sine wave		See Figures 3–237 to 3–239	
B-Y, R-Y frequency	502 kHz sine wave			
12.5T pulses (Opt 03)	Lines 182 – 221			
Bowtie timing markers			Eleven timing markers indicating 20 ns delay/advance between channels. Two timing markers centered around the center marker indicating 5 ns delay/advance between channels.	
100% Bowtie (Option 04)			Not available	See Figures 3–254, 3–255
Y channel amplitude		700 mV		
B-Y, R-Y amplitude		±300 mV		
Y channel frequency		500 kHz sine wave		
B-Y, R-Y frequency		502 kHz sine wave		
12.5T pulses (Opt 03)				
100% bowtie timing markers				Same as standard bowtie signal
Multiburst (Option 01, 02, 2J, Std.)			See Figures 3–74, 3–75	Option 01. Figures 3–154, 3–155
Y channel amplitude	428.6 mV_{p-p}	420 mV_{p-p}	Centered on 285.7 mV	Centered on 285.7 mV
R-Y, B-Y amplitude	420 mV_{p-p}	388.5 mV_{p-p}	Centered on 0 mV	Centered on 0 mV
Y channel white flag	428.6 mV_{p-p}	420 mV_{p-p}	Centered on 285.7 mV	Centered on 285.7 mV
B-Y, R-Y white flag	420 mV_{p-p}	388.5 mV_{p-p}	Centered on 0 mV	Centered on 0 mV
Y channel frequencies	0.5, 1.0, 2.0, 3.0, 4.0, 4.5 MHz	0.5, 1.0, 2.0, 3.0, 4.0, 4.5 MHz		
R-Y, B-Y frequencies	0.2, 0.5, 1.0, 1.5, 2.0 MHz	0.2, 0.5, 1.0, 1.5, 2.0 MHz		
60% multiburst (Opt 03)			See Figures 3–231, 3–232	Not available

Table 3–5: Component test signal definitions (Y, B-Y, and R-Y format) (cont.)

Characteristics	Signal definitions: Betacam	Signal definitions: MII	Supplemental information: Betacam	Supplemental information: MII
Y channel amplitude	420 mV_{p-p}		Centered on 350 mV	
R-Y, B-Y amplitude	420 mV_{p-p}		Centered on 0 mV	
Y channel white flag	420 mV_{p-p}		Centered on 350 mV	
B-Y, R-Y white flag	420 mV_{p-p}		Centered on 0 mV	
Y channel frequencies	0.5, 1.0, 2.0, 3.0, 4.0, 4.2 MHz			
R-Y, B-Y frequencies	0.2, 0.5, 1.0, 1.5, 2.0 MHz			
Matrix (Option 03)				Not available
Lines				
21 – 61	75% color bars			
62 – 101	60% narrow multi-burst			
102 – 141	50% bowtie			
142 – 181	Bowtie markers			
182 – 221	Line 17			
222 – 262	T pulses			
Matrix			Std & Options 02, 2J	Option 01
Lines				
21 – 61	75% color bars	75% color bars	See Figures 3–50 to 3–52. For 2J see Figures 3–188 to 3–190	See Figures 3–125 to 3–127
62 – 101	50% flat field	50% flat field	Figure 3–57	Figures 3–133, 3–134
102 – 110	Bowtie markers	Bowtie markers	Figure 3–73	Figure 3–151
111 – 141	Bowtie	Bowtie	Figures 3–71, 3–72	Figures 3–149, 3–150
142 – 181	5-step	5-step	Figures 3–76, 3–77	Figures 3–152, 3–153
182 – 221	Multiburst	Multiburst	Figures 3–74, 3–75	Figures 3–154, 3–155
222 – 262	T pulses	T pulses	Figures 3–65, 3–66	Figures 3–143, 3–144

Table 3–6: Component test signal definitions (CTDM format)

Characteristics	Signal definitions		Supplemental information	
	Betacam	MII	Betacam	MII
75% bars			See Figures 3–78, 3–79 (SN B020000 & up), 3–80, 3–81 (below)	See Figures 3–156, 3–157
100% bars			See Figures 3–82, 3–60 (SN B020000 & up), 3–84 (below) Not available, Opt 03	See Figures 3–158, 3–159 Not available, Opt 04
Flat field				
Nominal amplitude				
Y channel, 50%	350 mV	350 mV	Figures 3–85, 3–87	Figures 3–161, 3–162
Y channel, 100%	700 mV	700 mV	Figures 3–85, 3–88	Figures 3–161, 3–163
Y channel, 0%	0 mV	0 mV	Figures 3–85, 3–86 Not in Option 03	Figures 3–160, 3–161
Bowtie			Figures 3–91 to 3–93 (SN B020000 & up), 3–94 (below)	Figures 3–164 to 3–166
Y channel	500 kHz sine wave			Not in Option 04
C channel	1.04 MHz sine wave		Not in Option 03	
Bowtie timing markers			Eleven timing markers indicating 20 ns delay/advance between channels. Two timing markers centered around the center marker indicating 5 ns delay/advance between channels.	
Line sweep			Figures 3–89, 3–90	Figures 3–167, 3–168
Sweep amplitude				
Y channel	428.6 mV$_{p-p}$	428.6 mV$_{p-p}$		
C channel	420 mV$_{p-p}$	420 mV$_{p-p}$	Not in Option 03 or 2J	Not in Option 04
Frequency response				
Range	200 kHz – 5.5 MHz	200 kHz – 5.5 MHz		
Markers	0.5, 1, 2, 3, 4, 5 MHz	0.5, 1, 2, 3, 4, 5 MHz		

Table 3–7: Test signal generator GBR-format test signals

Characteristics	Signal definitions	Supplemental information
75% bars		See Figures 3–95 to 3–97
100% bars		See Figures 3–98 to 3–100

Table 3–7: Test signal generator GBR-format test signals (cont.)

Characteristics	Signal definitions	Supplemental information
10-step staircase		See Figures 3–113 and 3–114
Green amplitude	703 mV	
Blue & red amplitude	700 mV	
Linearity	1%	Relative step matching
2T pulse & bar with window		See Figures 3–115 and 3–116
Window timing	Lines 72 – 202	
2T pulse HAD	250 ns	
Bar amplitude	700 mV	
Color fields		
Red	700 mV on R channel	See Figures 3–101 to 3–103
Green	700 mV on G channel	See Figures 3–107 and 3–108
Blue	700 mV on B channel	See Figures 3–104 to 3–106
Multiburst		See Figures 3–117 and 3–118
Amplitude	420 mV_{p-p} centered on 350 mV	
White flag	420 mV_{p-p} centered on 350 mV	
Frequencies	0.5, 1, 2, 3, 4, and 5 MHz	
100% line sweep		See Figures 3–119 and 3–120
Amplitude	700 mV	
Frequency range	200 kHz – 5.5 MHz	
Markers		0.5, 1, 2, 3, 4, 5, and 5.5 MHz
Bowtie		See Figures 3–121 to 3–124
G channel	500 kHz sine wave	
B channel	502 kHz sine wave	
R channel	502 kHz sine wave	
Channel amplitudes	350 mV (all channels)	
Timing markers	11 timing markers	Marker spacing indicates 20 ns delay/advance between channels.
Convergence		See Figures 3–109 to 3–112
Amplitude	525 mV (75%)	
Pattern	Crosshatch 14 horizontal and 15 vertical lines per field.	

Table 3–8: Black burst output (Options 02, 03, 2J)

Characteristics	Performance requirements	Supplemental information	Performance check step no.
Black amplitude	7.5 IRE ±1 IRE 0 IRE ±1 IRE (Option 2J)		65
Blanking width	10.9 μs ±0.2 μs		66
Sync timing		See Figure 3–1 Options 01/02, 02, & 03. See Figure 3–2 Option 2J.	

Table 3–9: Audio tone characteristics

Characteristics	Performance requirements	Supplemental information	Performance check step #
Amplitude	0 to +8 dBu adjustable	Balanced XLR impedance to drive 600 Ω or high-impedance load	
Frequency			
Distortion (THD)	≤0.5% THD		64
Audio ID click frequency range (one channel)	Rate adjustable 0.2 Hz – 4 Hz		

Table 3–10: Composite sync output (Options 02, 03, 04, 2J, and 01/02)

Characteristics	Performance requirements	Supplemental information	Performance check step no.
Duration			67
Horizontal sync	4.7 μs ±100 ns		
Vertical serrations	4.7 μs ±100 ns		
Equalizing pulses	2.35 μs ±100 ns		
Amplitude	–4.0 ±0.5 V		68
Rise and fall times	140 ns ±20 ns		69
Impedance		75 Ω	
Return loss		≥30 dB to 5 MHz	

Table 3–11: Power supply specifications

Characteristics	Performance requirements	Supplemental information
Supply accuracy		
+5 V		+5 V ±250 mV

Table 3–11: Power supply specifications (cont.)

Characteristics	Performance requirements	Supplemental information
–5.2 V		–5.2 V +300 mV, –500 mV
–10 V		–10 V ±600 mV
Power limit		18 Watts
Hum		Typical
+5 V		10 mV
–5.2 V		20 mV
–10 V		10 mV
Noise		
+5 V		≤50 mV (5 MHz bandwidth)
–5.2 V		≤50 mV (5 MHz bandwidth)
–10 V		≤50 mV (5 MHz bandwidth)
Line voltage range		
115 VAC		90 – 130 VAC
240 VAC		180 – 250 VAC
Fuse data		
110 V setting		0.5 A, 250V med. blow
230 V setting		0.25 A, 250V med. blow
Power consumption, typical		15 Watts
Line frequency		48 – 62 Hz

Table 3–12: Physical characteristics

Characteristics	Supplemental information
Dimensions	
Height	43.4 mm (1.71 in)
Width	205.7 mm (8.1 in)
Length	381.0 mm (15.0 in)
Net weight	1.47 kg (4 lbs, 6 oz)
Shipping weight	3.2 kg (7 lbs, 1 oz)

Table 3–13: Environmental characteristics

Characteristics	Supplemental information
Temperature	
Non-operating	–40 to +65 °C
Operating	0 to +35 °C
Altitude	
Non-operating	To 50,000 feet
Operating	To 15,000 feet
Vibration (operating)	5 minutes each axis at 0.060 inch, with frequency varied from 5–15–5 cycles per second, with instrument secured to vibration platform. 5 minutes each axis at 0.020 inch, with frequency varied from 25–55–25 cycles per second, with instrument secured to vibration platform. 5 minutes each axis at 0.040 inch, with frequency varied from 15–25–15 cycles per second, with instrument secured to vibration platform. Ten minutes each axis at any resonant point, or at 33 cycles per second.
Shock	50 g, half sine, 11 ms duration, 3 guillotine-type shocks per side.
Transportation	Qualified under NTSB Test Procedure 1A, Category II (24-inch drop).

Table 3–14: Certifications and compliances

EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EN 50081-1 Emissions: EN 55022 Class B Radiated and Conducted Emissions EN 50082-1 Immunity: IEC 801-2 Electrostatic Discharge Immunity IEC 801-3 RF Electromagnetic Field Immunity IEC 801-4 Electrical Fast Transient/Burst Immunity Good quality shielded cables must be used to ensure conformity to above listed EMC standards.
EMC Compliance	Meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility when it is used with the product(s) stated in the specifications table. Refer to the EMC specification published for the stated products. May not meet the intent of the Directive if used with other products.
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits
EC Declaration of Conformity – Low Voltage	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 73/23/EEC EN 61010-1:1993 Safety requirements for electrical equipment for measurement, control, and laboratory use
Approvals	UL3111-1 – Standard for electrical measuring and test equipment CAN/CSA C22.2 No. 1010.1 – Safety requirements for electrical equipment for measurement, control and laboratory use
Safety Certification of Plug-in or VXI Modules	For modules (plug-in or VXI) that are safety certified by Underwriters Laboratories, UL Listing applies only when the module is installed in a UL Listed product. For modules (plug-in or VXI) that have cUL or CSA approval, the approval applies only when the module is installed in a cUL or CSA approved product.
Installation Category Descriptions	Terminals on this product may have different installation category designations. The installation categories are: CAT III Distribution-level mains (usually permanently connected). Equipment at this level is typically in a fixed industrial location CAT II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected CAT I Secondary (signal level) or battery operated circuits of electronic equipment

Waveform Illustrations

In the following illustrations, time is referenced to the half–amplitude point (or a pulse peak) unless otherwise specified.

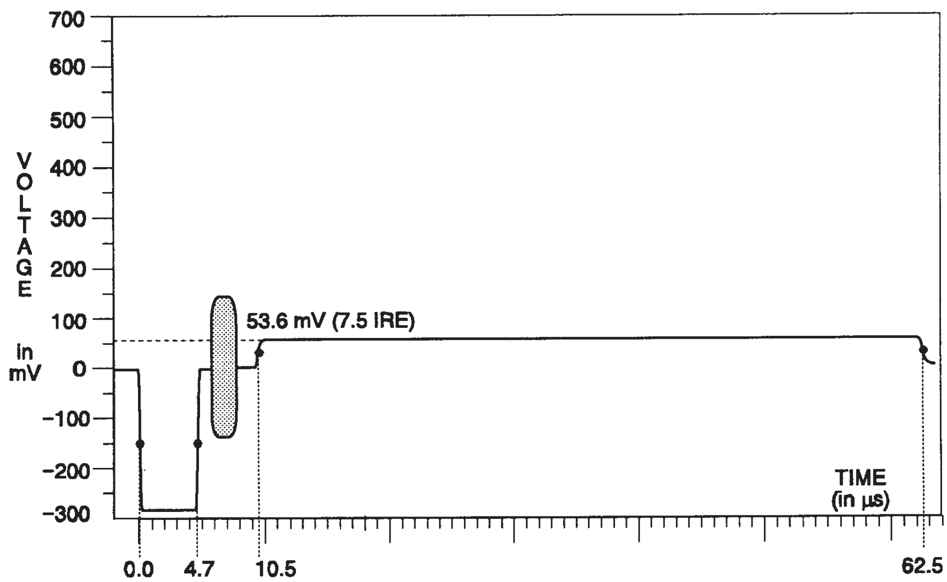


Figure 3–1: Options 01/02, 02, and 03 black burst output

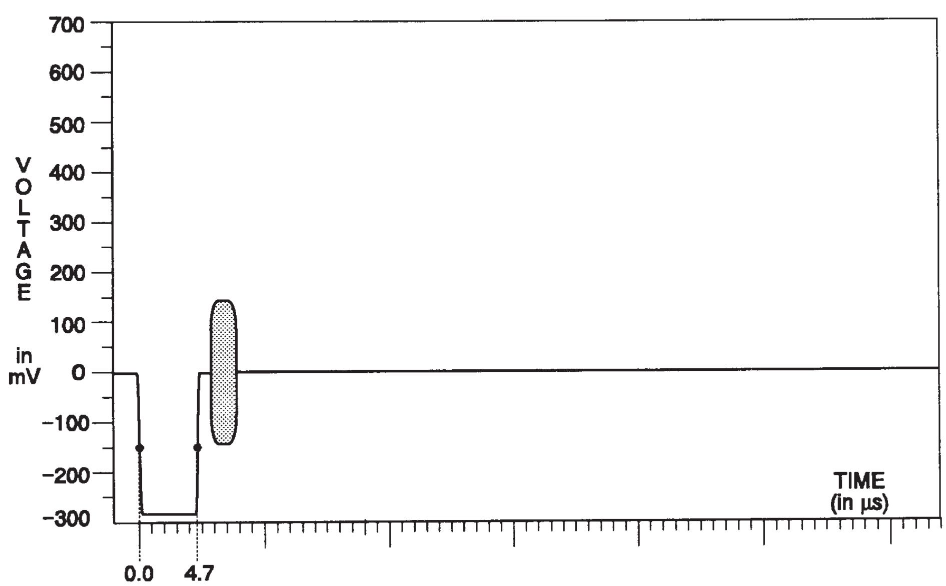


Figure 3–2: Option 2J black burst output

Y–C Signal Format

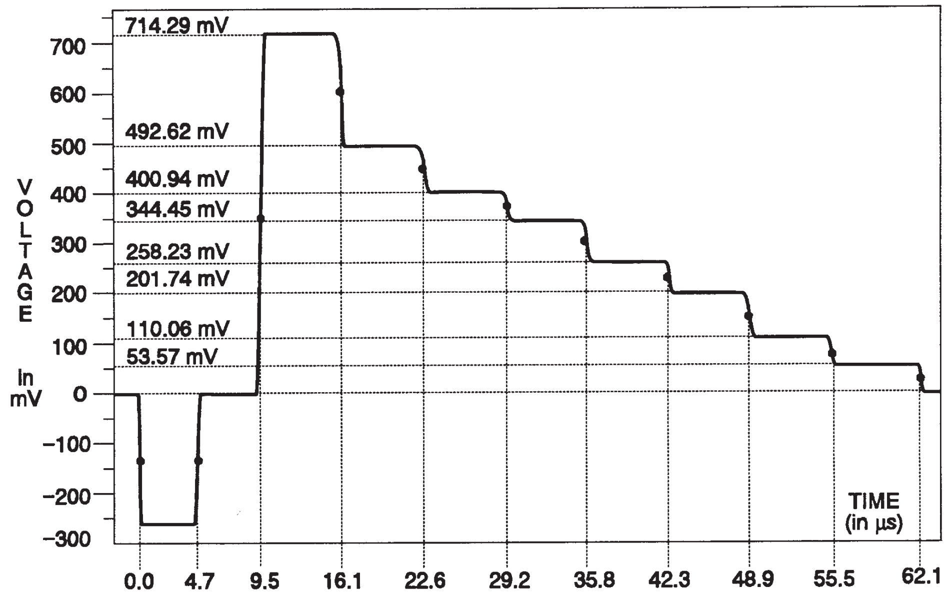


Figure 3–3: Y channel – 75% bars

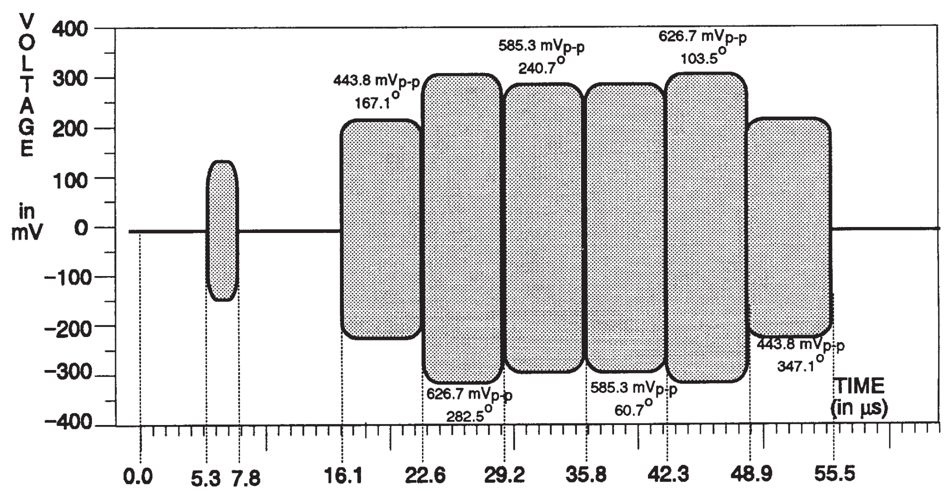


Figure 3–4: C channel – 75% bars

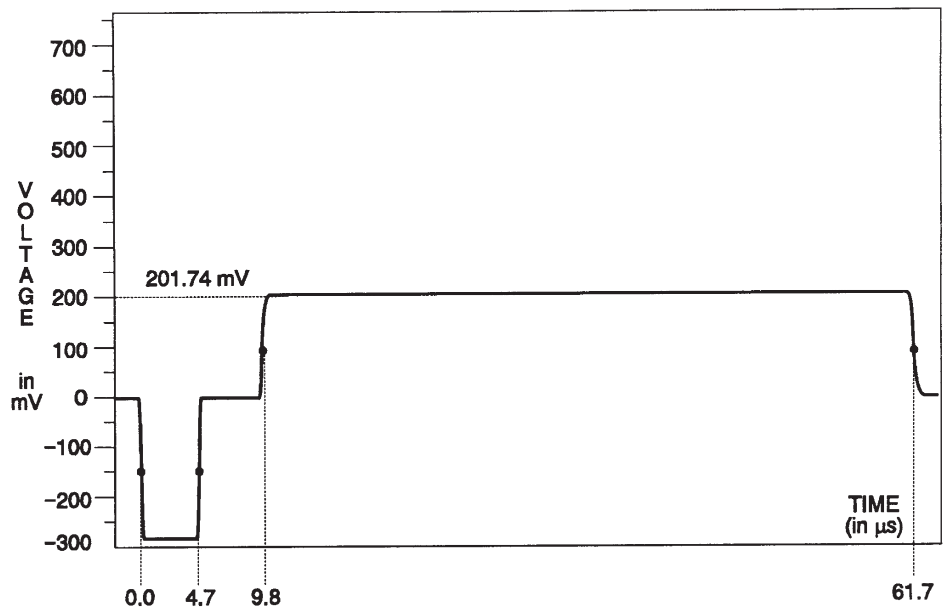


Figure 3–5: Y channel – 75% red (same as red field)

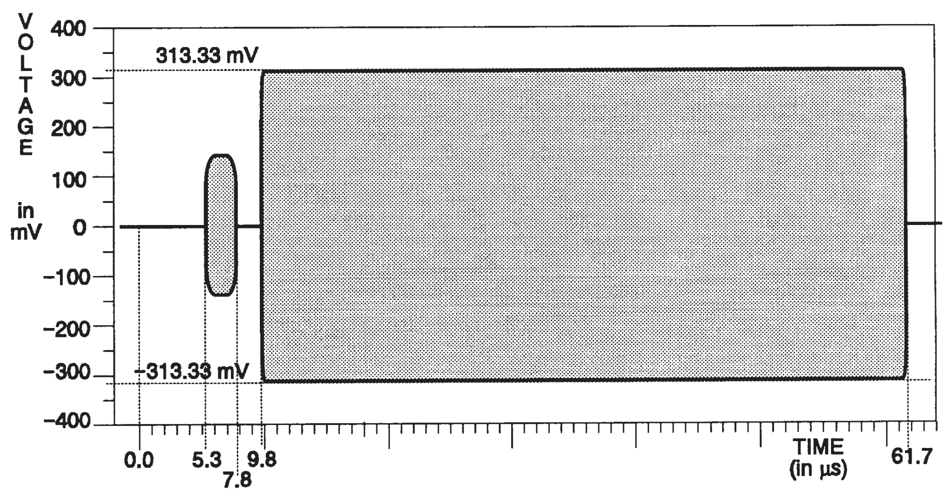


Figure 3–6: C channel – 75% red (same as red field)

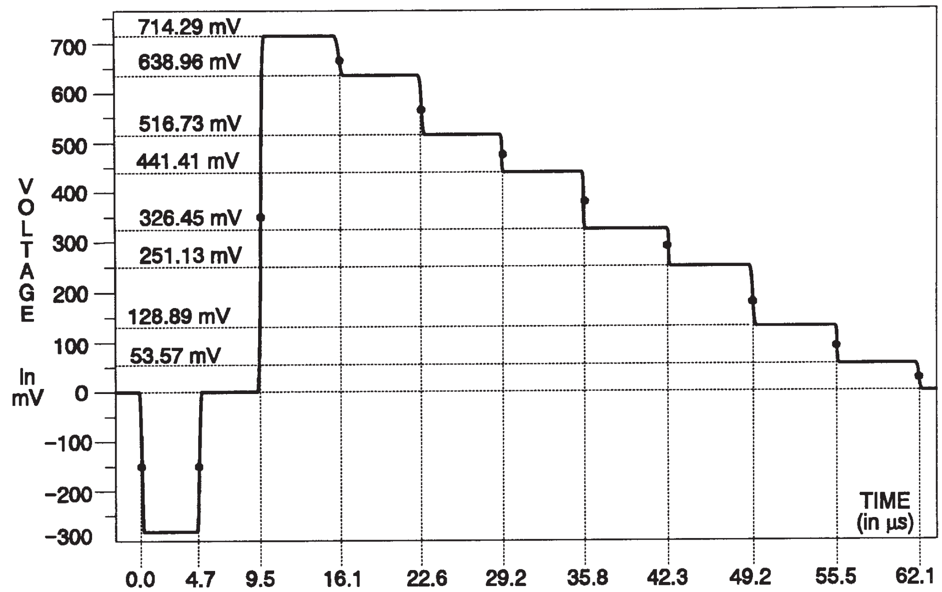


Figure 3–7: Y channel – 100% bars

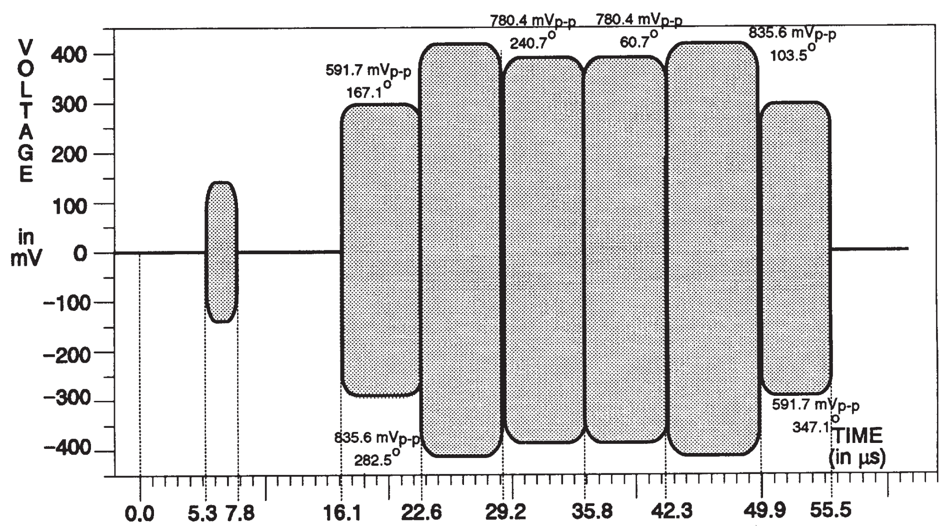


Figure 3–8: C channel – 100% bars

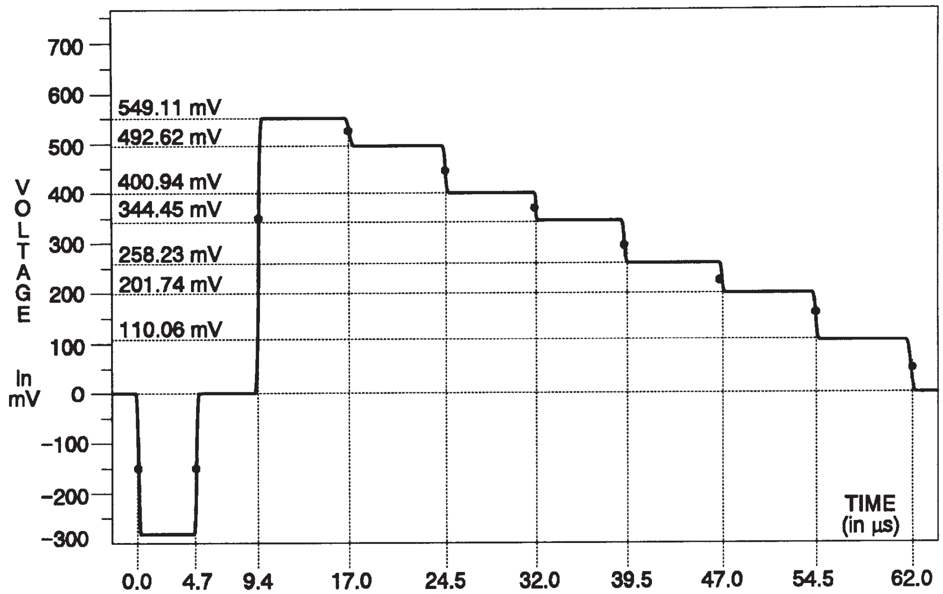


Figure 3–9: Y channel – SMPTE bars

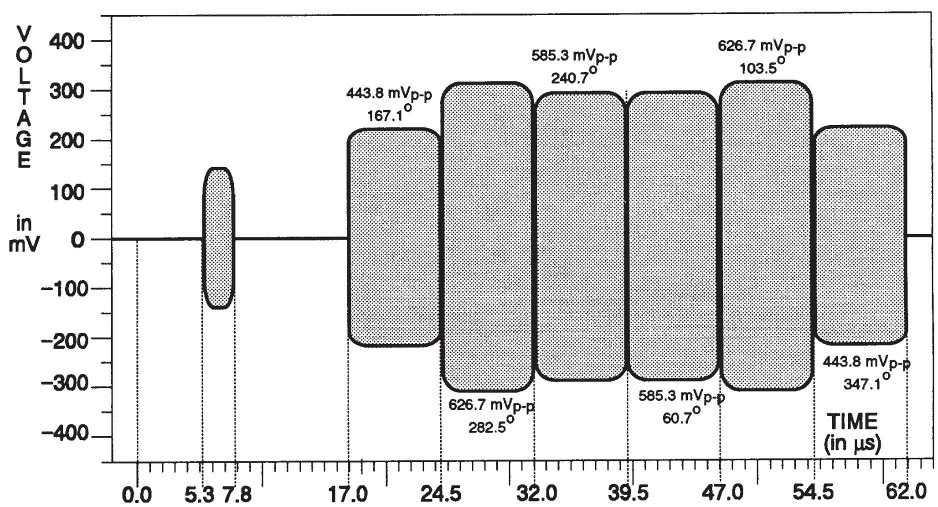


Figure 3–10: C channel – SMPTE bars

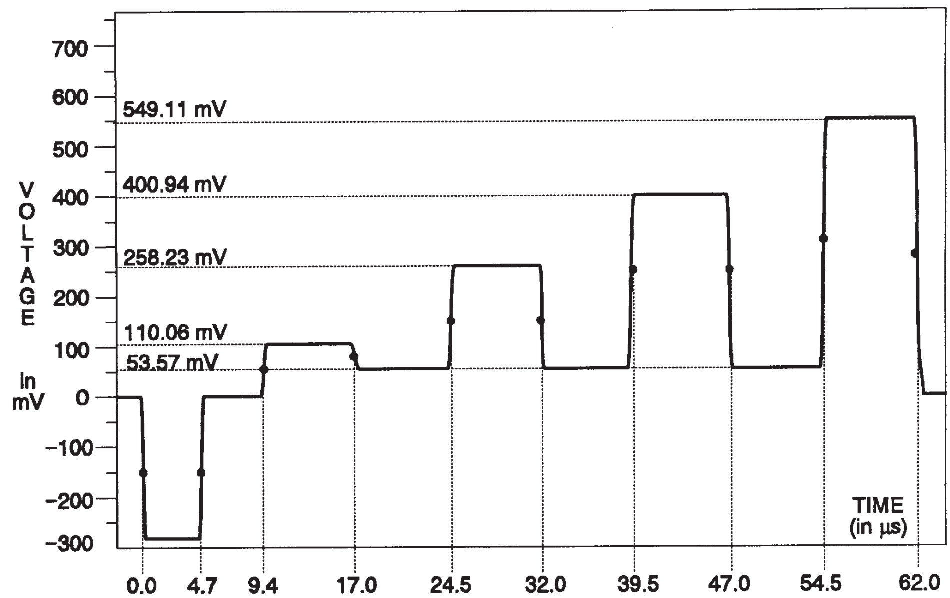


Figure 3–11: Y channel – SMPTE reverse blue bars

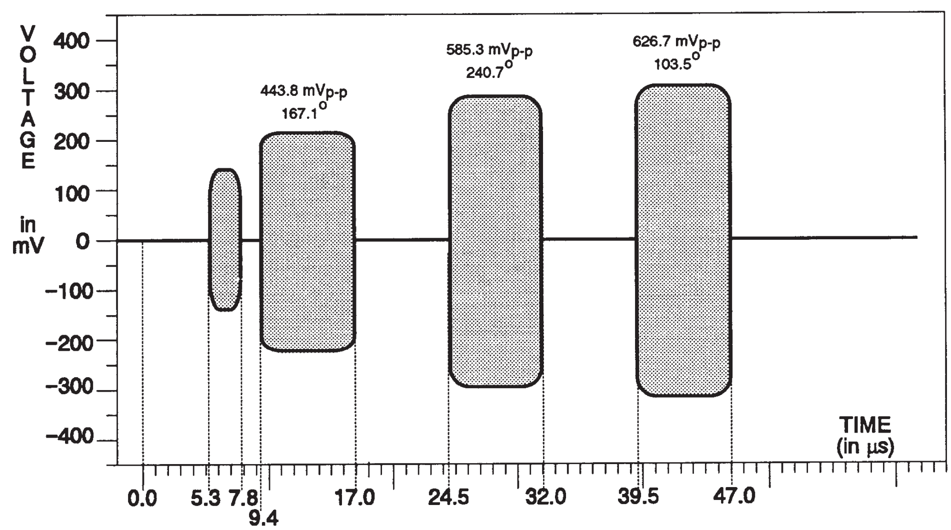


Figure 3–12: C channel – SMPTE reverse blue bars

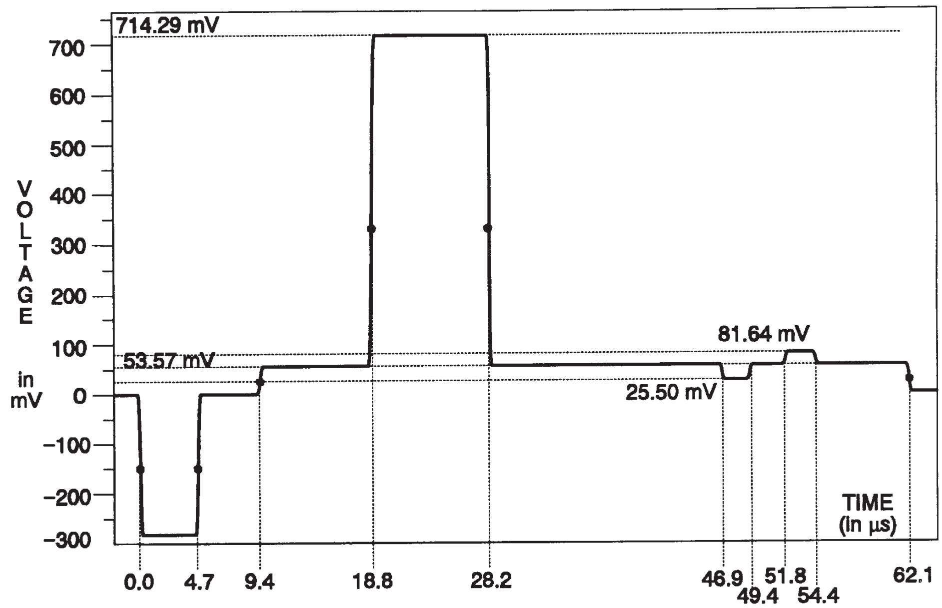


Figure 3–13: Y channel – SMPTE bars (IYQB)

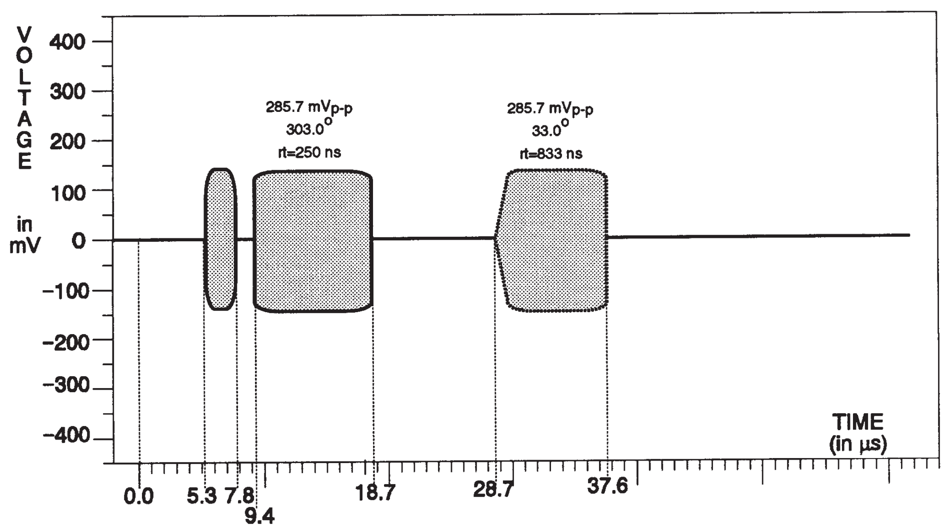


Figure 3–14: C channel – SMPTE bars (IYQB)

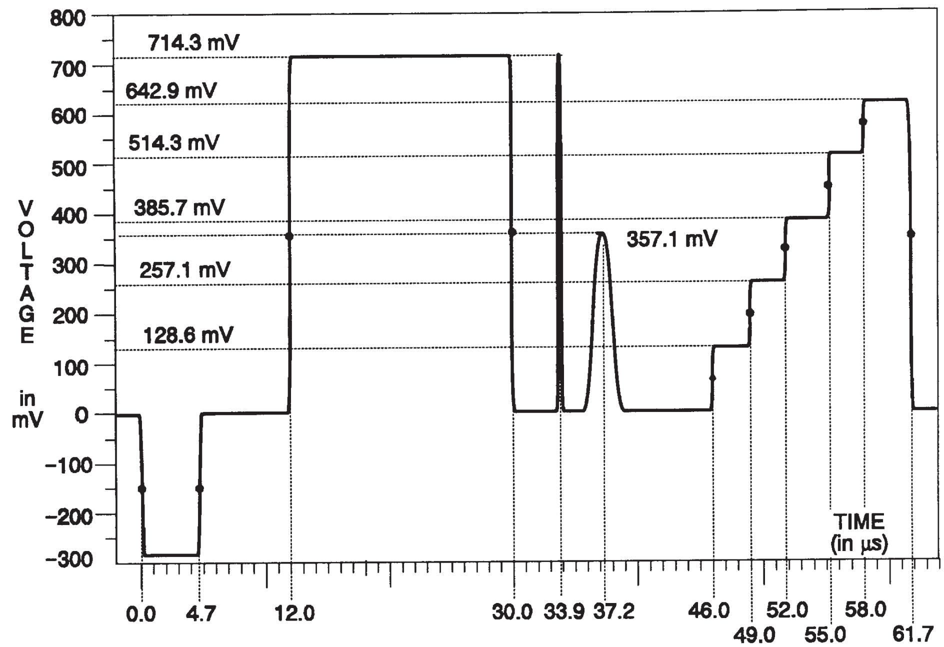


Figure 3–15: Y channel – NTC7 composite

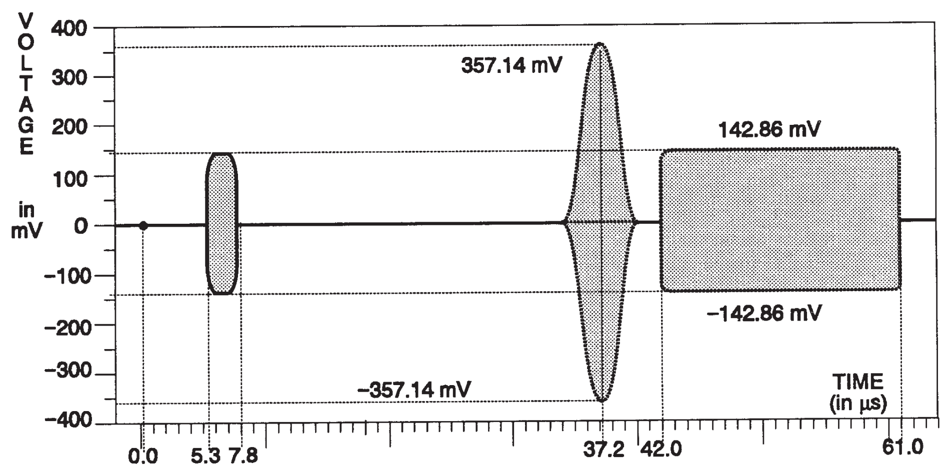


Figure 3–16: C channel – NTC7 composite

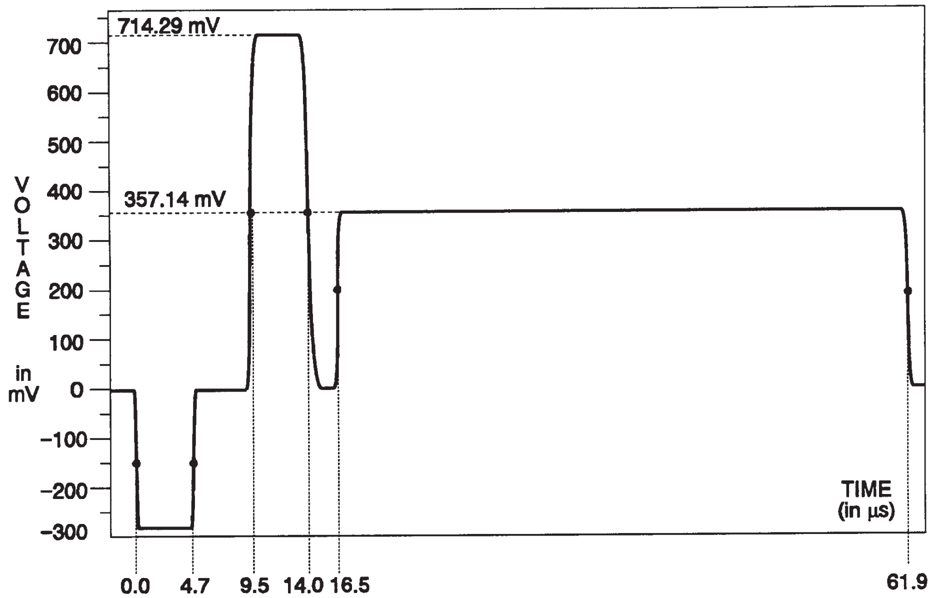


Figure 3–17: Y channel – chroma frequency response

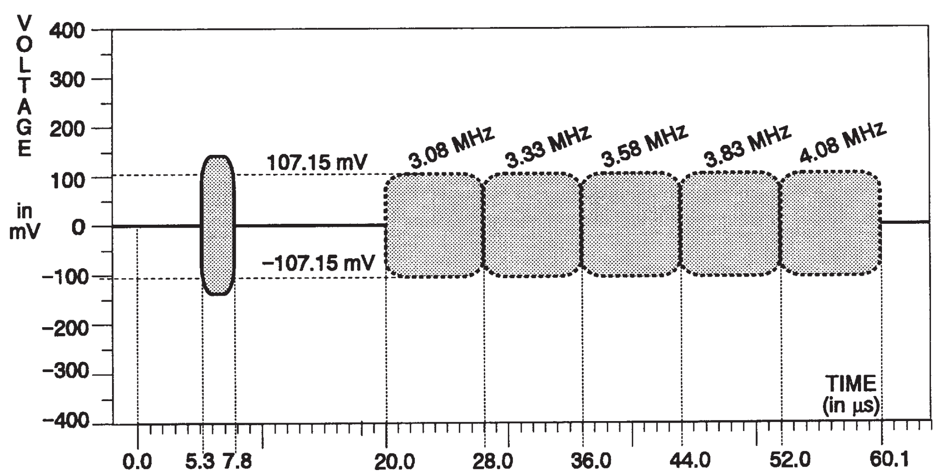


Figure 3–18: C channel – chroma frequency response

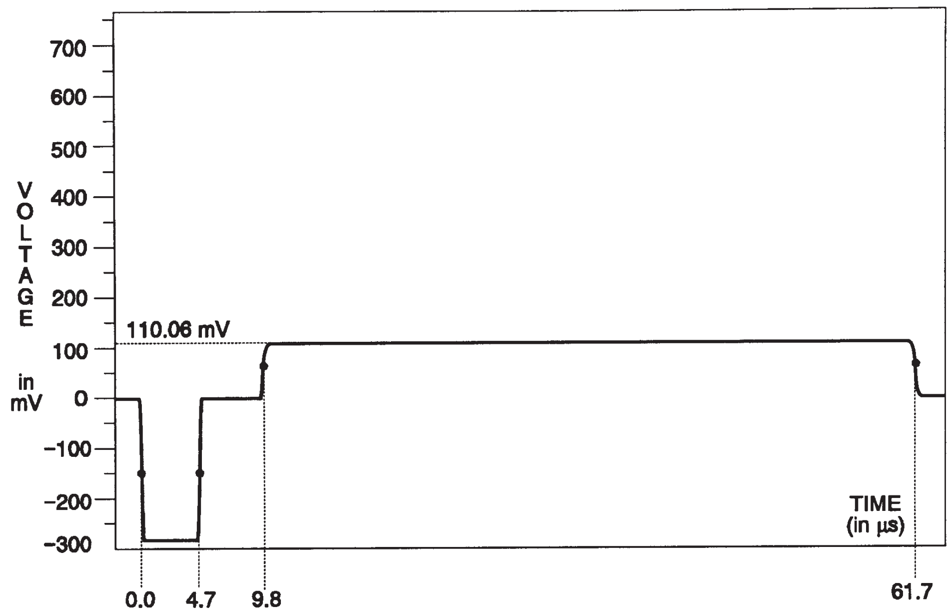


Figure 3–19: Y channel – blue field

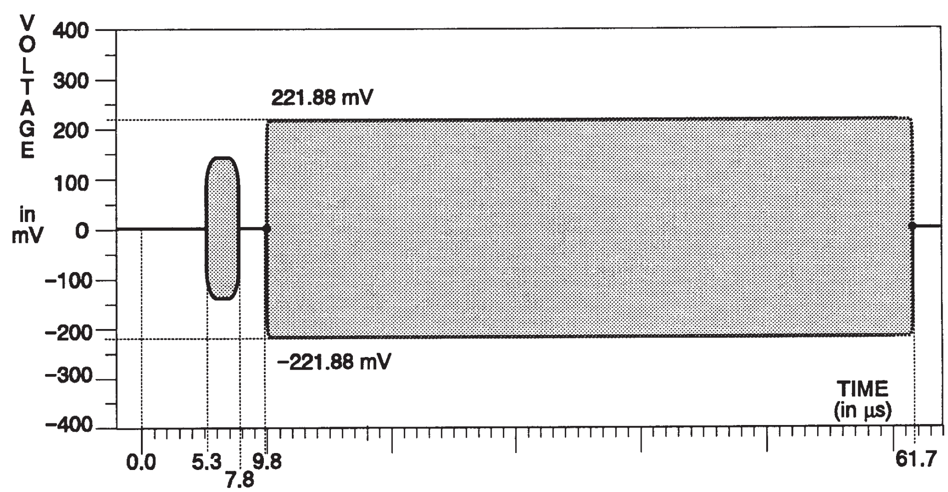


Figure 3–20: C channel – blue field

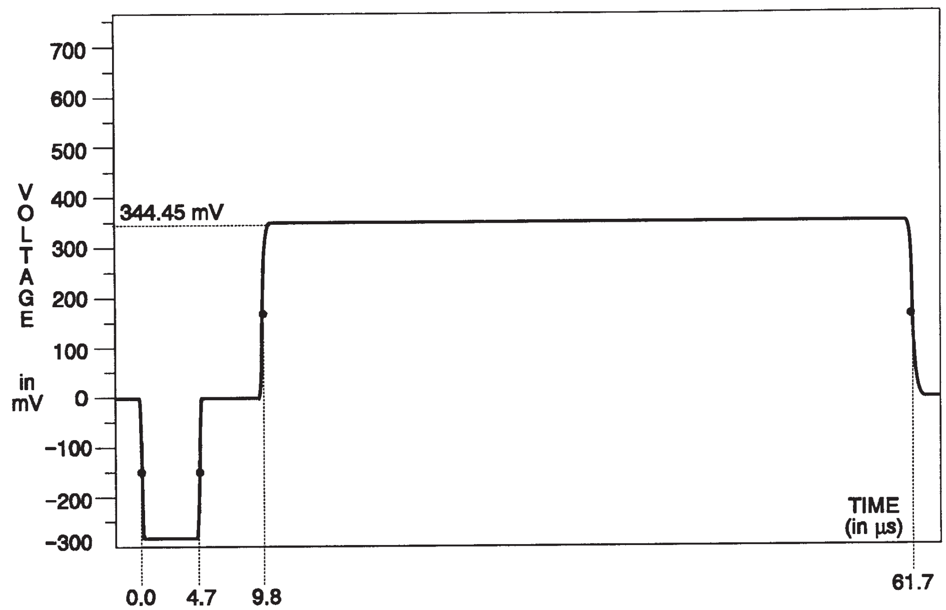


Figure 3–21: Y channel – green field

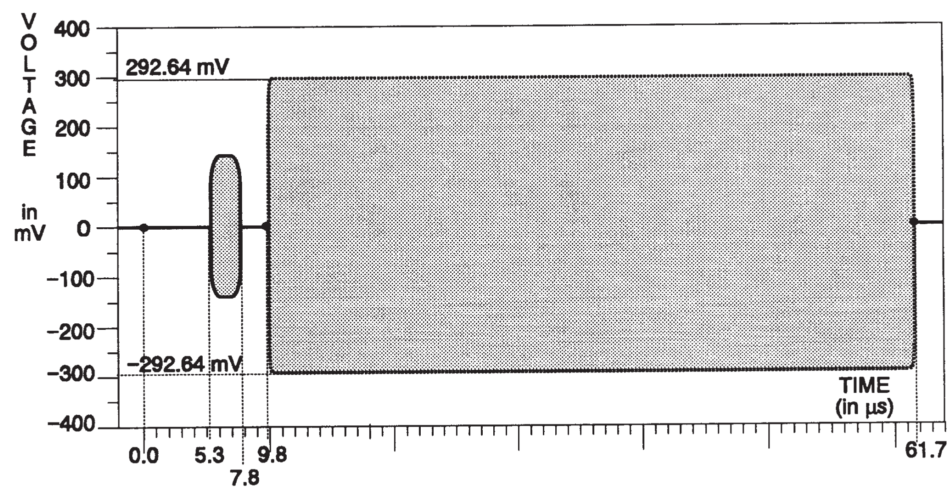


Figure 3–22: C channel – green field

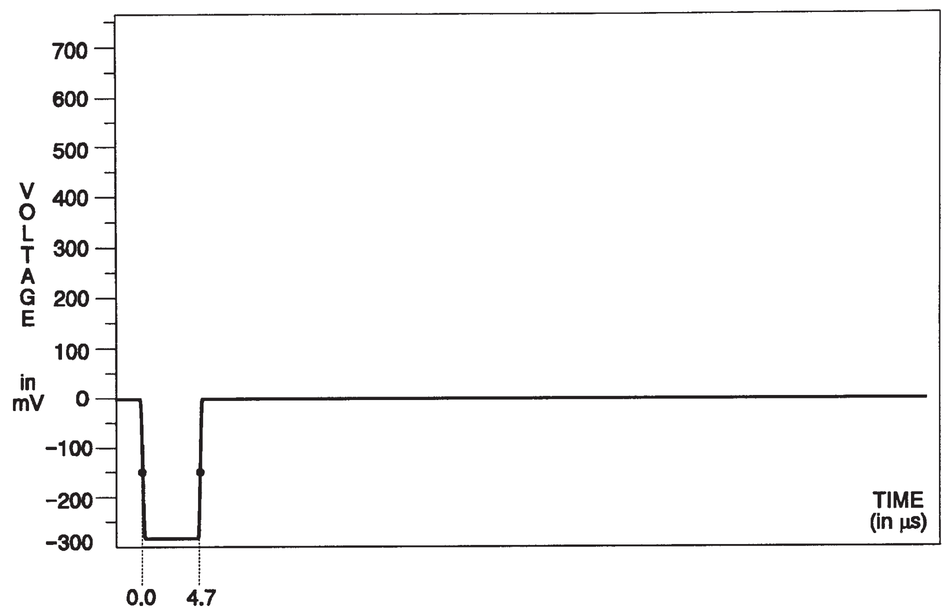


Figure 3–23: Y channel – 0% flat field

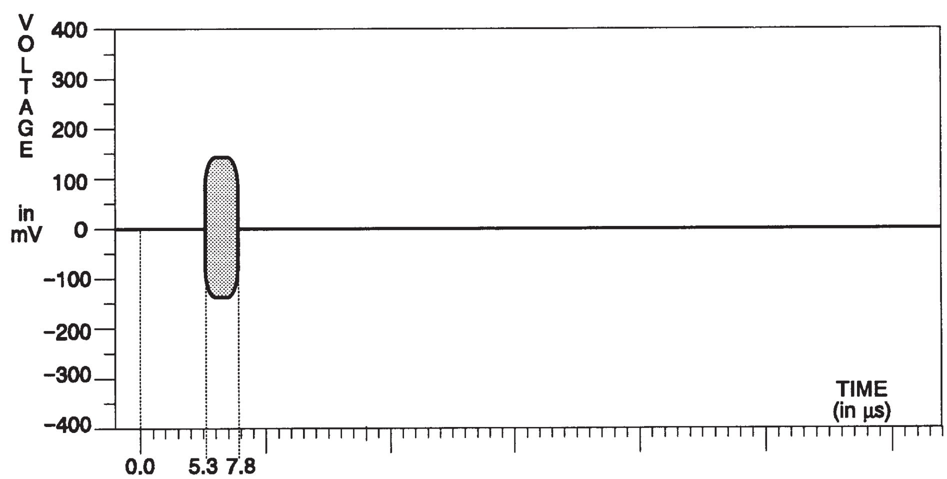


Figure 3–24: C channel – 0% flat field

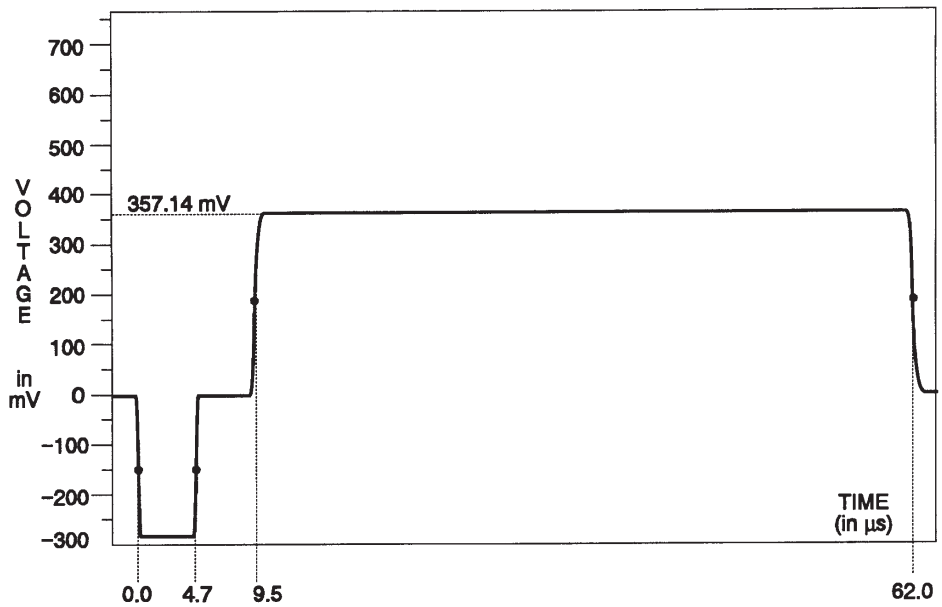


Figure 3–25: Y channel – 50% flat field

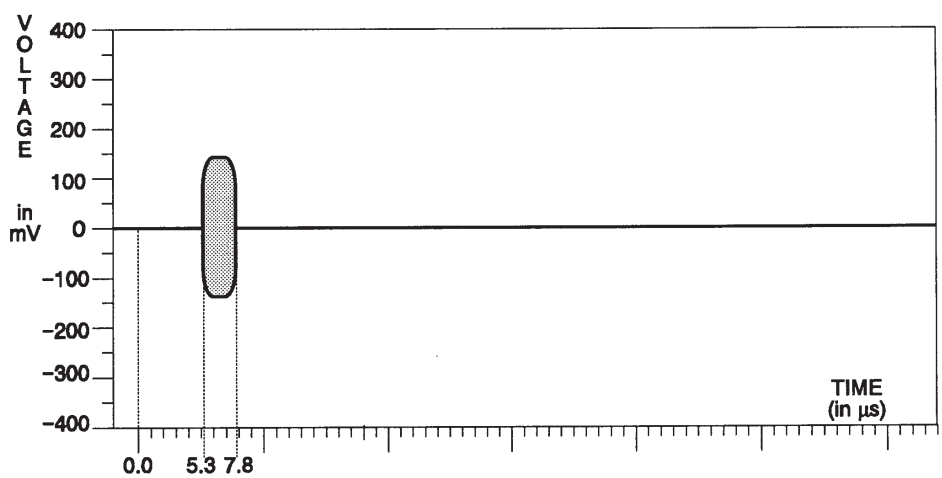


Figure 3–26: C channel – 50% flat field

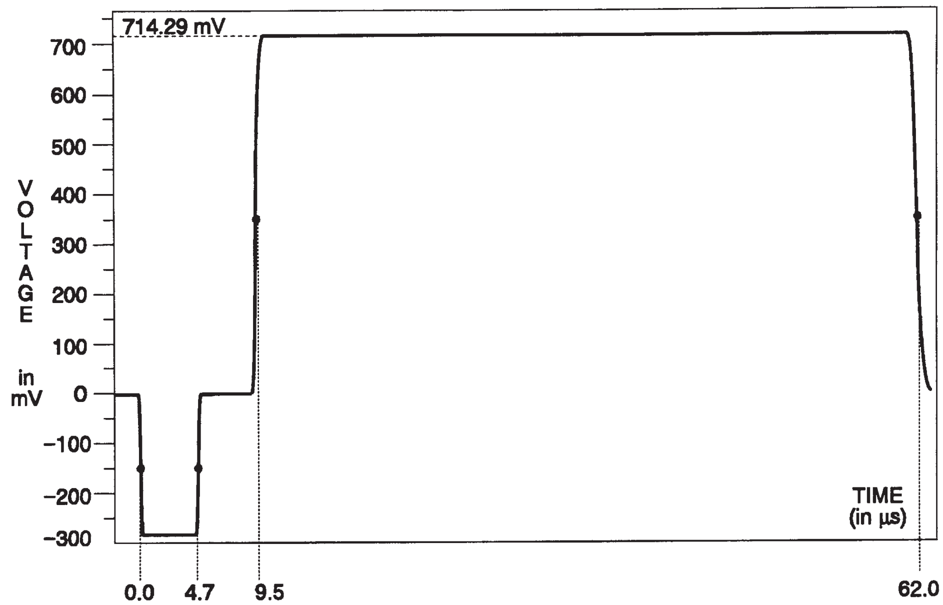


Figure 3–27: Y channel – 100% flat field

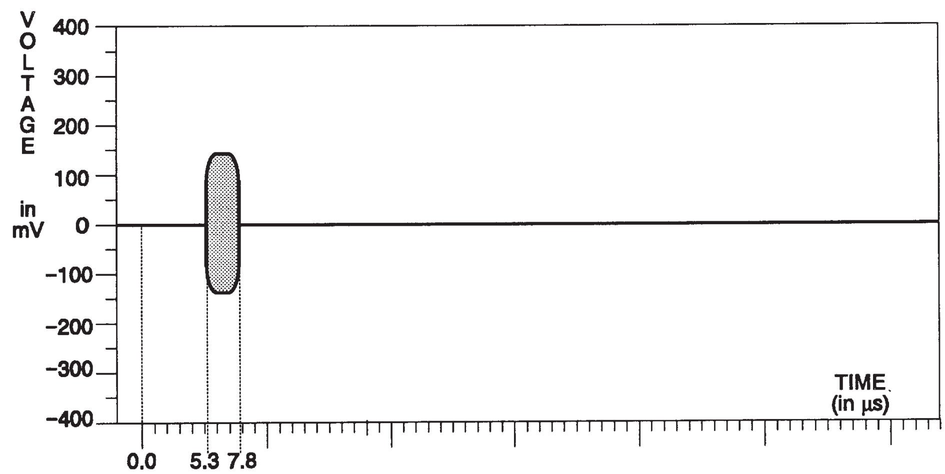


Figure 3–28: C channel – 100% flat field

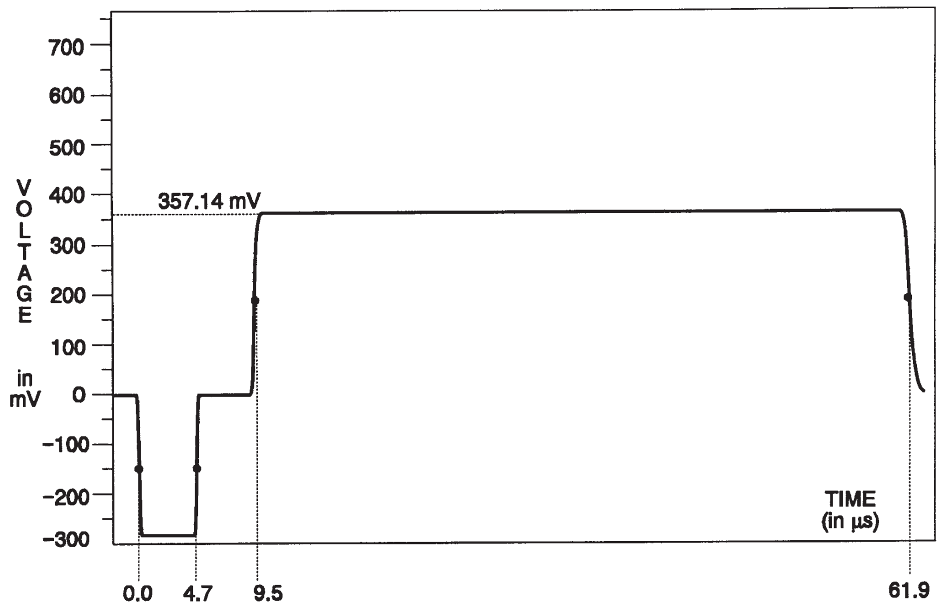


Figure 3–29: Y channel – chroma noise

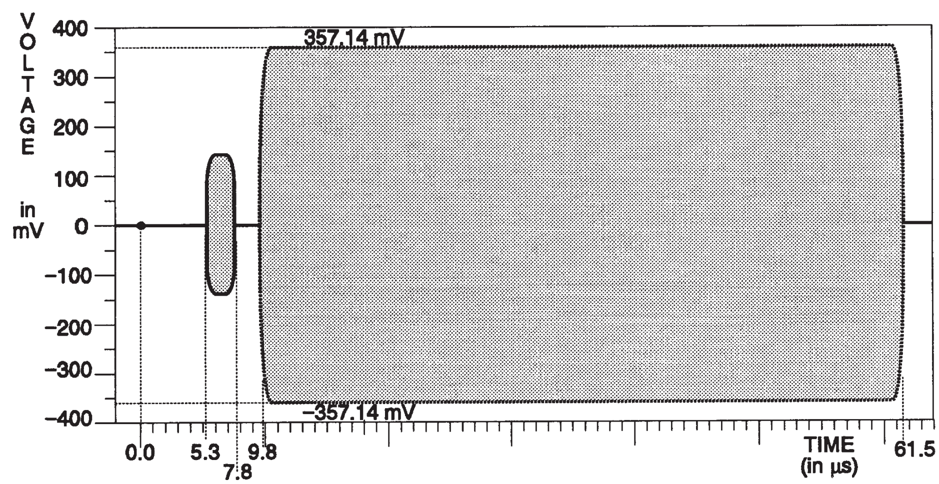


Figure 3–30: C channel – chroma noise

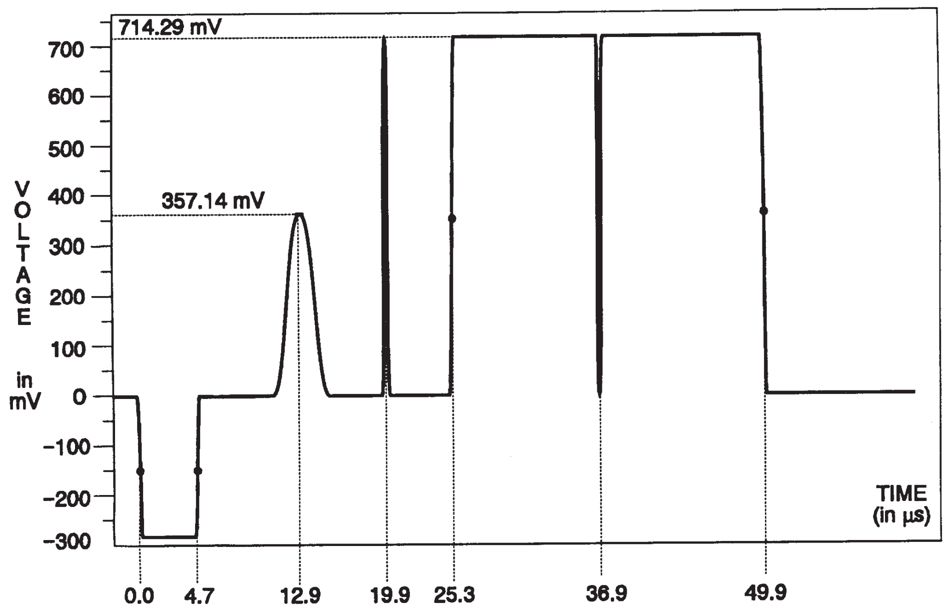


Figure 3–31: Y channel – pulse and bar window

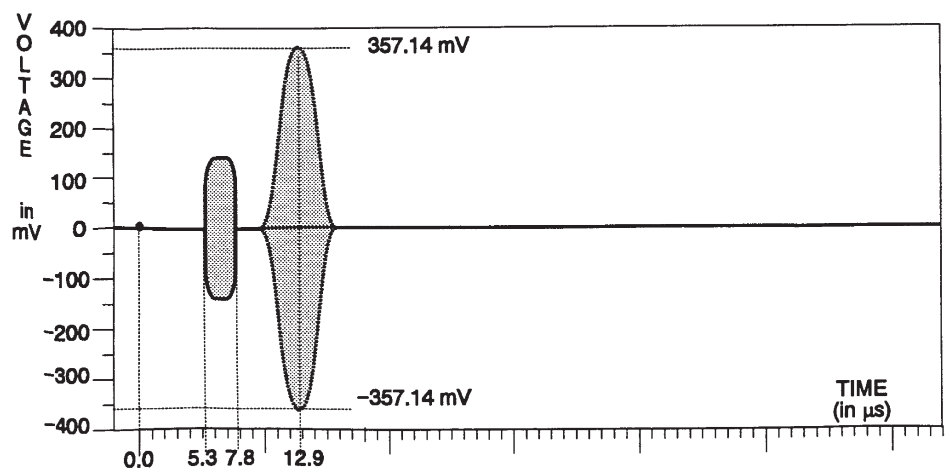


Figure 3–32: C channel – pulse and bar window

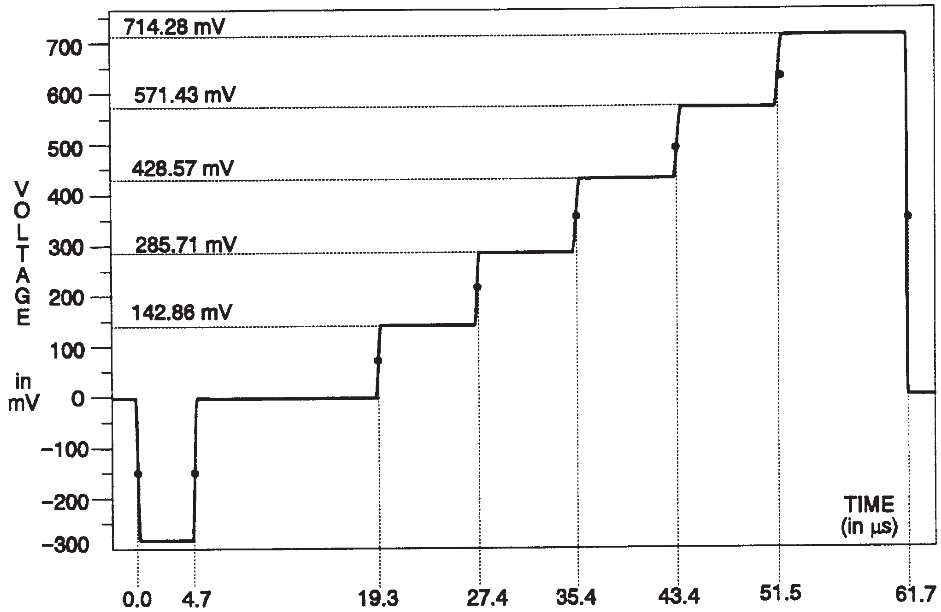


Figure 3–33: Y channel – 5 step

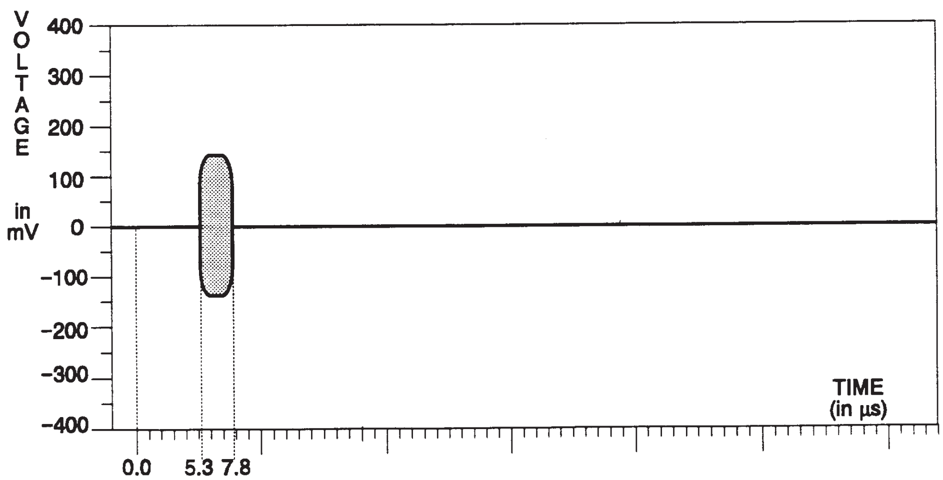


Figure 3–34: C channel – 5 step

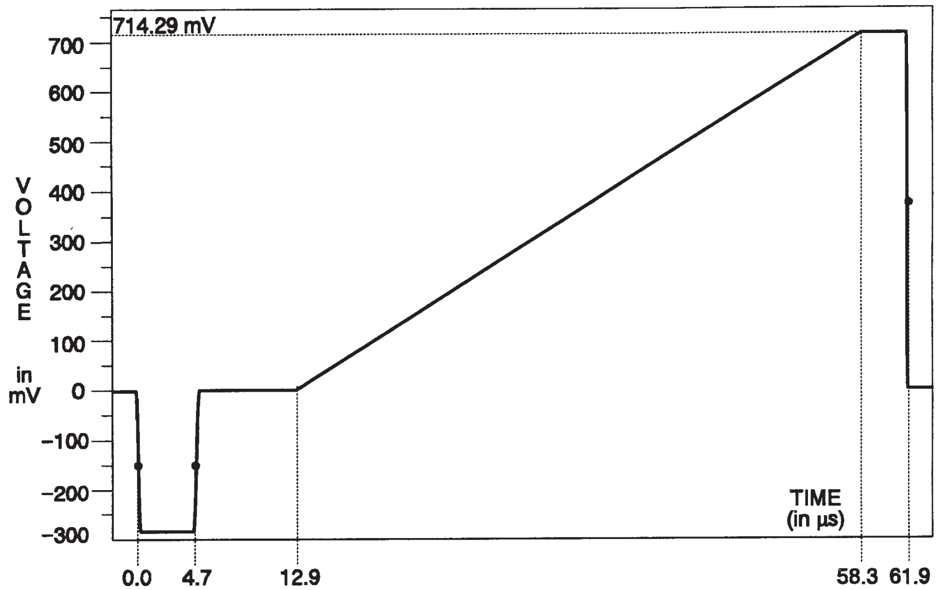


Figure 3–35: Y channel – ramp

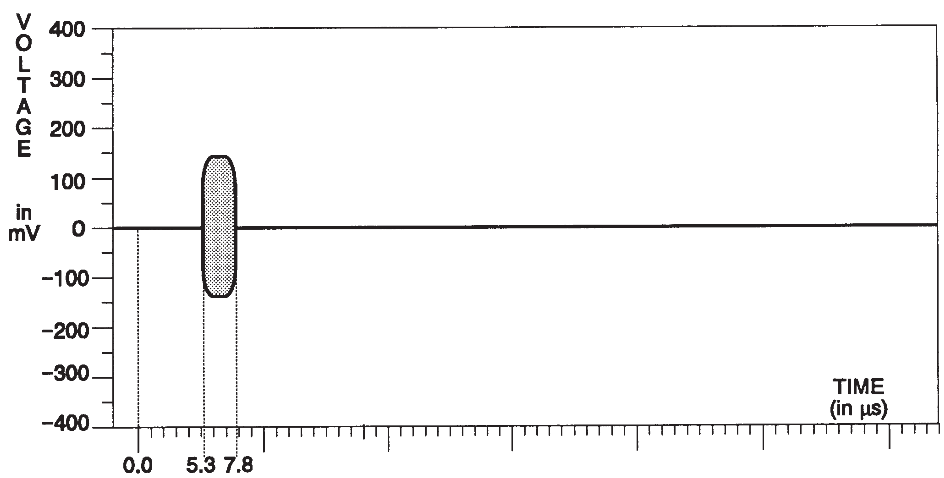


Figure 3–36: C channel – ramp

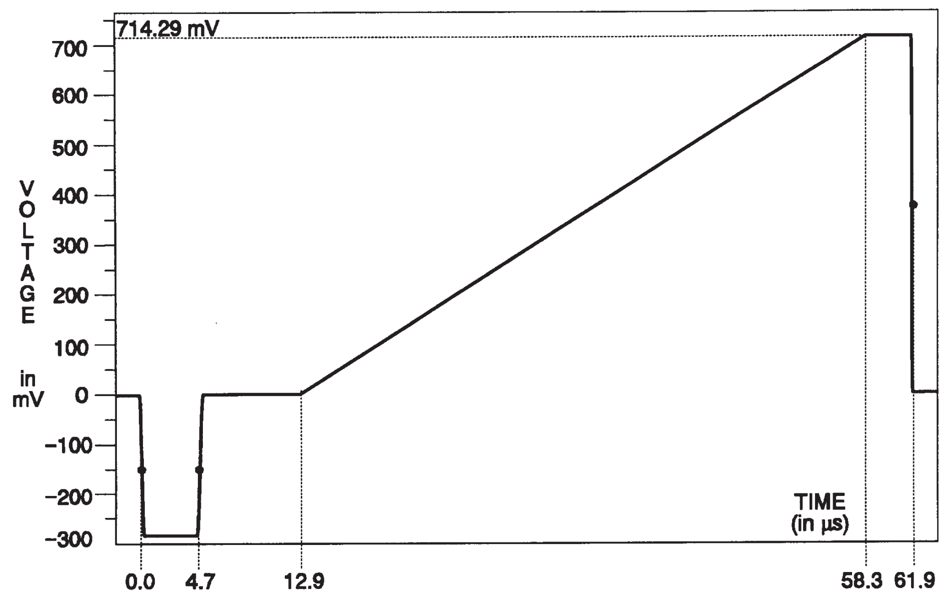


Figure 3–37: Y channel – modulated ramp

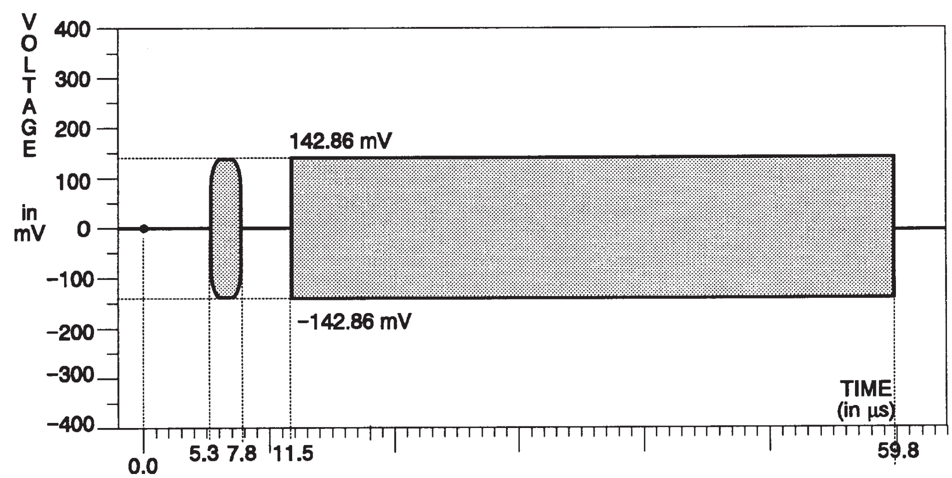


Figure 3–38: C channel – modulated ramp

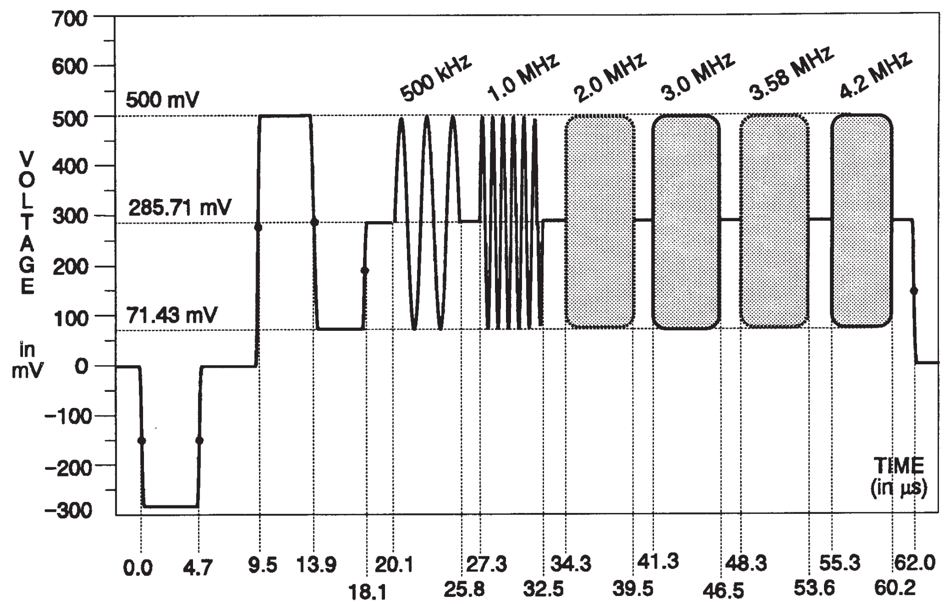


Figure 3–39: Y channel – multiburst

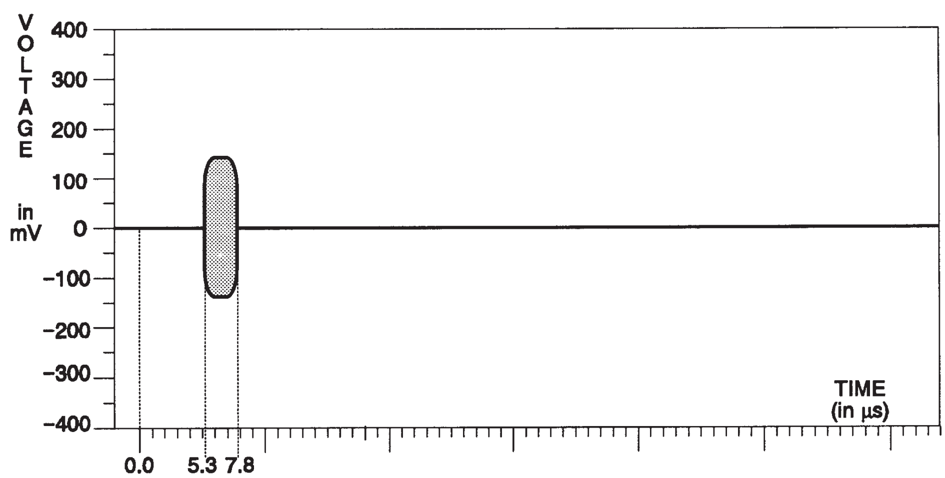


Figure 3–40: C channel – multiburst

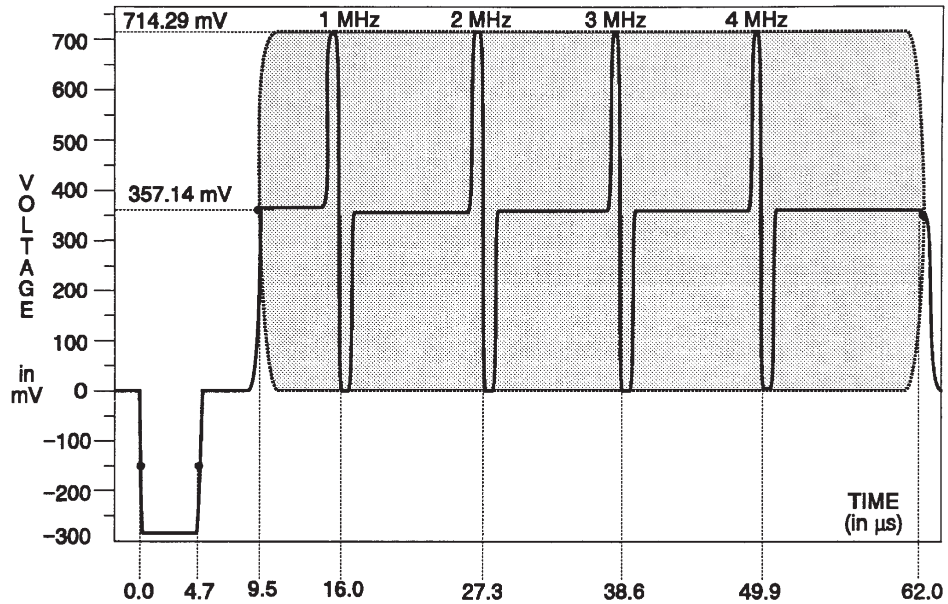


Figure 3–41: Y channel – sweep

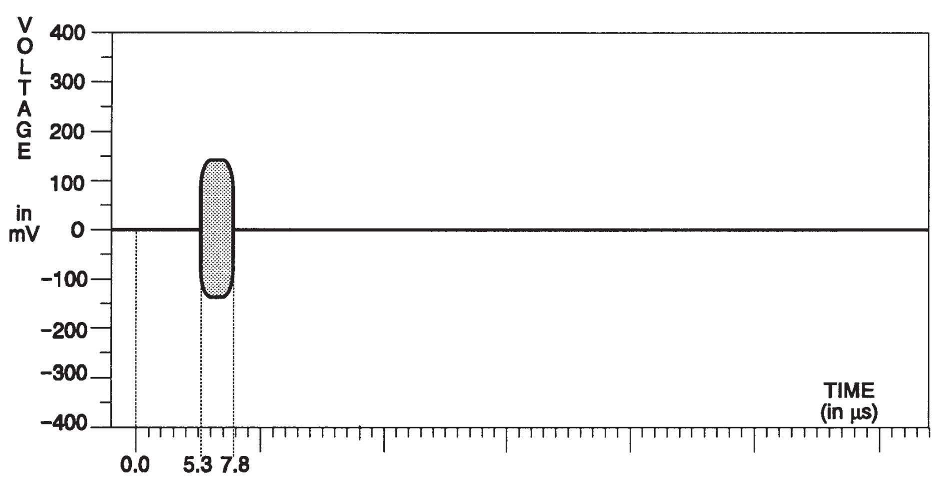


Figure 3–42: C channel – sweep

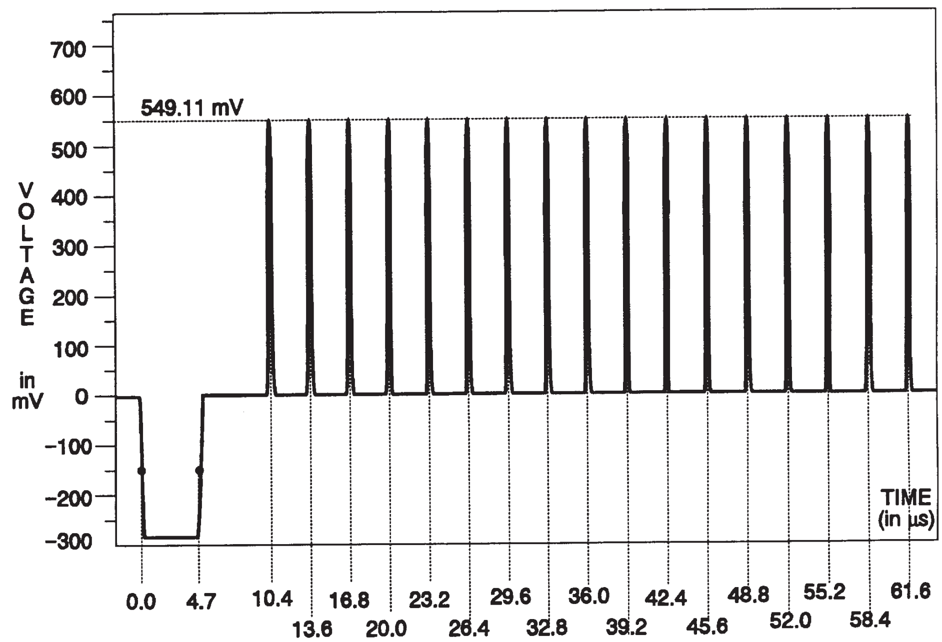


Figure 3–43: Y channel – convergence (vertical)

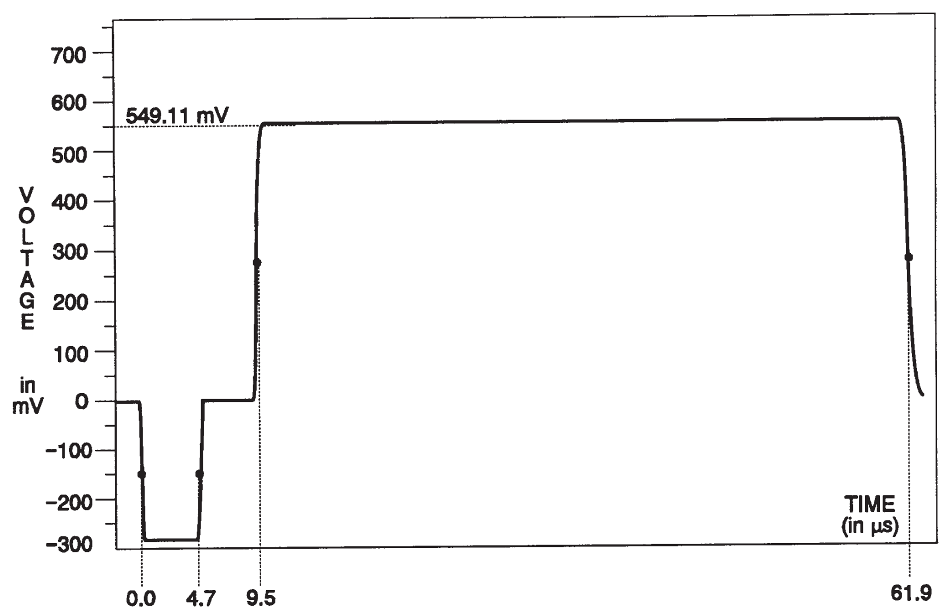


Figure 3–44: Y channel – convergence (horizontal)

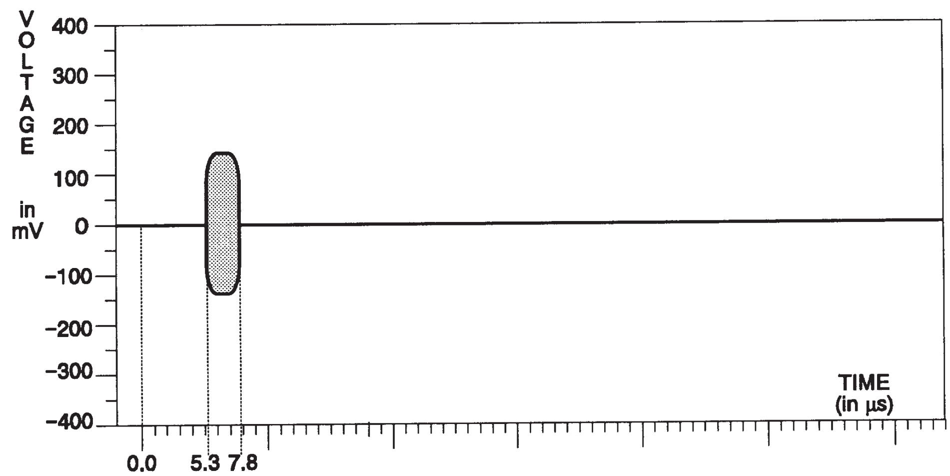


Figure 3–45: C channel – convergence

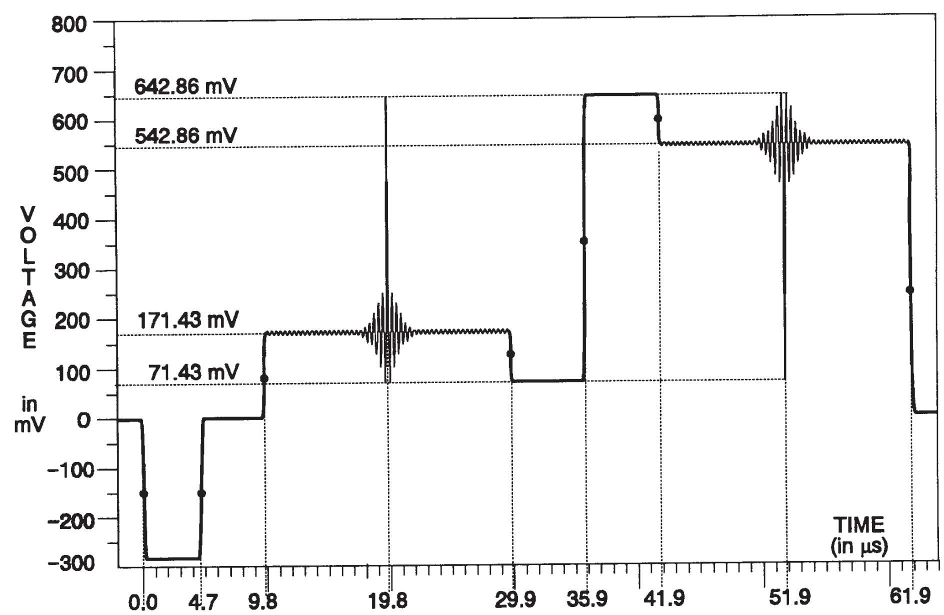


Figure 3–46: Y channel – sin(x)/x

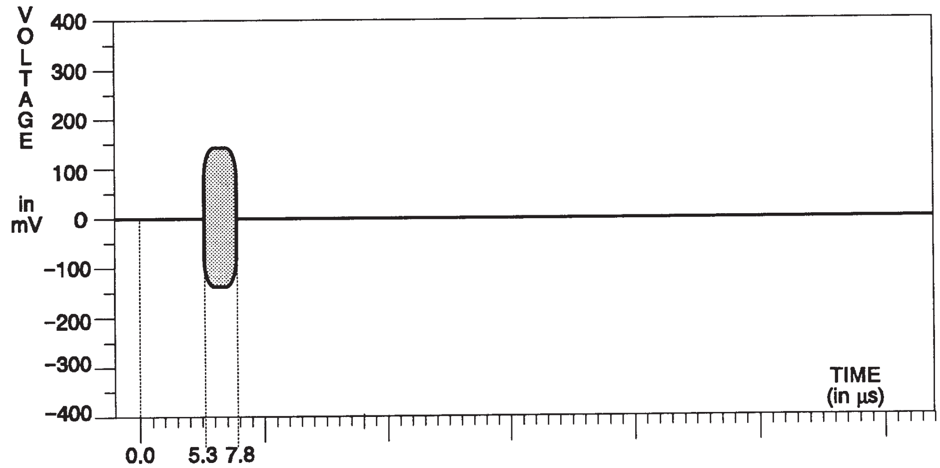


Figure 3–47: C channel – sin(x)/x

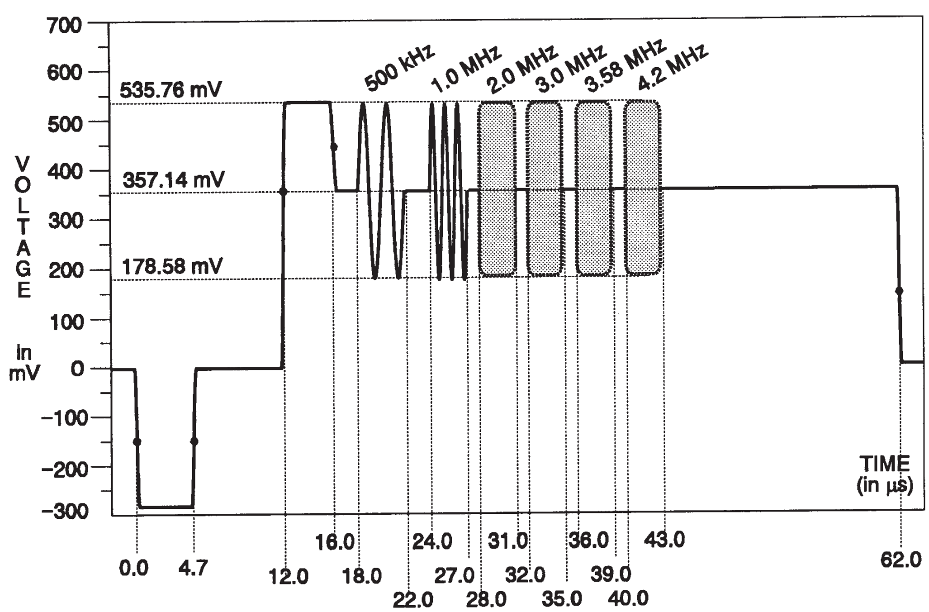


Figure 3–48: Y channel – NTC7 combination

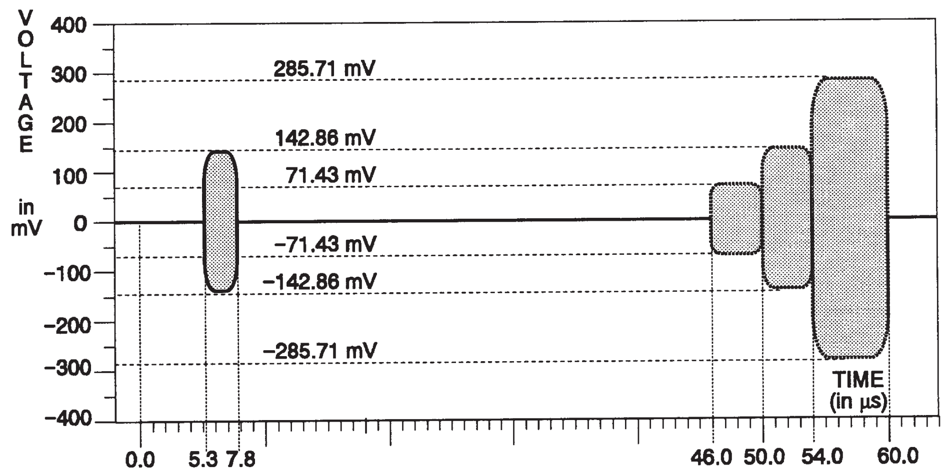


Figure 3–49: C channel – NTC7 combination

Betacam Component Signals (3–Wire)

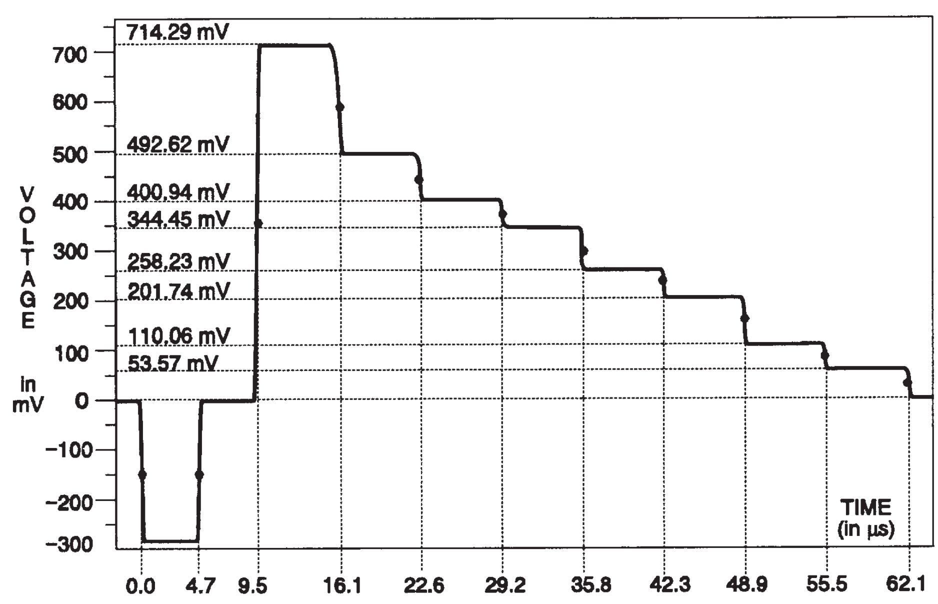


Figure 3–50: Y channel – 75% bars

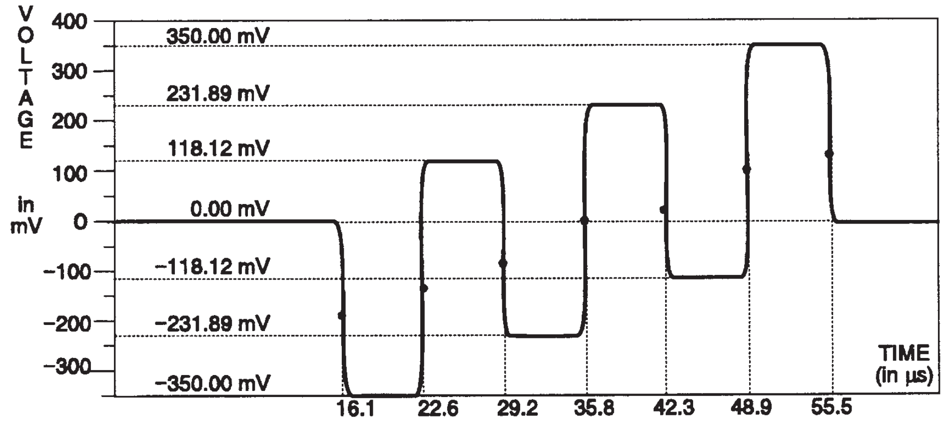


Figure 3–51: B–Y channel – 75% bars

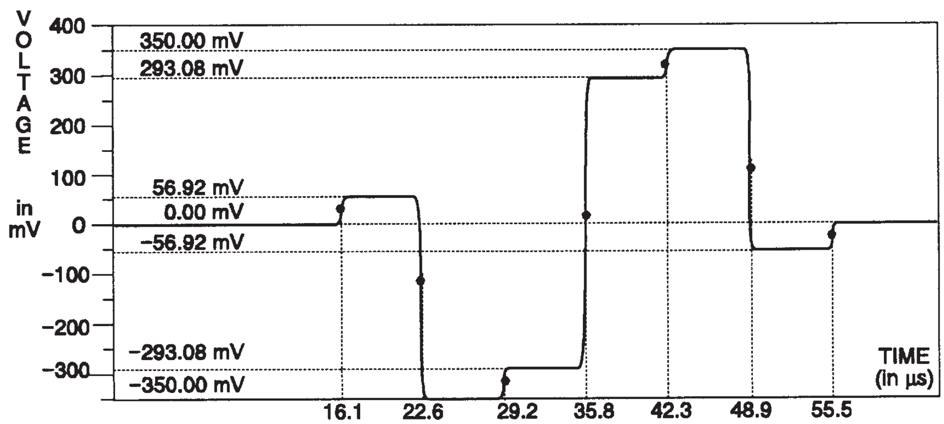


Figure 3–52: R–Y channel – 75% bars

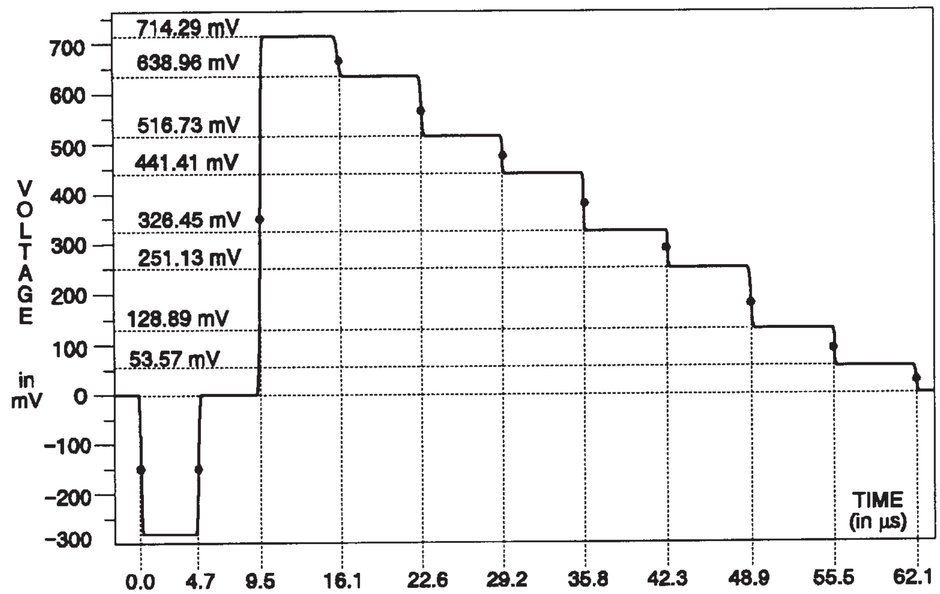


Figure 3–53: Y channel – 100% bars

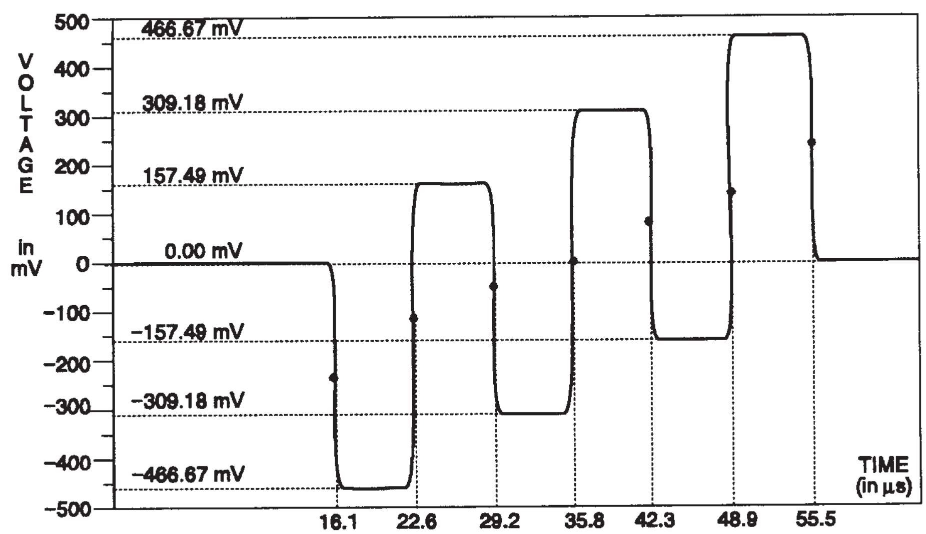


Figure 3–54: B–Y channel – 100% bars

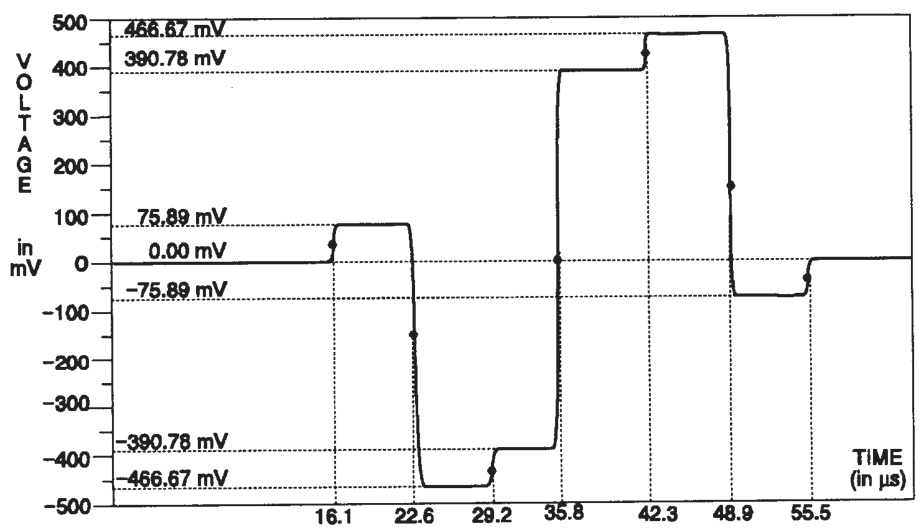


Figure 3–55: R–Y channel – 100% bars

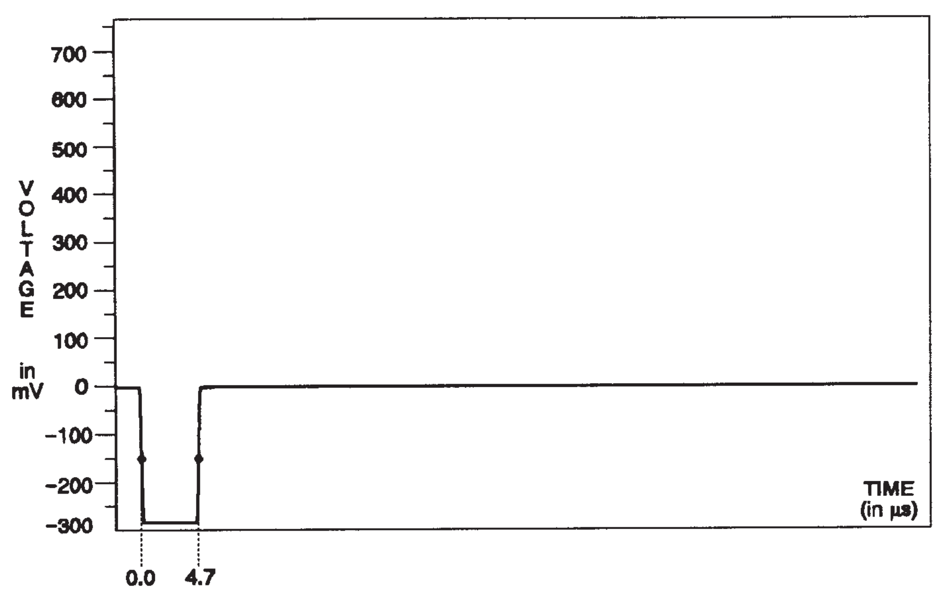


Figure 3–56: Y channel – 0% flat field

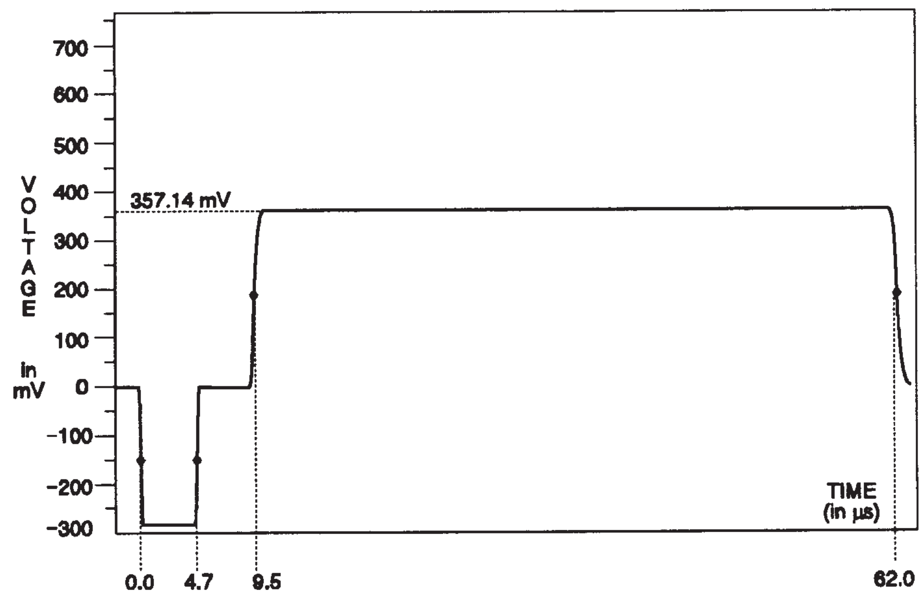


Figure 3–57: Y channel – 50% flat field

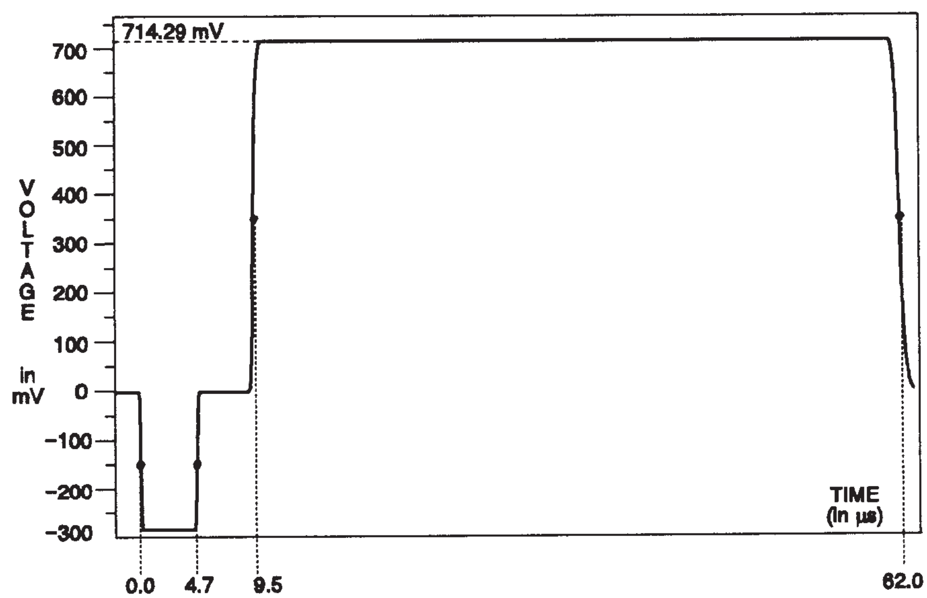


Figure 3–58: Y channel – 100% flat field

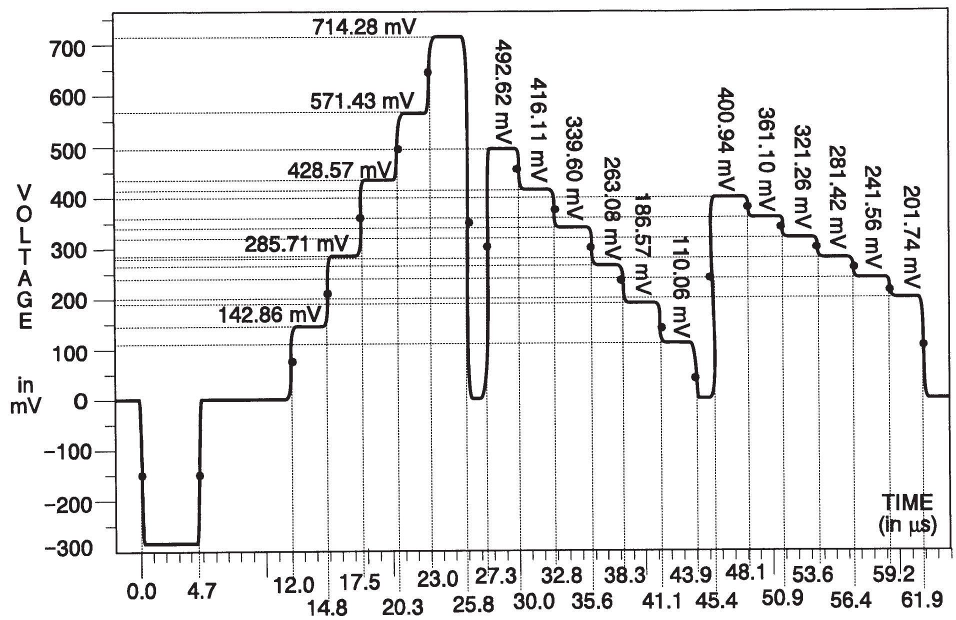


Figure 3–59: Y channel – valid 5 step

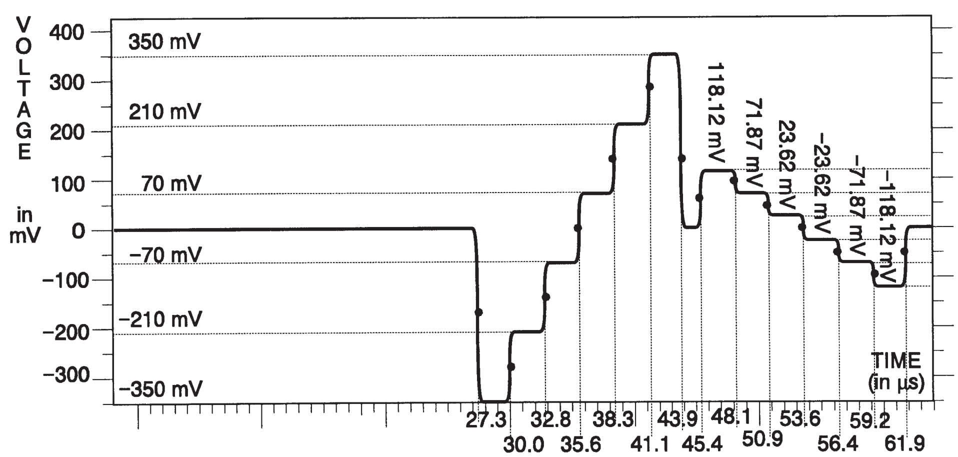


Figure 3–60: B–Y channel – valid 5 step

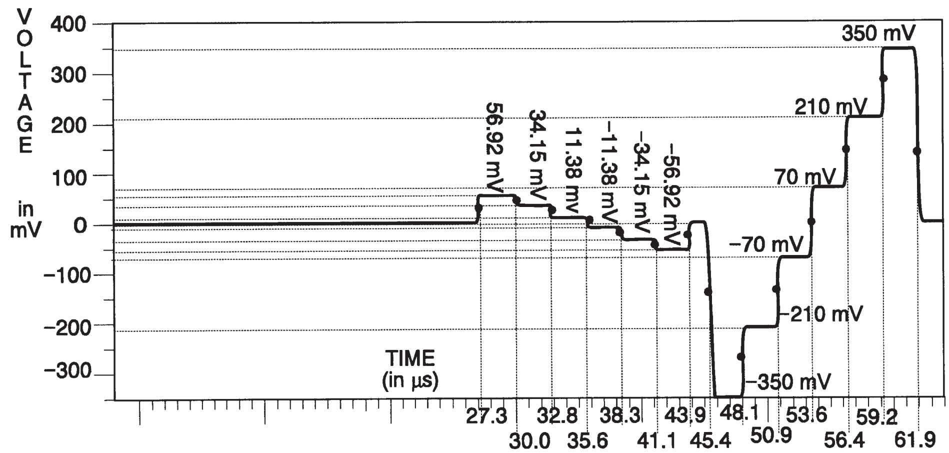


Figure 3–61: R–Y channel – valid 5 step

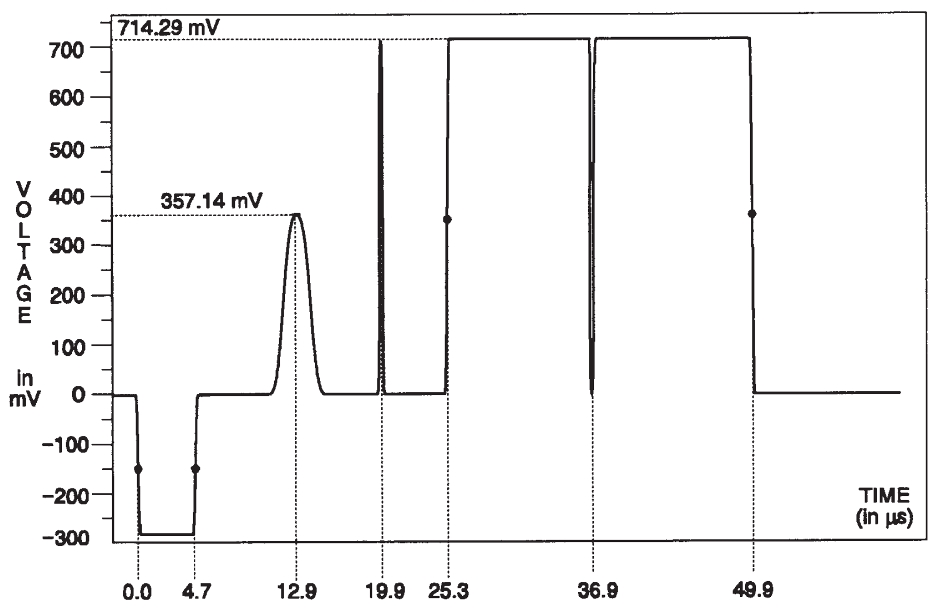


Figure 3–62: Y channel – pulse and bar with window

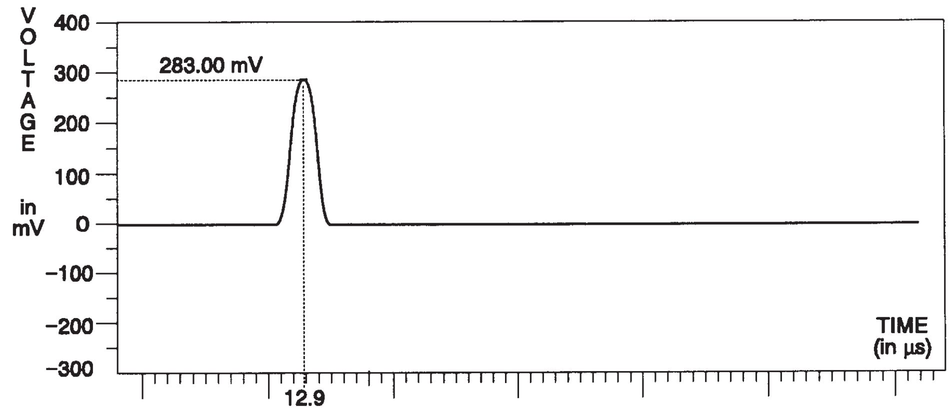


Figure 3–63: B–Y channel – pulse and bar with window

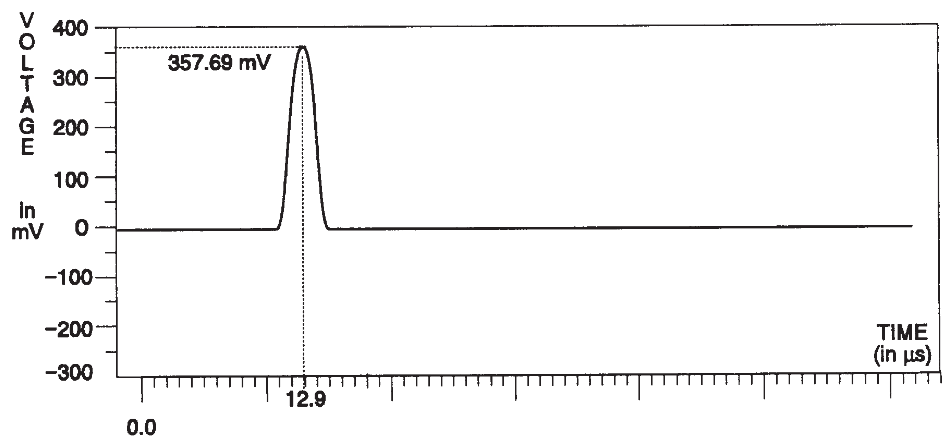


Figure 3–64: R–Y channel – pulse and bar with window

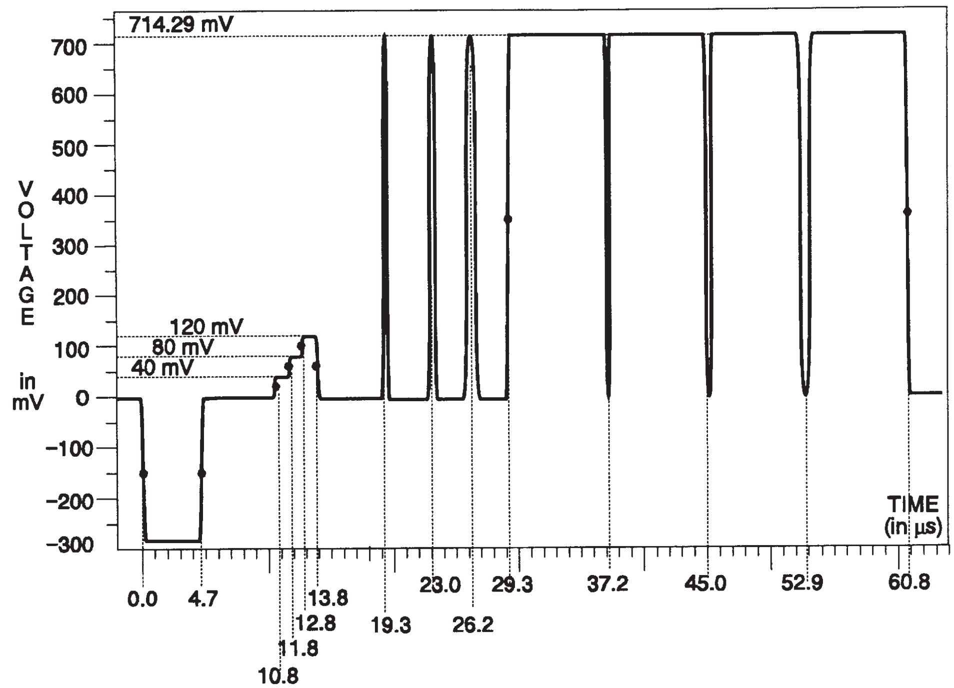


Figure 3–65: Y channel – T pulses

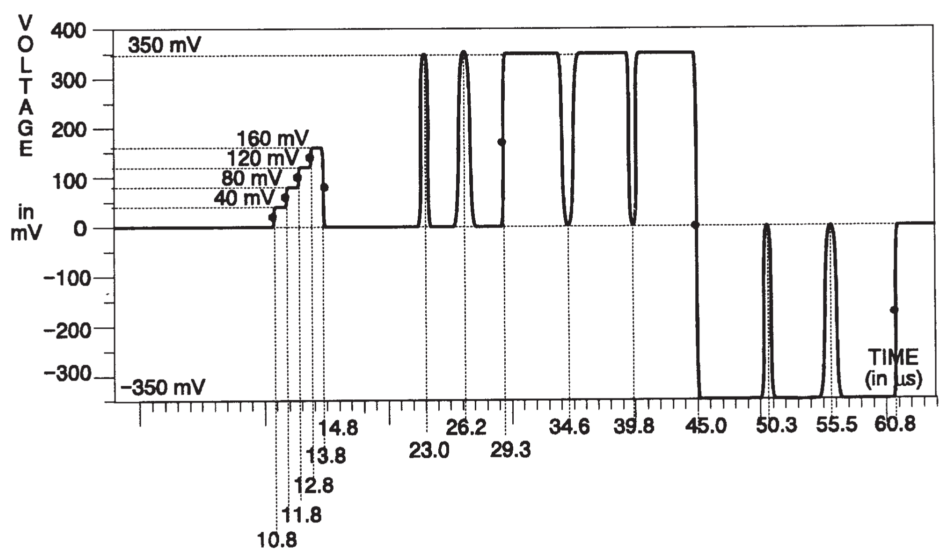


Figure 3–66: B–Y and R–Y channels – T pulses

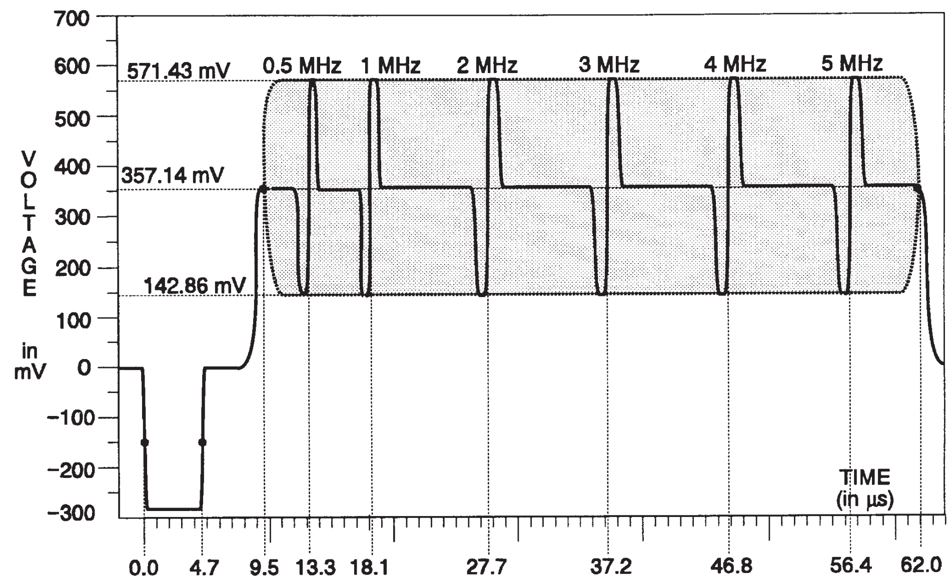


Figure 3–67: Y channel – line sweep

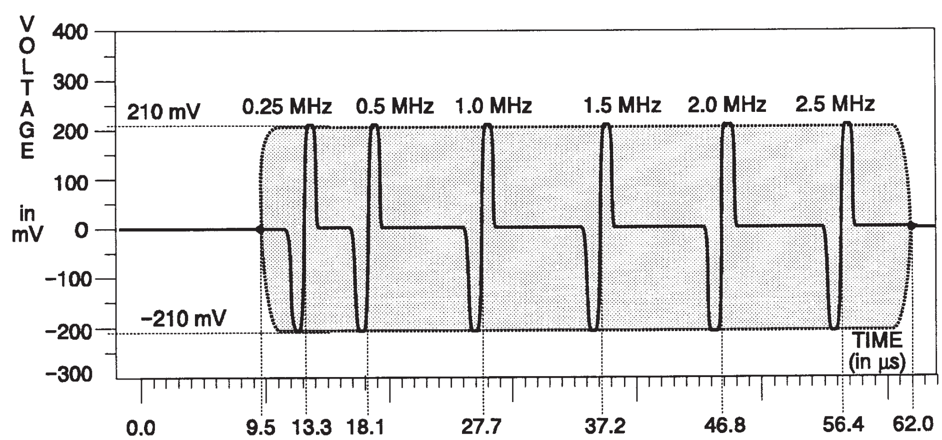


Figure 3–68: B–Y and R–Y channel – line sweep

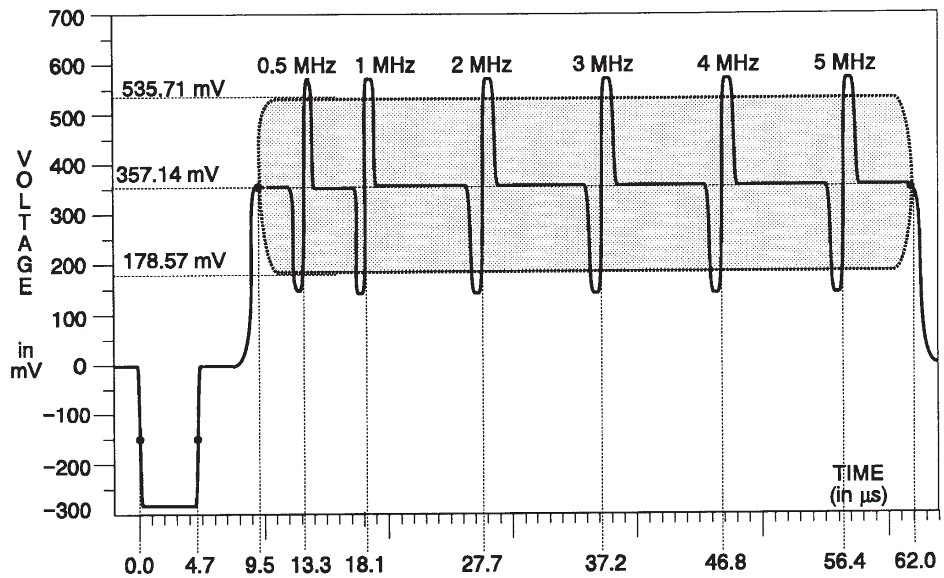


Figure 3–69: Y channel – reduced line sweep

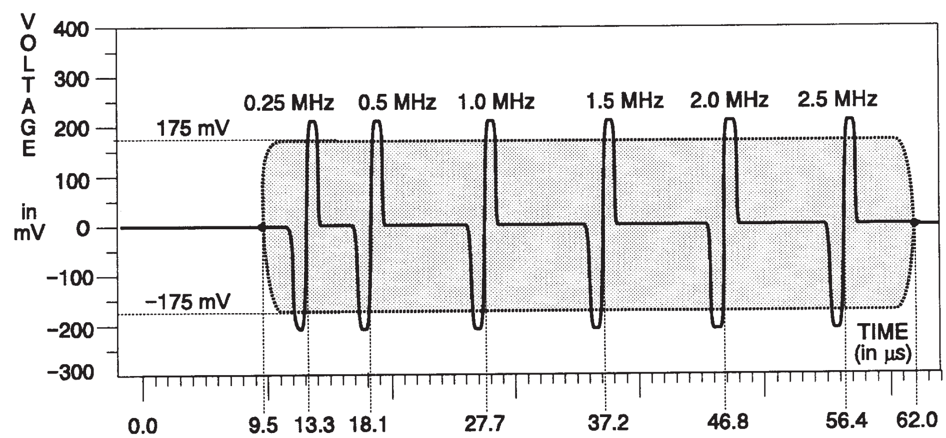


Figure 3–70: B–Y and R–Y channel – reduced line sweep

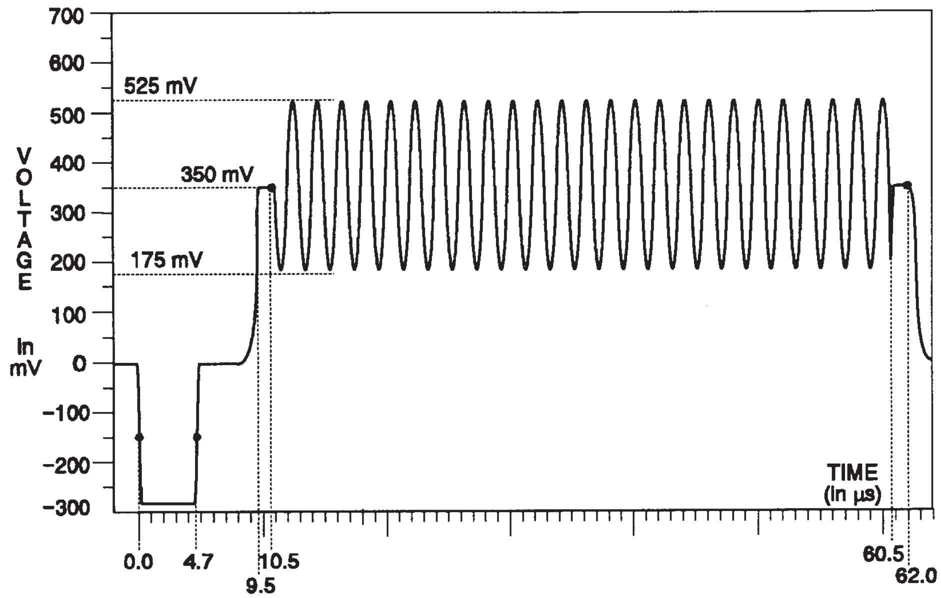


Figure 3–71: Y channel – bowtie

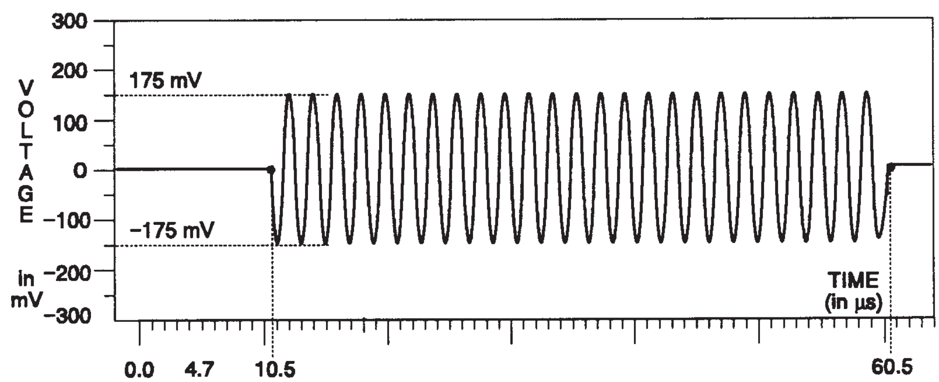


Figure 3–72: B–Y and R–Y channels – bowtie

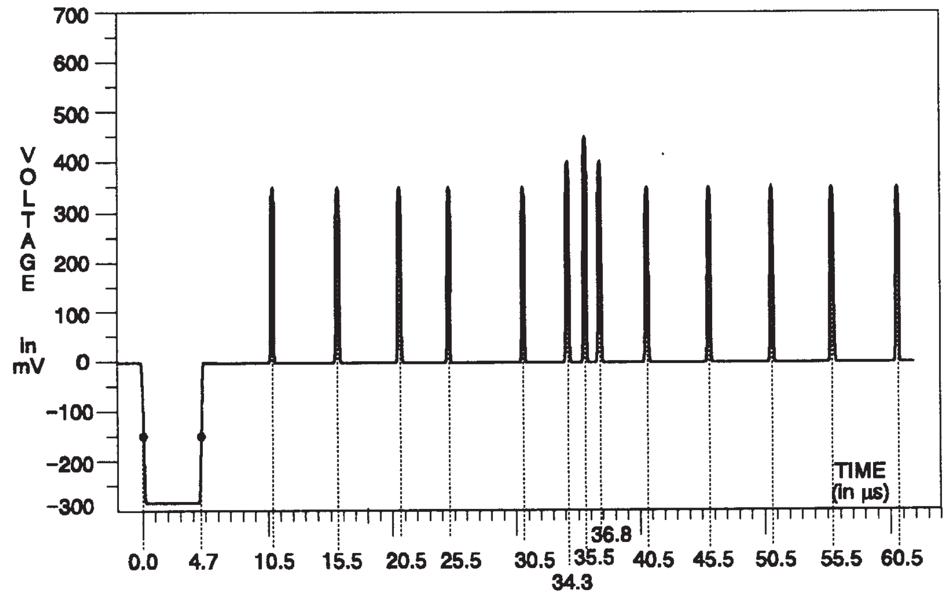


Figure 3–73: Y channel – bowtie markers

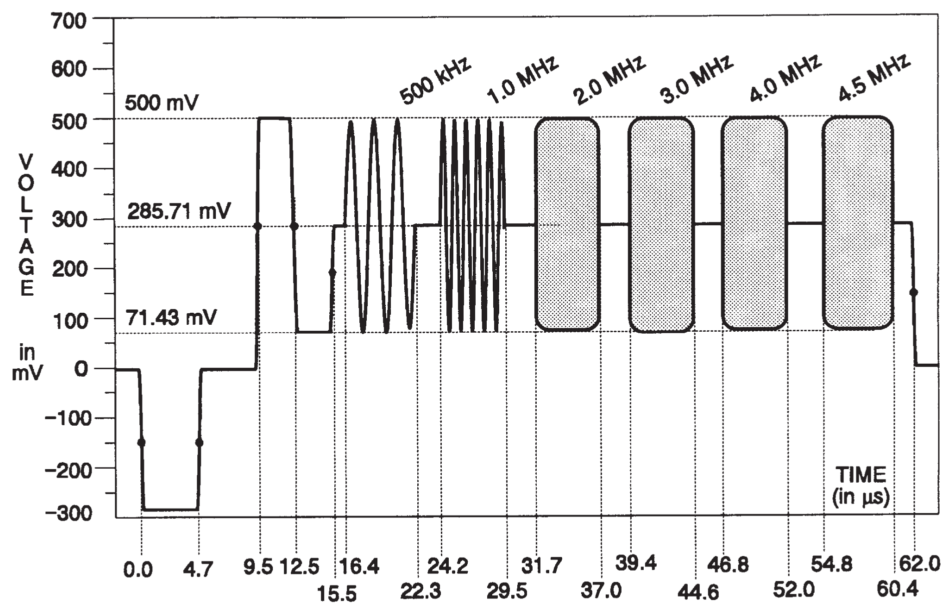


Figure 3–74: Y channel – multiburst

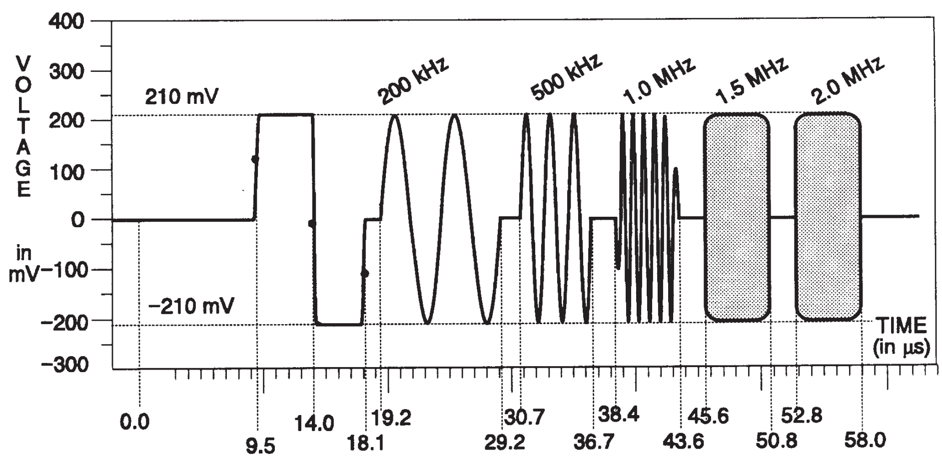


Figure 3–75: B–Y and R–Y channels – multiburst

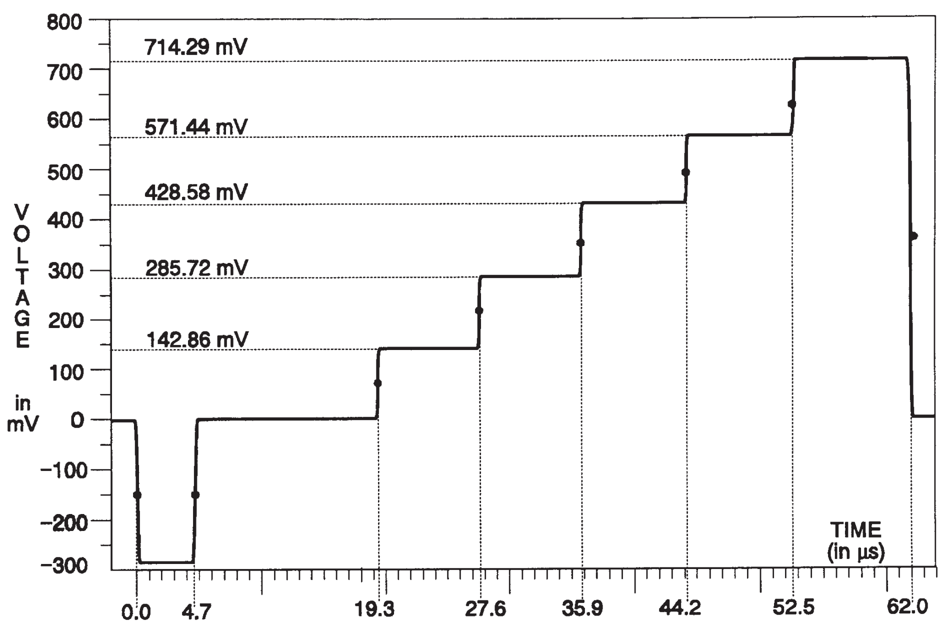


Figure 3–76: Y channel – 5 step (matrix only)

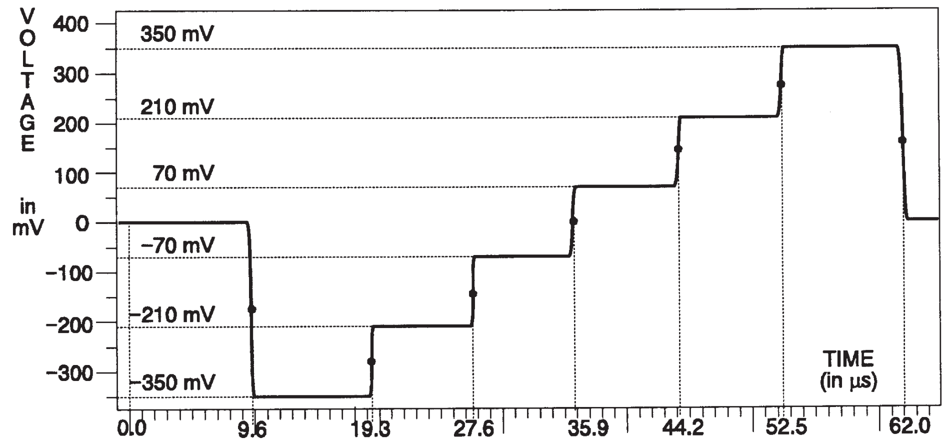


Figure 3–77: B–Y and R–Y channels – 5 step (matrix only)

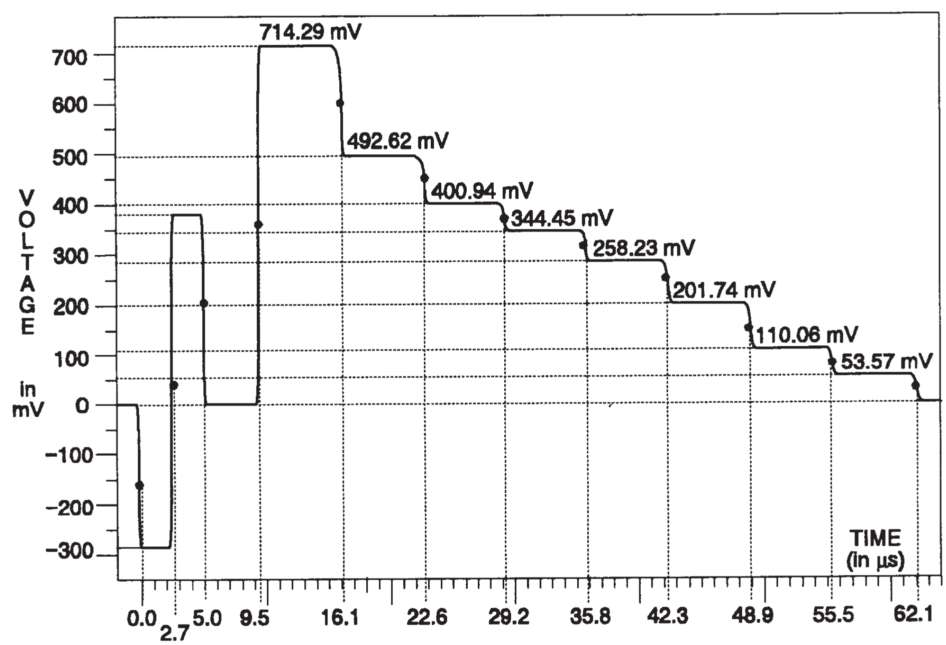


Figure 3–78: Y channel – 75% bars (SN B020000 to B039999)

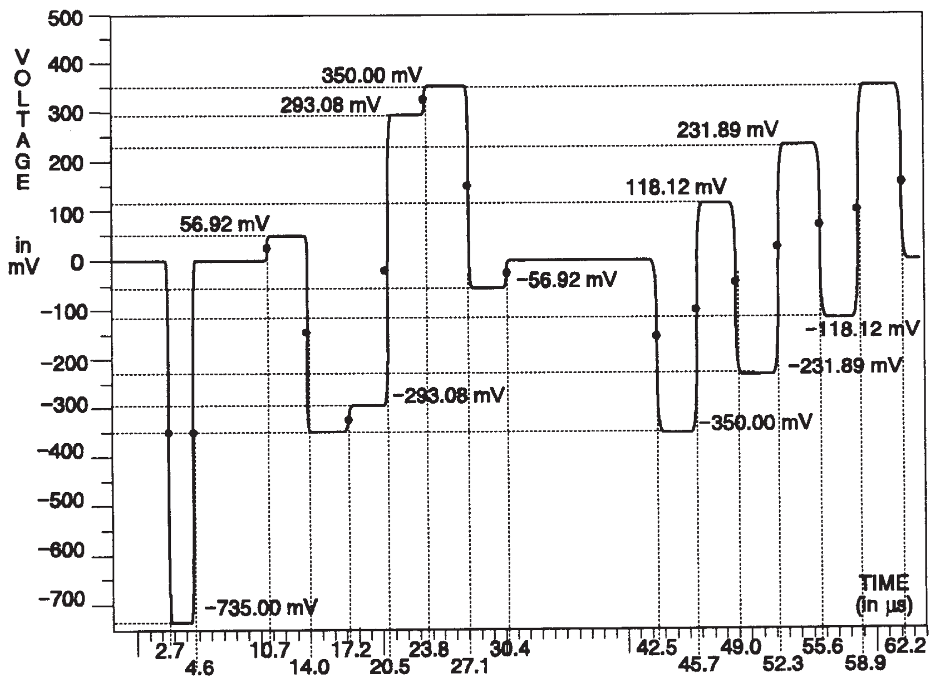


Figure 3–79: C channel – 75% bars (SN B020000 to B039999)

CTDM Format Betacam (2 Wire)

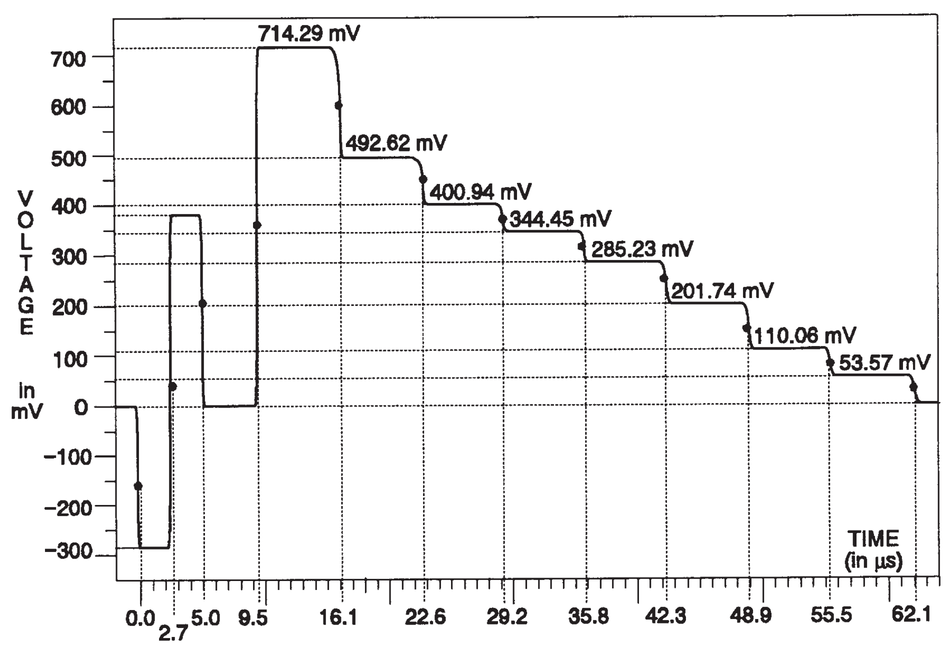


Figure 3–80: Y channel – 75% bars (SN B0199999 and below)

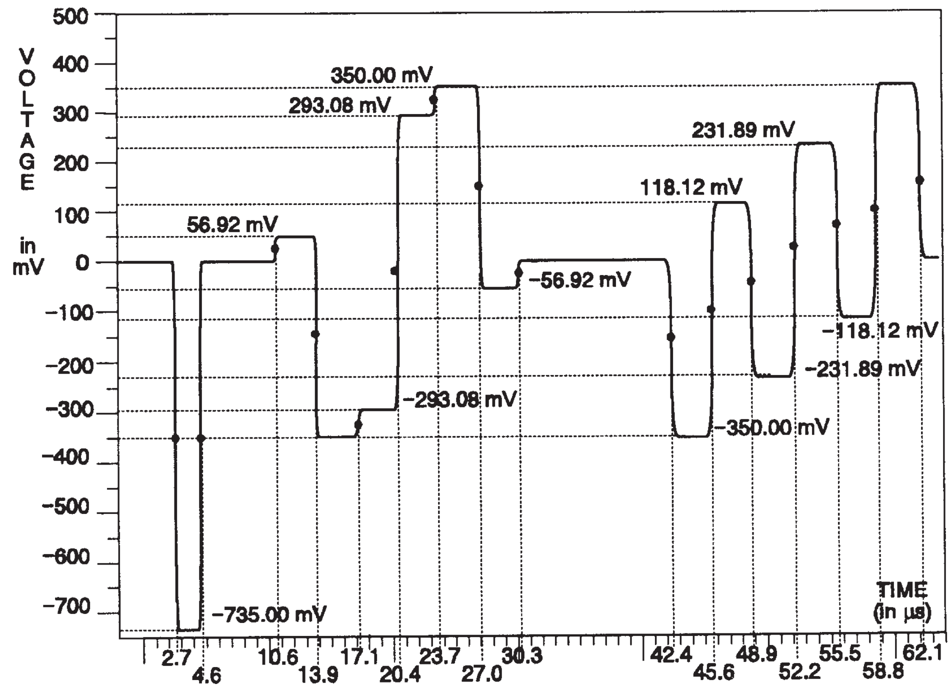


Figure 3–81: C channel – 75% bars (SN B0199999 and below)

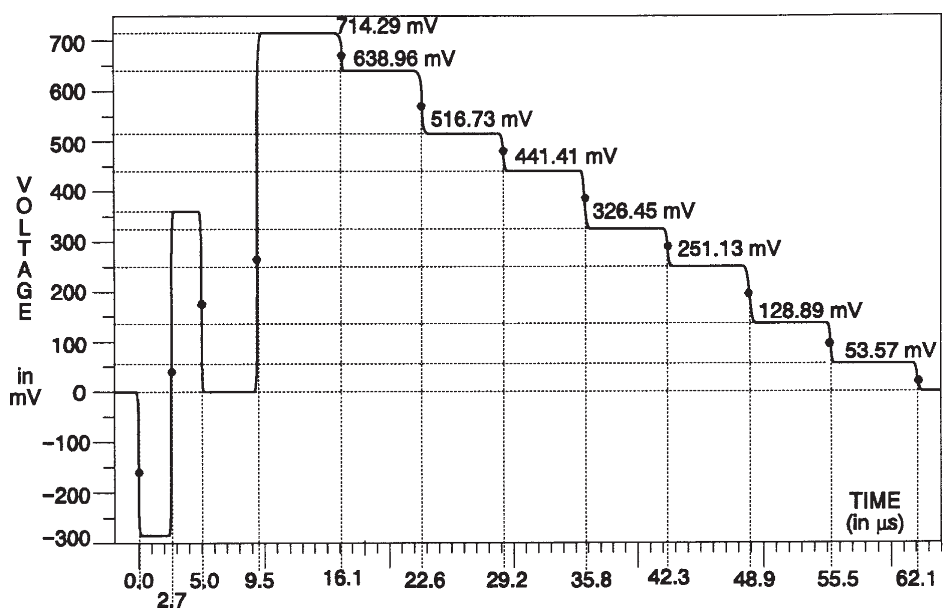


Figure 3–82: Y channel – 100% bars

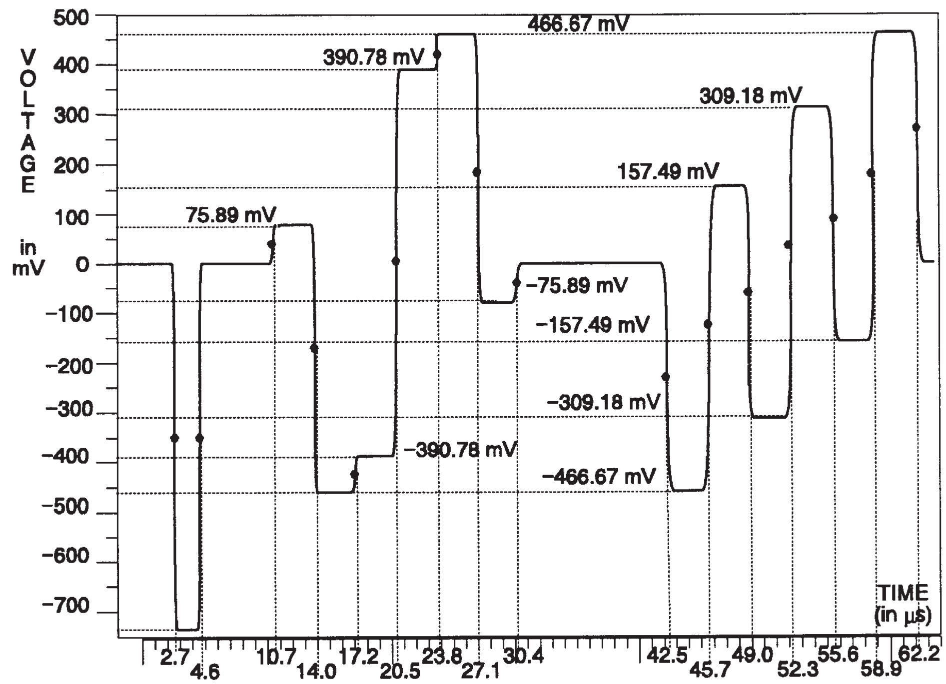


Figure 3–83: C channel – 100% bars (SN B020000 to B039999)

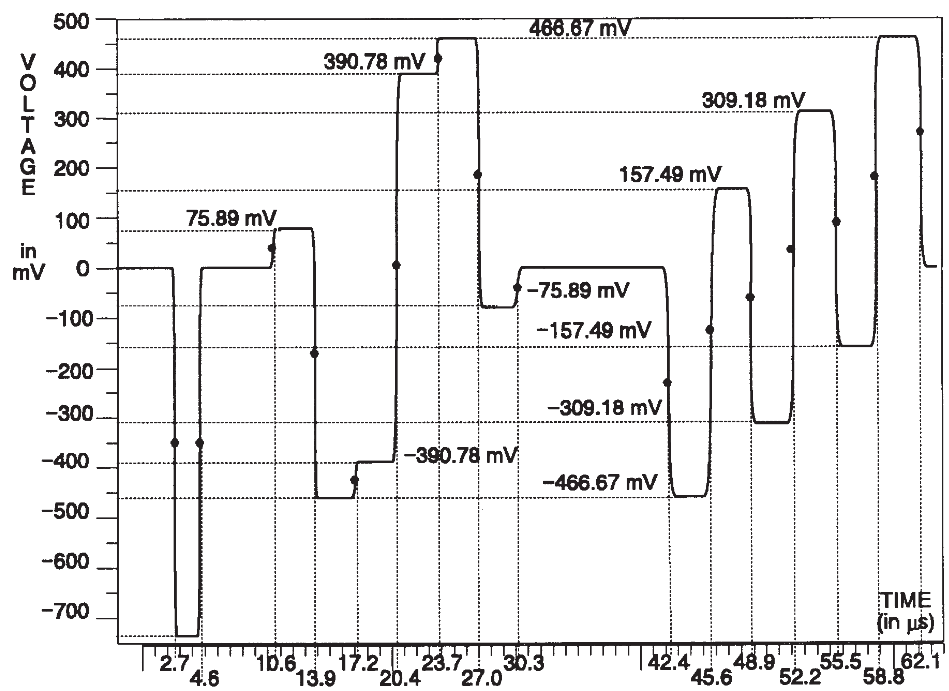


Figure 3–84: C channel – 100% bars (SN B019999 and below)

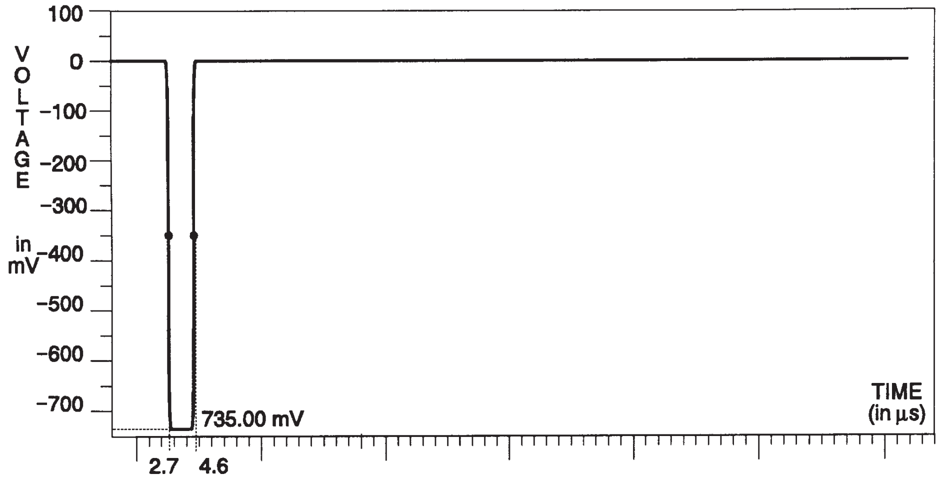


Figure 3–85: C channel – flat field signals

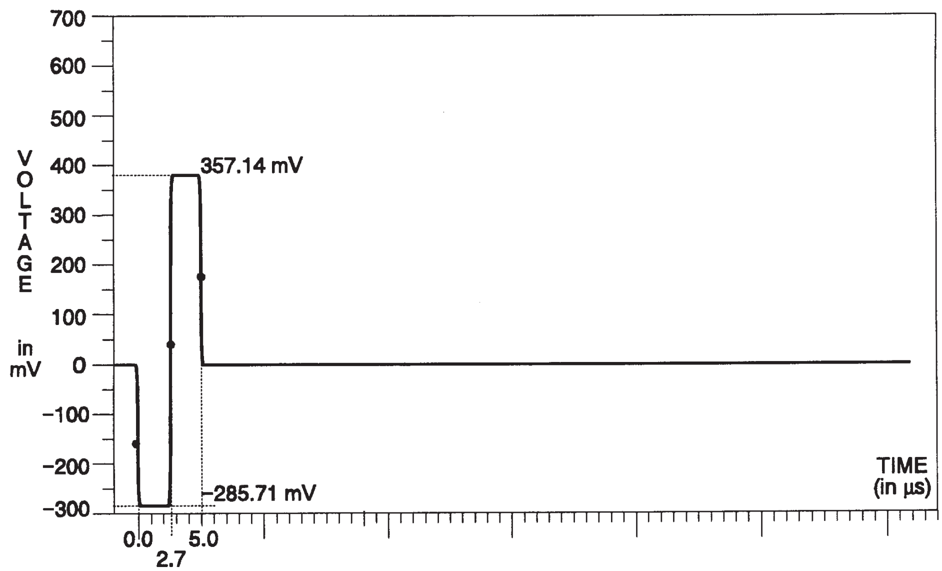


Figure 3–86: Y channel – 0% flat field

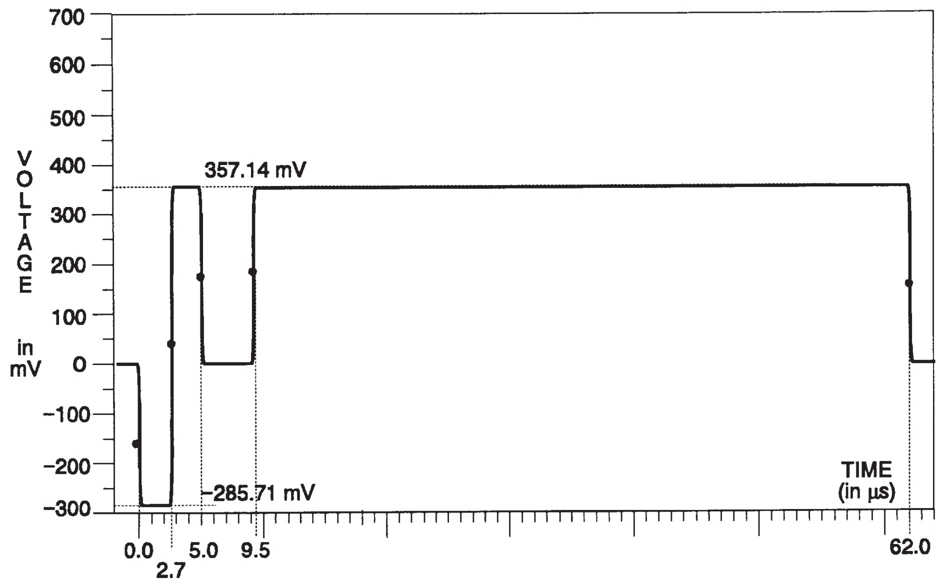


Figure 3–87: Y channel – 50% flat field

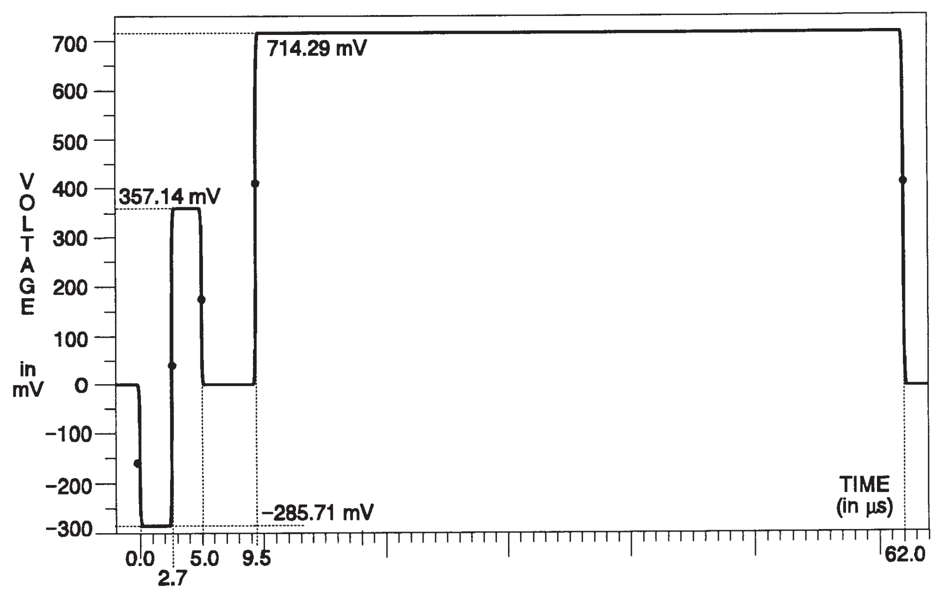


Figure 3–88: Y channel – 100% flat field

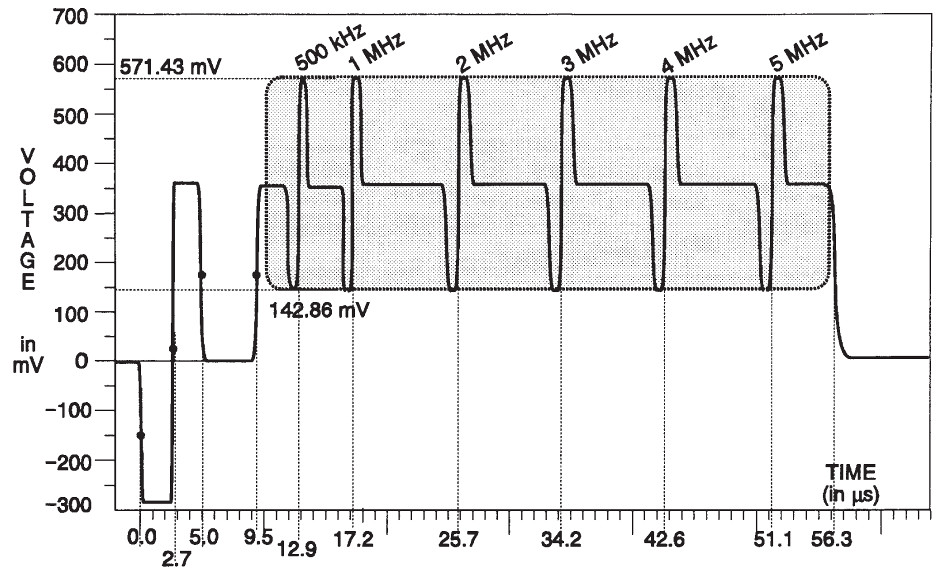


Figure 3–89: Y channel – line sweep

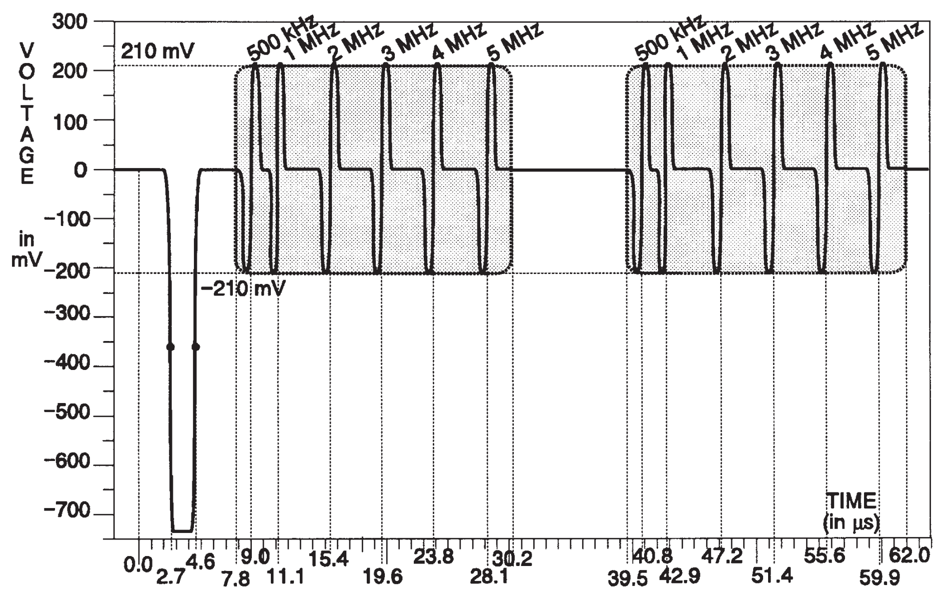


Figure 3–90: C channel – line sweep

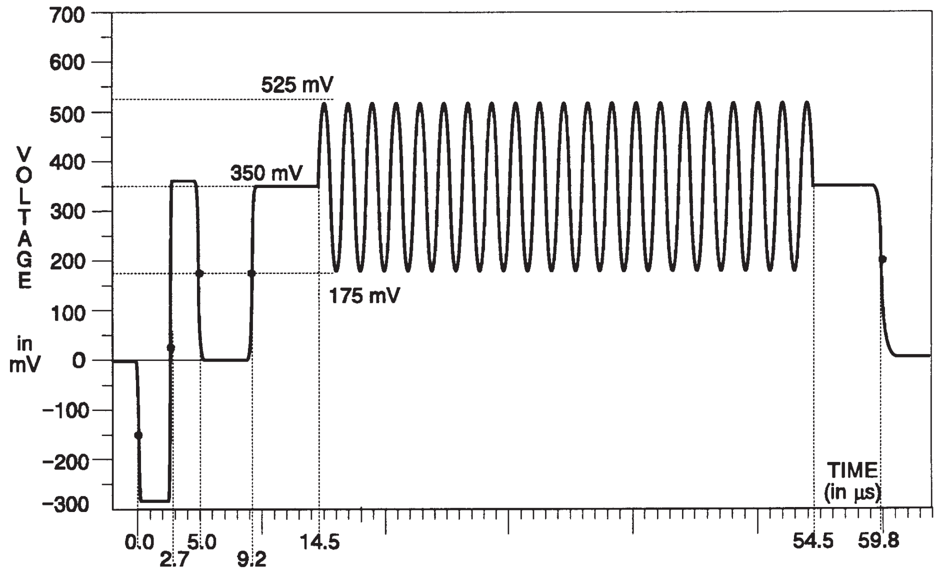


Figure 3–91: Y channel – channel timing (bowtie)

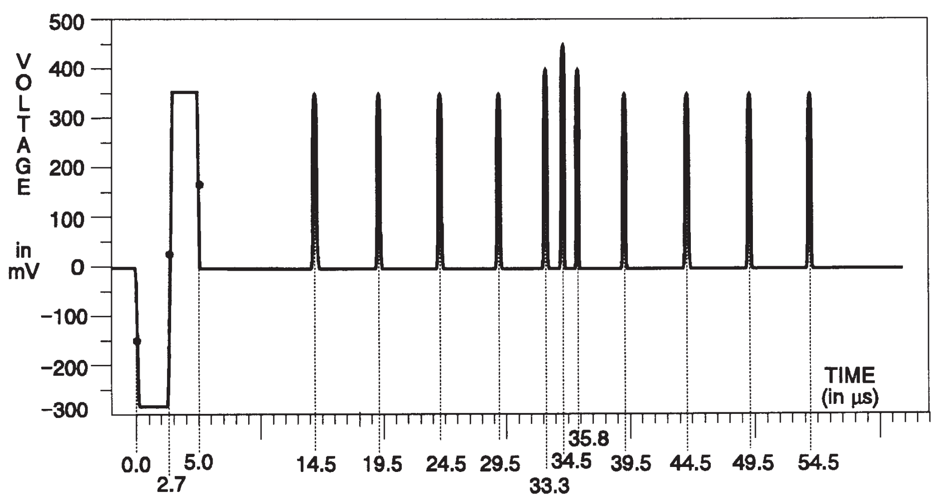


Figure 3–92: Y channel – channel timing (bowtie markers)

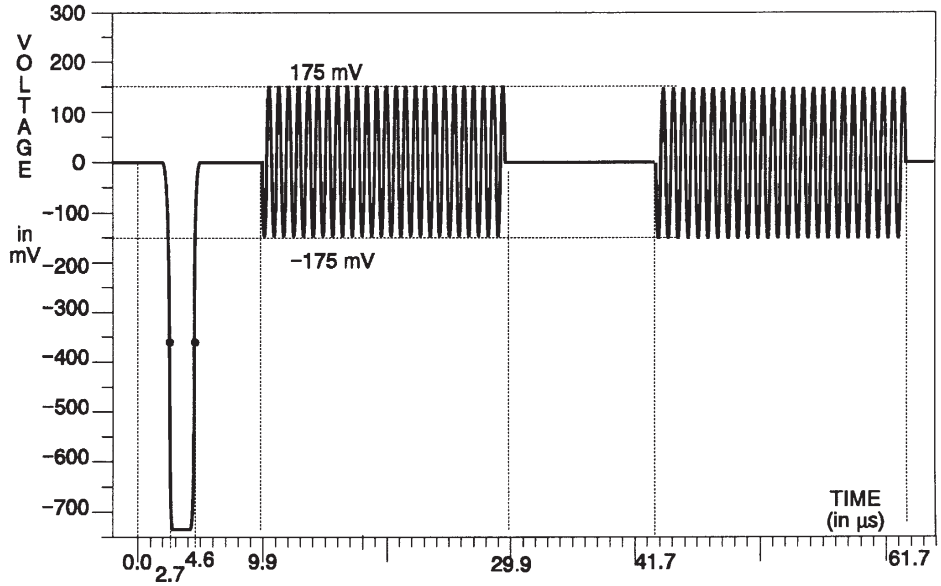


Figure 3–93: C channel – channel timing (bowtie, SN B020000 to B039999)

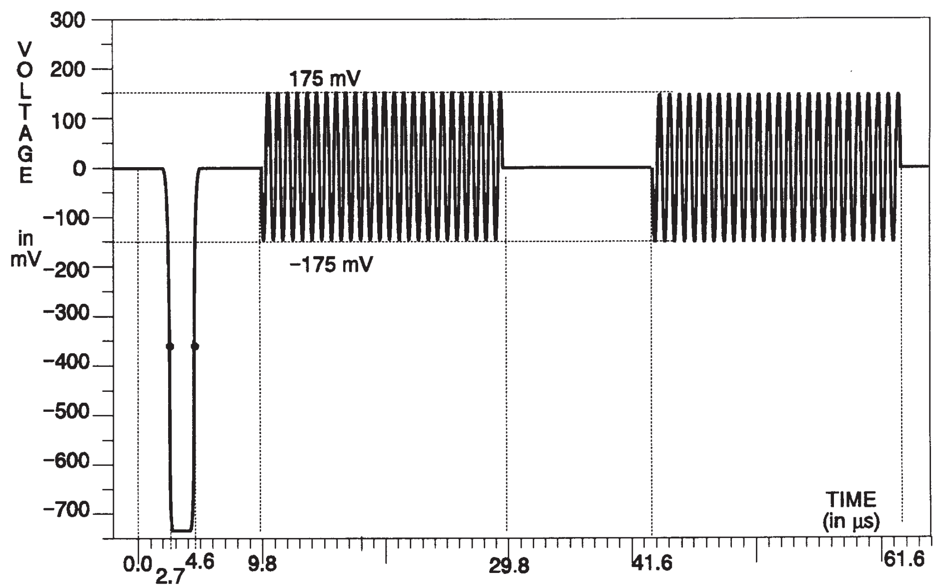


Figure 3–94: C channel – channel timing (bowtie, SN B019999 and below)

GBR Signals

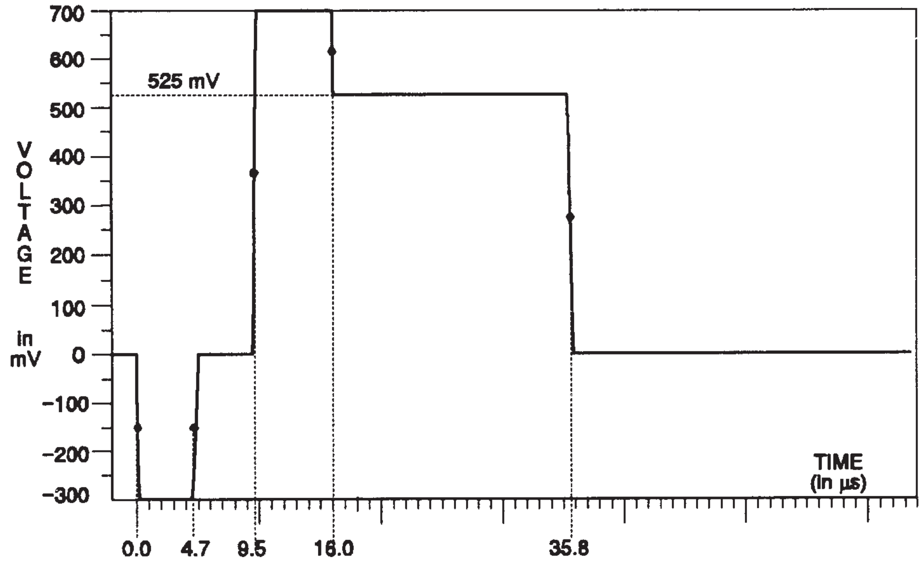


Figure 3–95: Green channel – 75% color bars

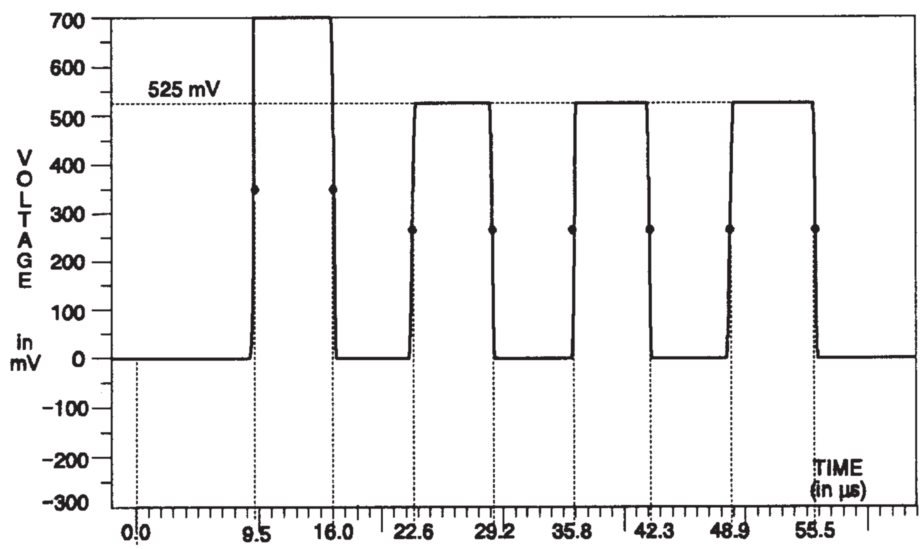


Figure 3–96: Blue channel – 75% color bars

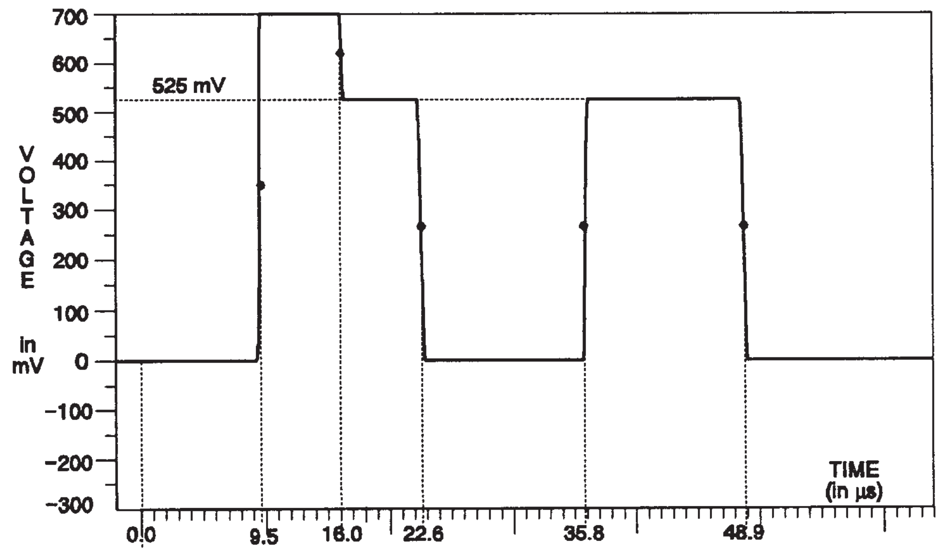


Figure 3–97: Red channel – 75% color bars

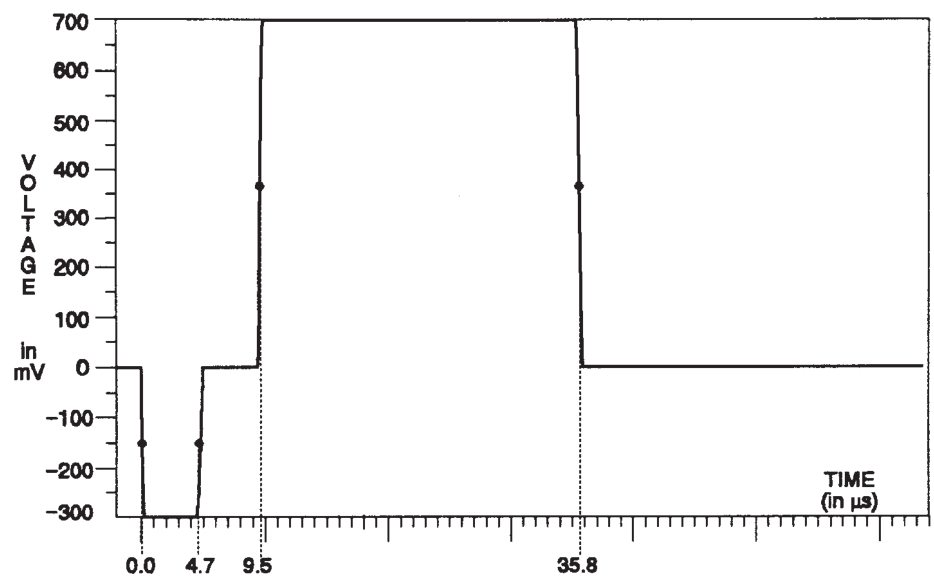


Figure 3–98: Green channel – 100% color bars

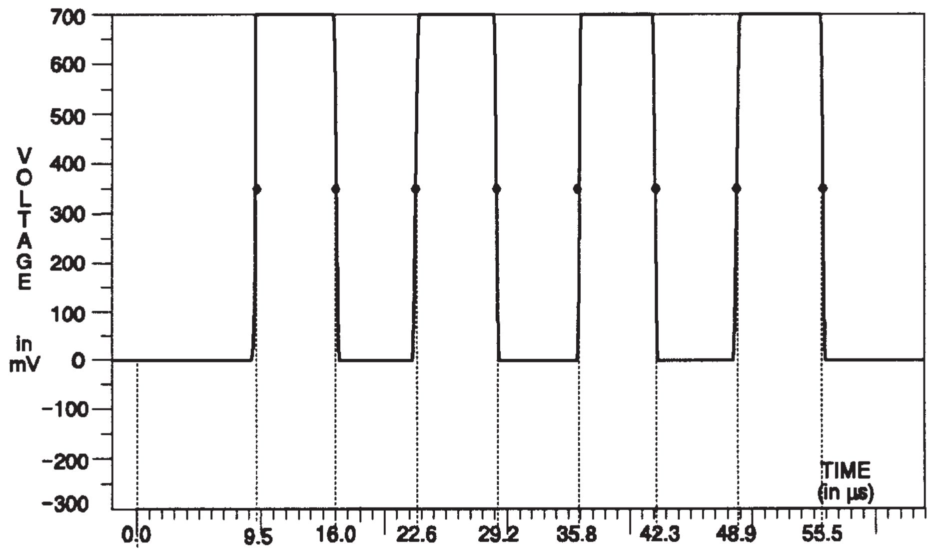


Figure 3–99: Blue channel – 100% color bars

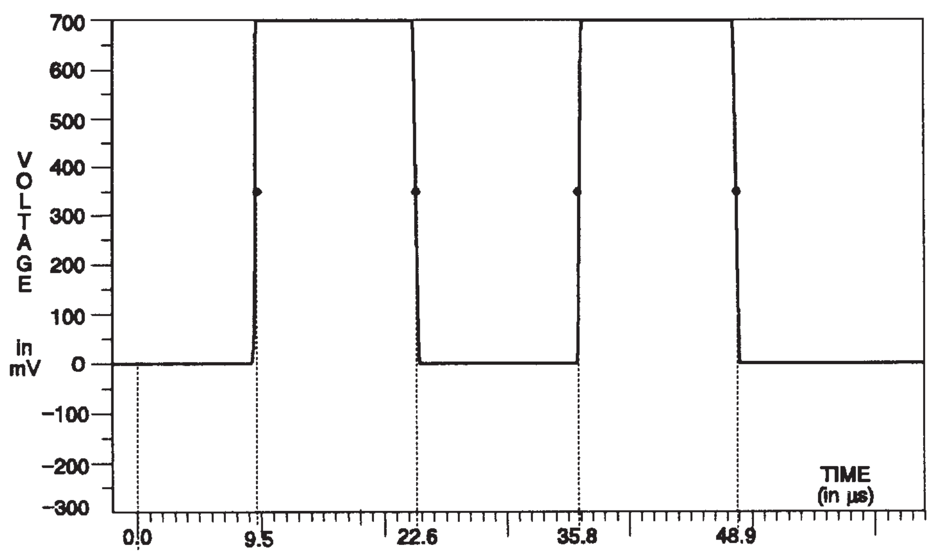


Figure 3–100: Red channel – 100% color bars

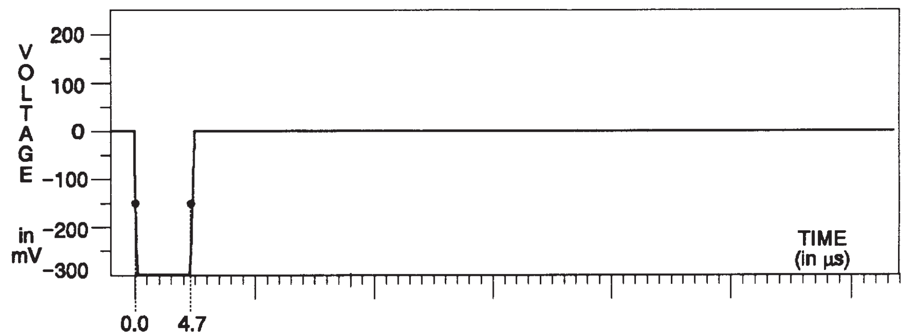


Figure 3–101: Green channel – red field

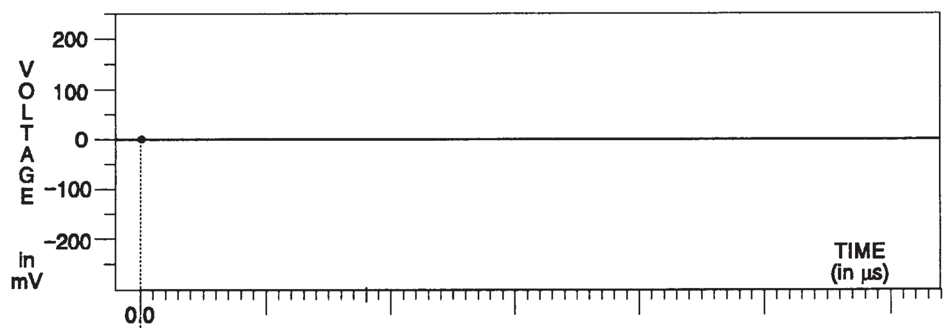


Figure 3–102: Blue channel – red field

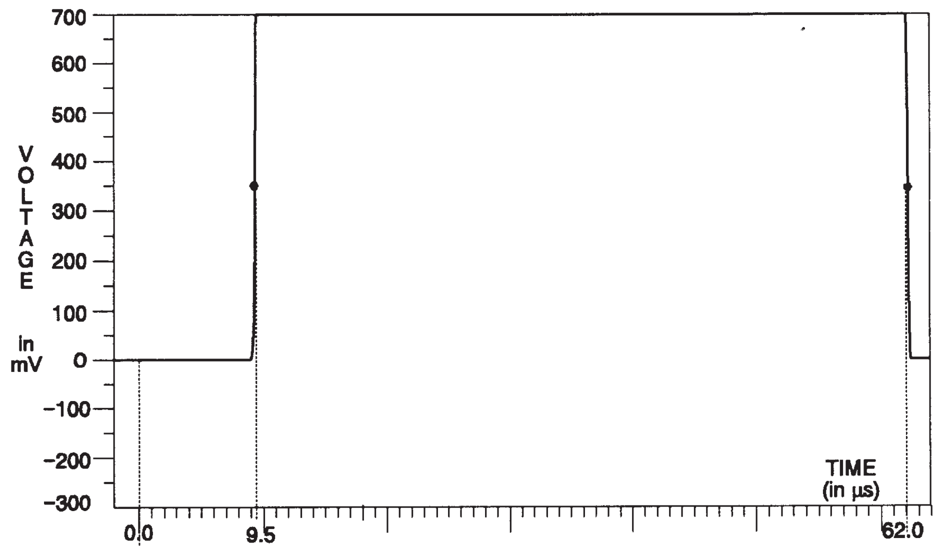


Figure 3–103: Red channel – red field

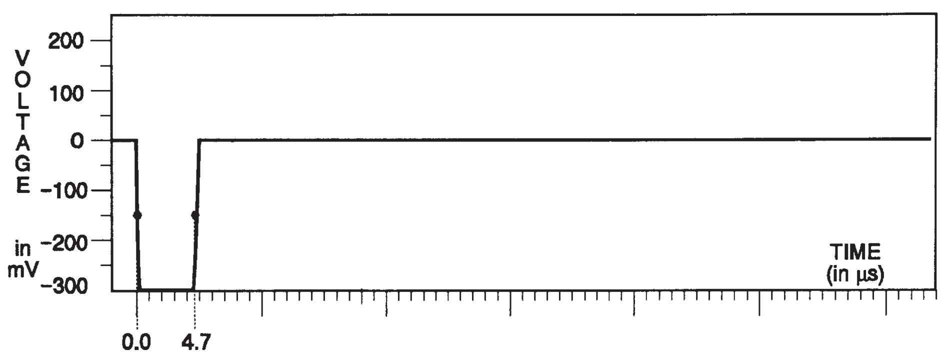


Figure 3–104: Green channel – blue field

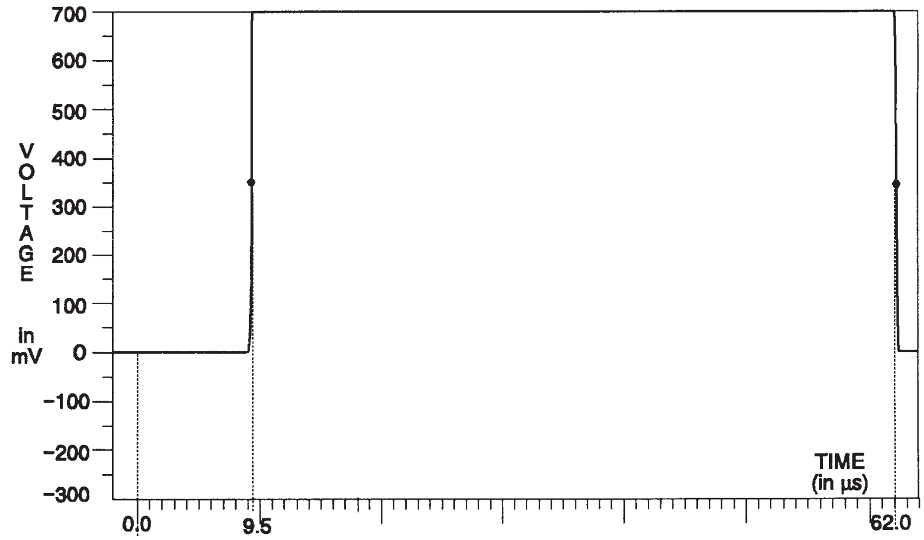


Figure 3–105: Blue channel – blue field

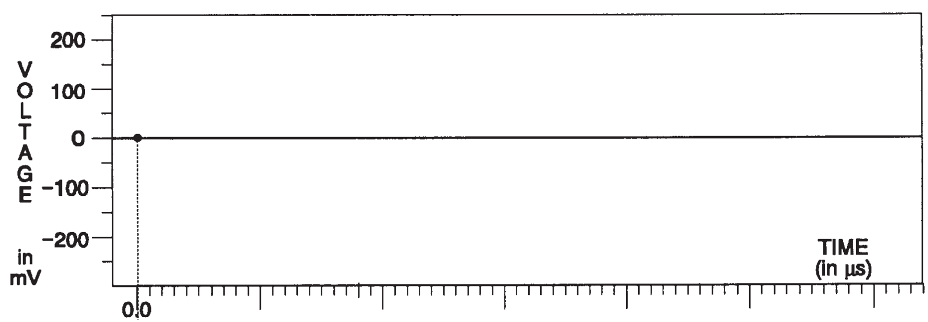


Figure 3–106: Red channel – blue field

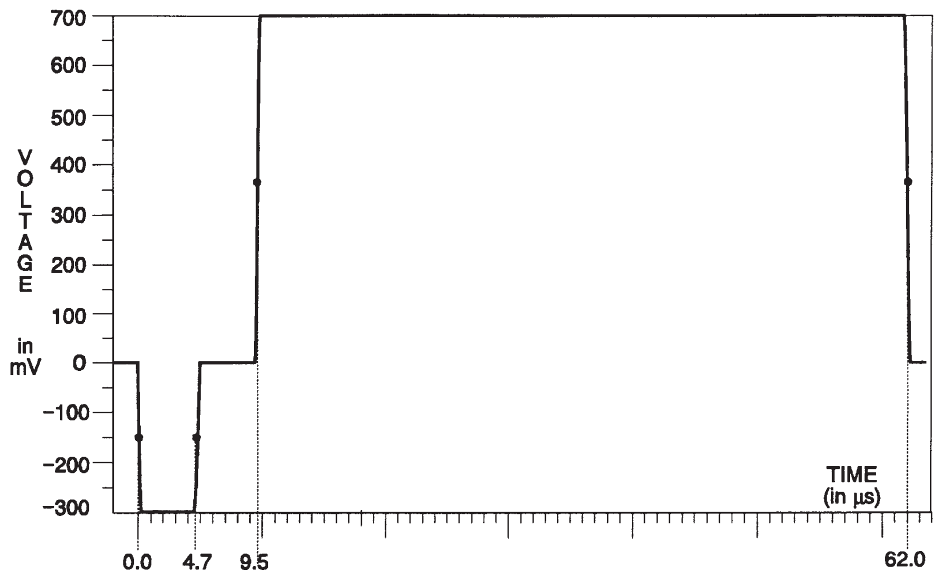


Figure 3–107: Green channel – green field

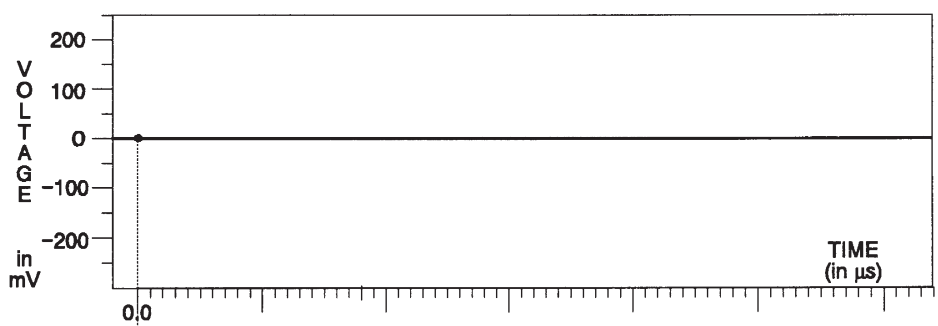


Figure 3–108: Blue and red channels – green field

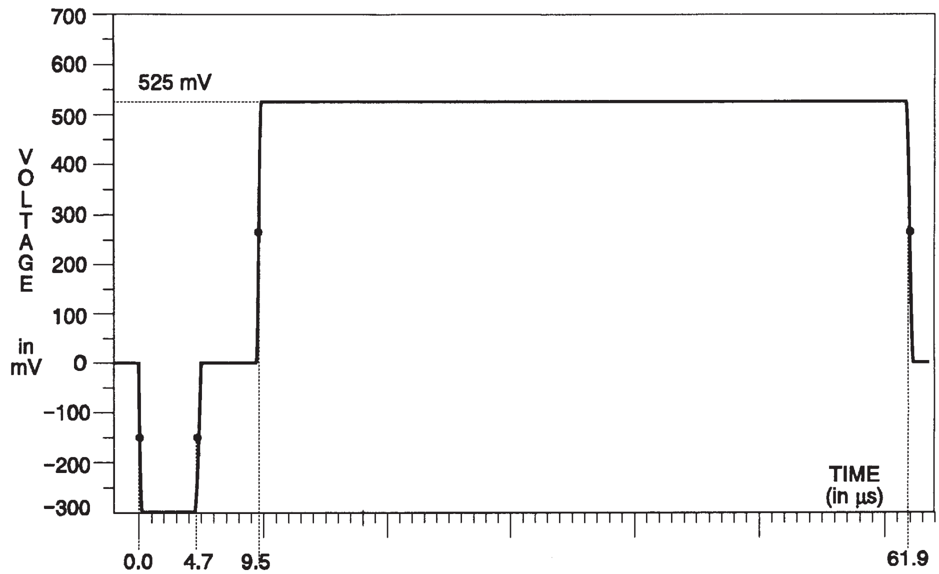


Figure 3–109: Green channel – convergence (horizontal)

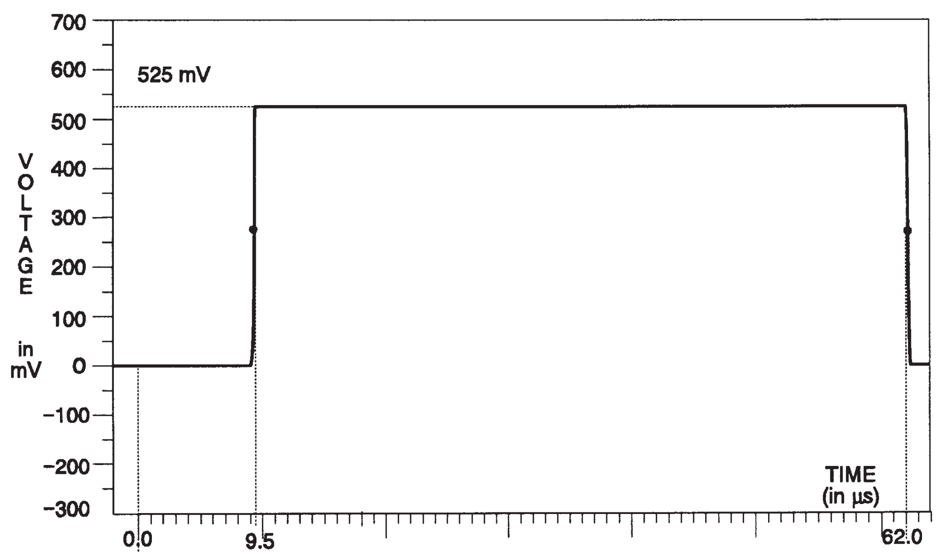


Figure 3–110: Blue and red channels – convergence (horizontal)

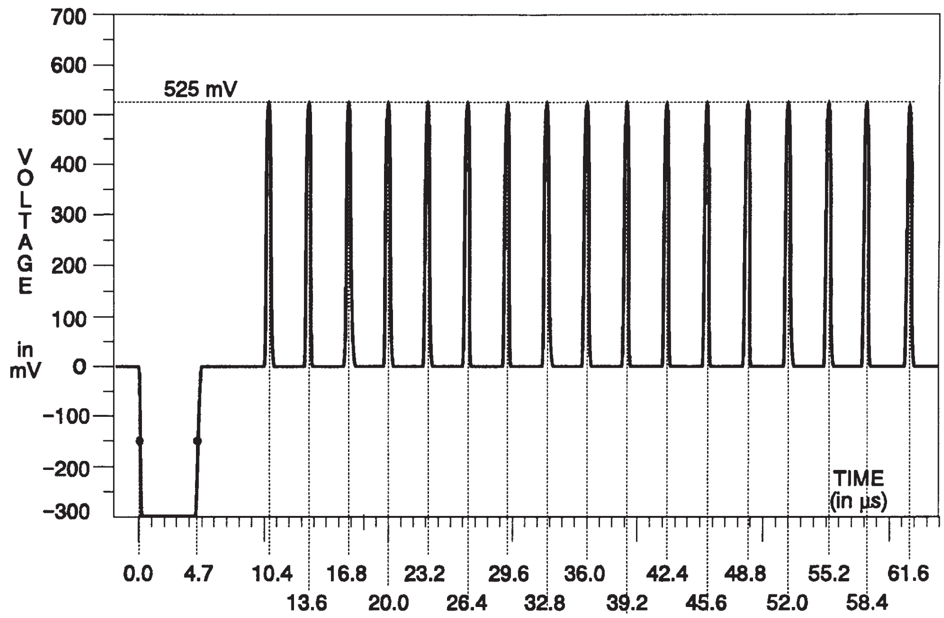


Figure 3–111: Green channel – convergence (vertical)

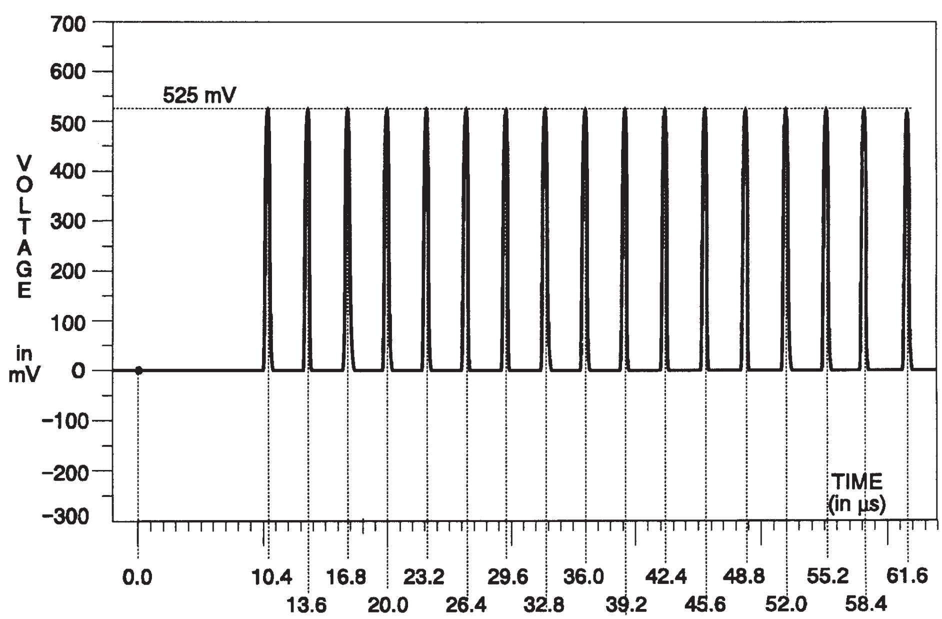


Figure 3–112: Blue and red channels – convergence (vertical)

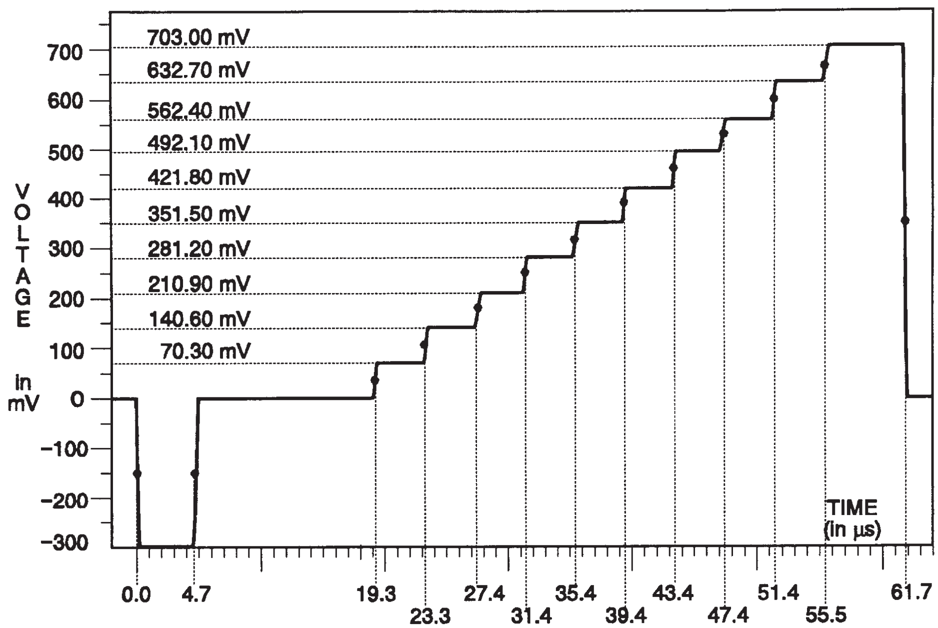


Figure 3–113: Green channel – 10 step

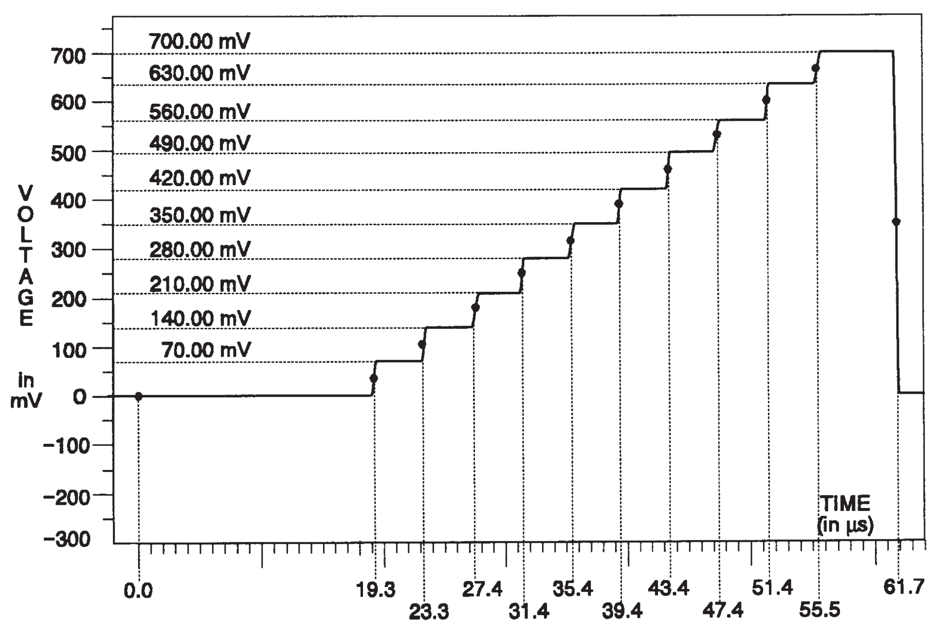


Figure 3–114: Blue and red channels – 10 step

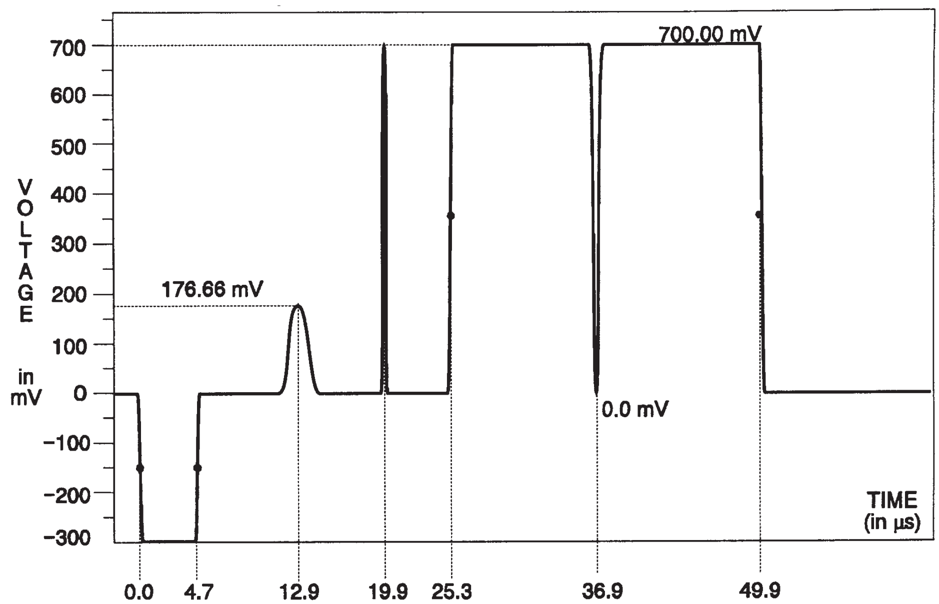


Figure 3–115: Green channel – pulse and bar

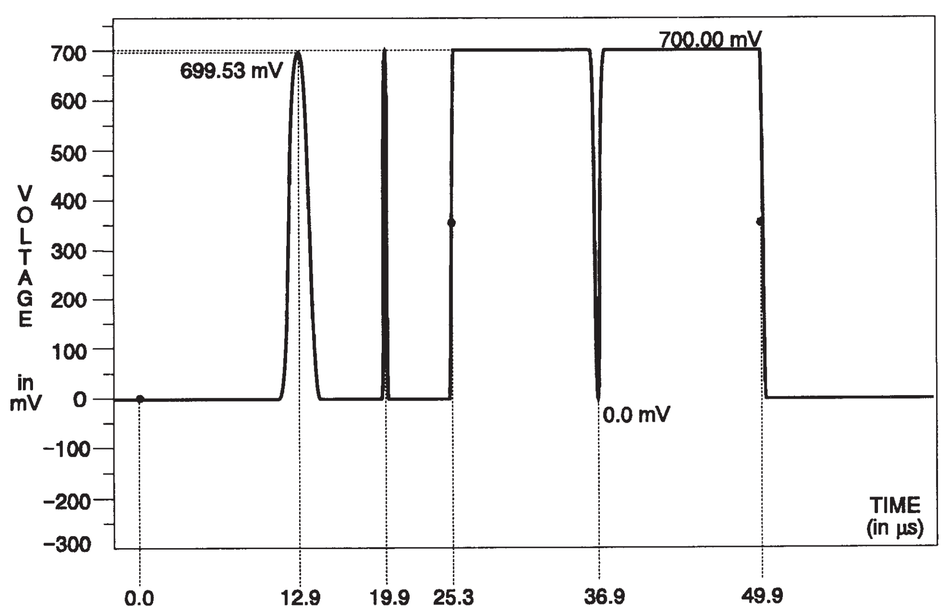


Figure 3–116: Blue and red channels – pulse and bar

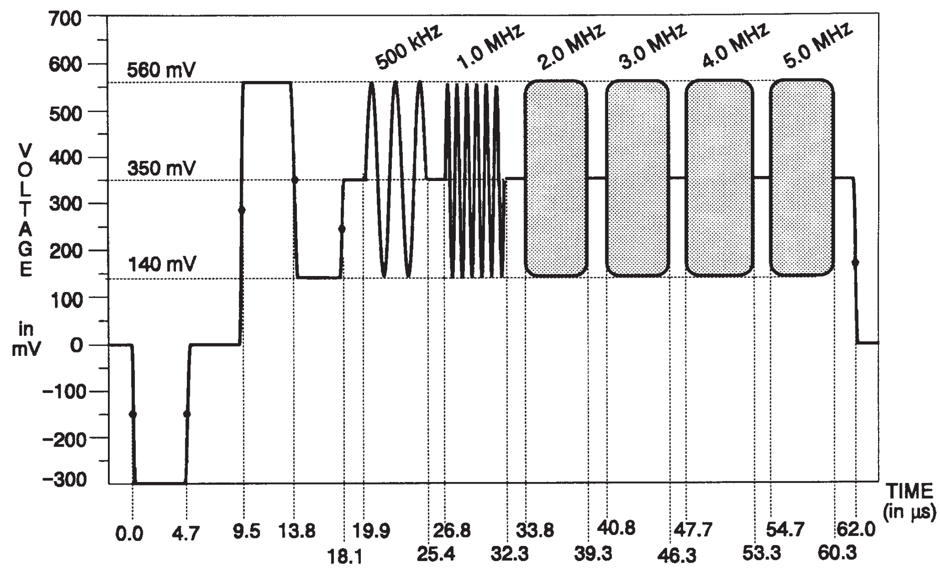


Figure 3–117: Green channel – multiburst

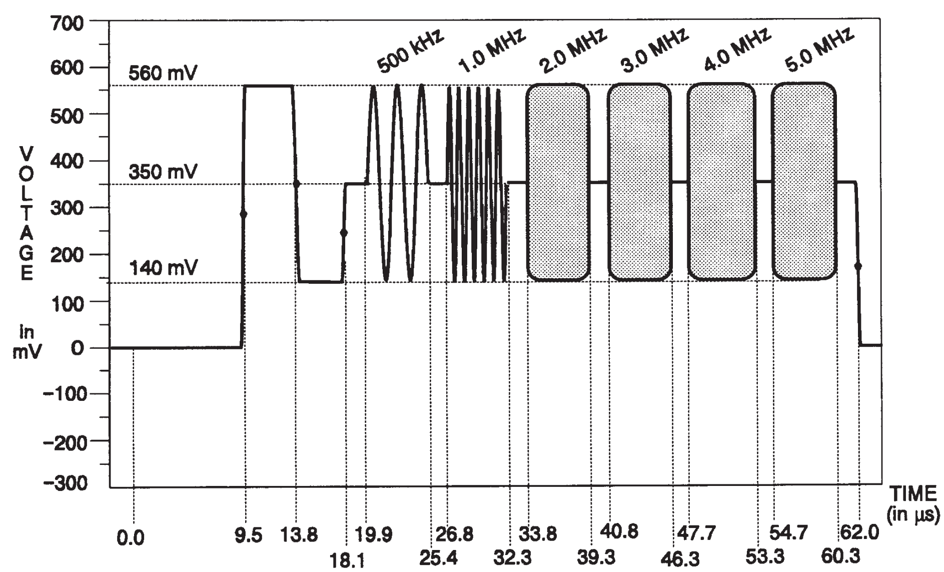


Figure 3–118: Blue and red channels – multiburst

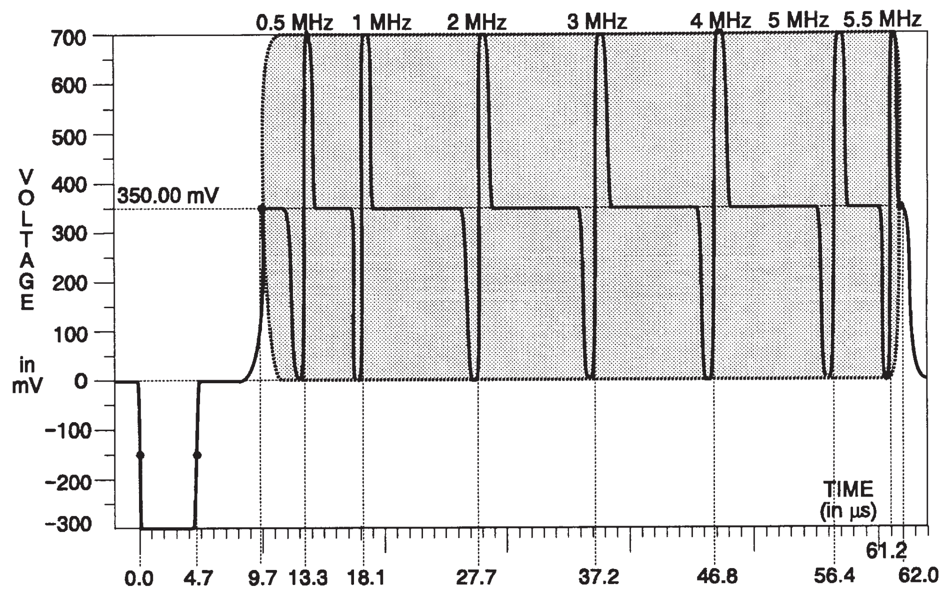


Figure 3–119: Green channel – sweep

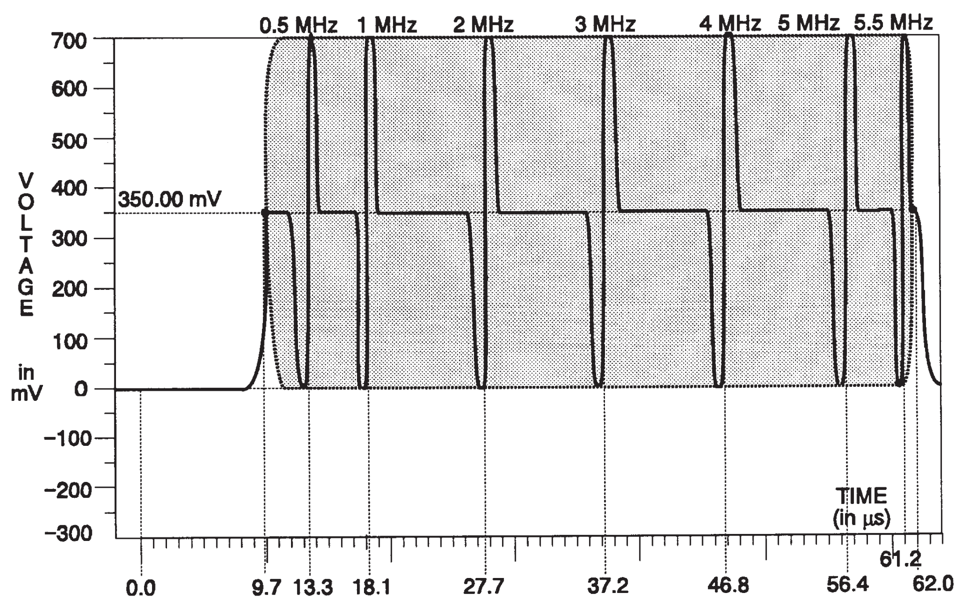


Figure 3–120: Blue and red channels – sweep

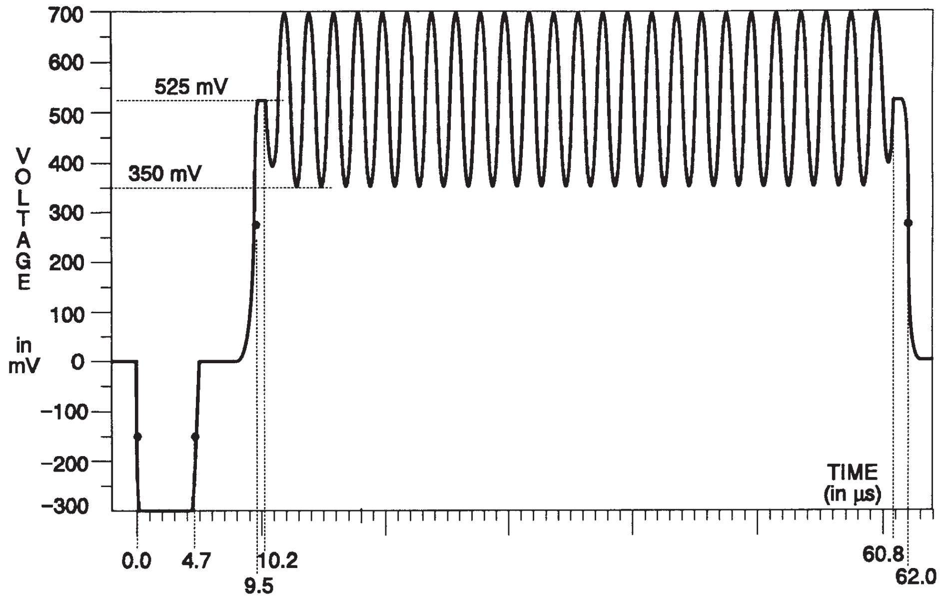


Figure 3–121: Green channel – bowtie

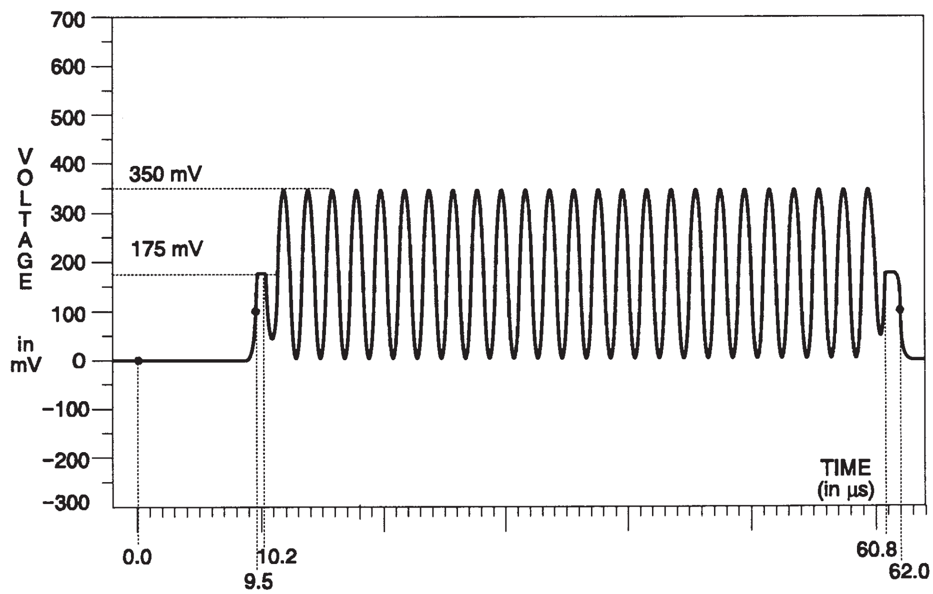


Figure 3–122: Blue and red channels – bowtie

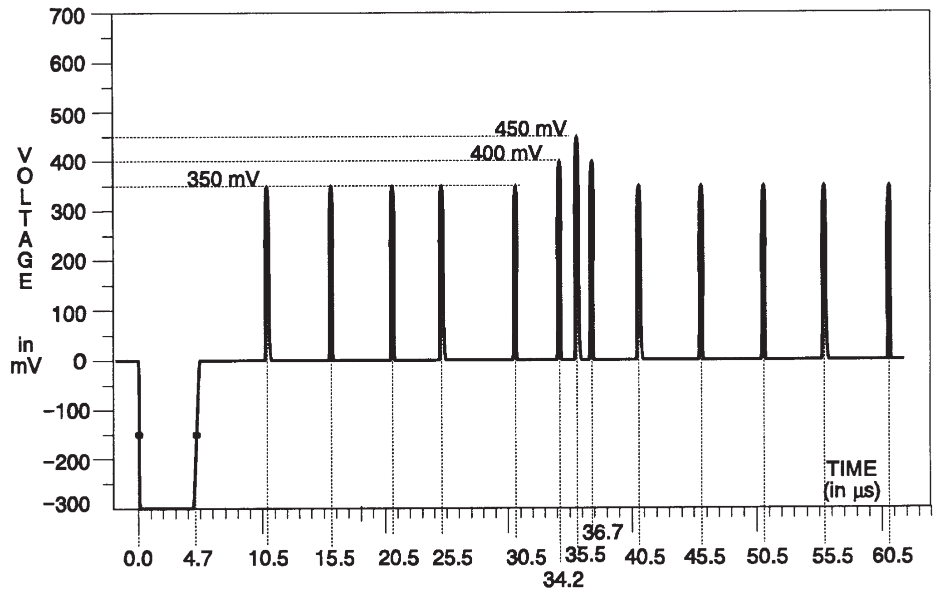


Figure 3–123: Green channel – bowtie markers

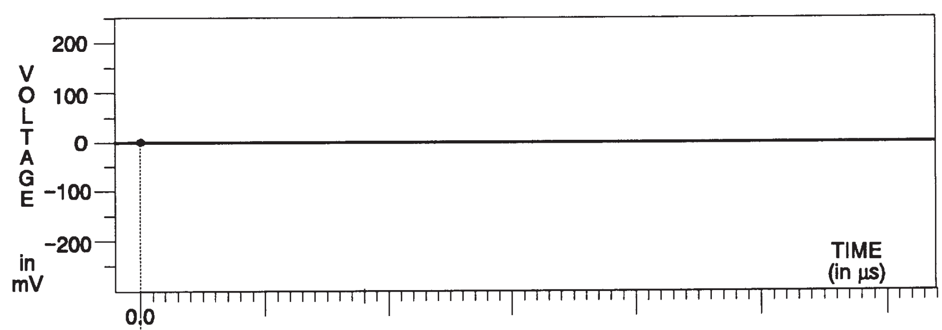


Figure 3–124: Blue and red channels – bowtie markers

Option 01 Signals (MII 3–Wire)

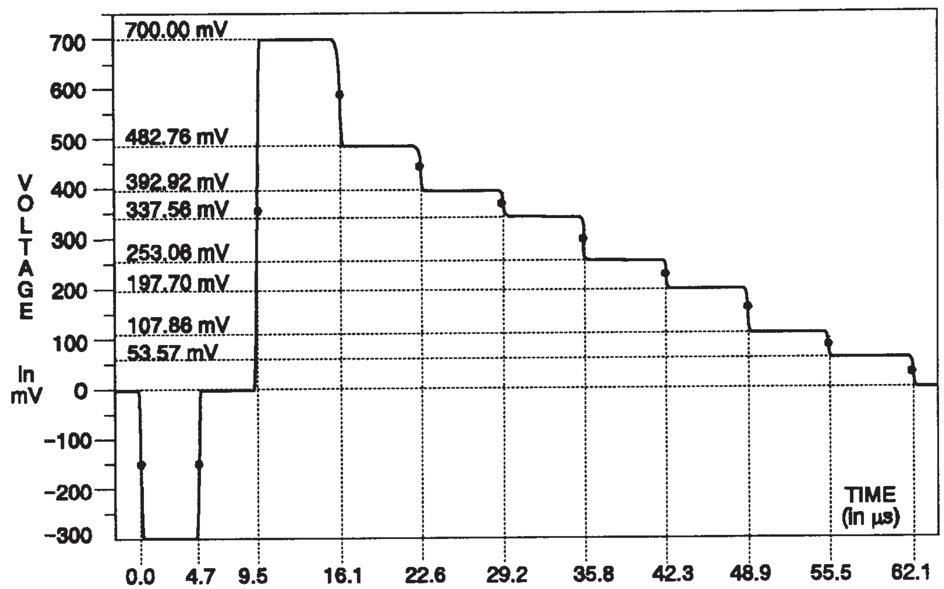


Figure 3–125: Y channel – 75% color bars

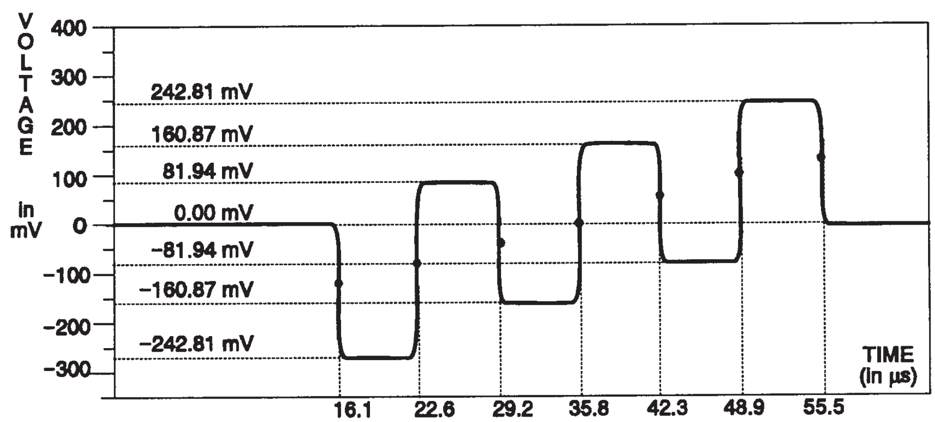


Figure 3–126: B–Y channel – 75% color bars

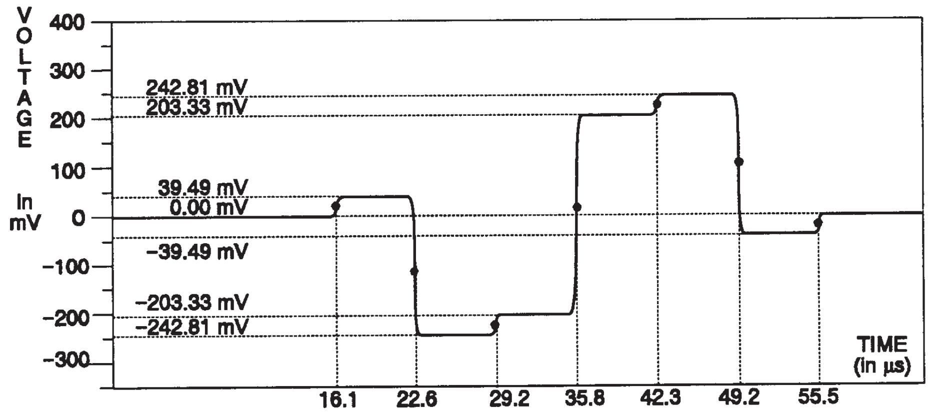


Figure 3–127: R–Y channel – 75% color bars

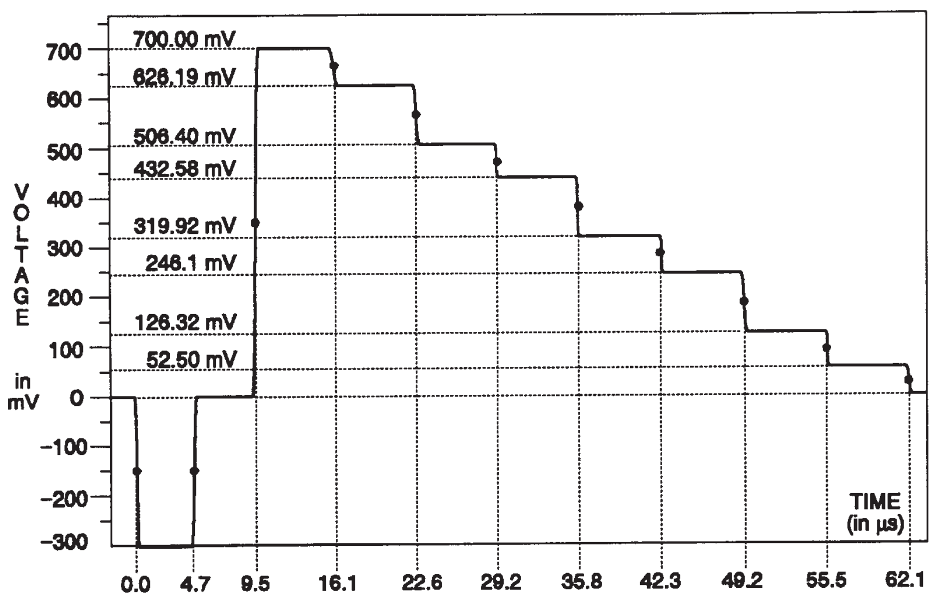


Figure 3–128: Y channel – 100% color bars

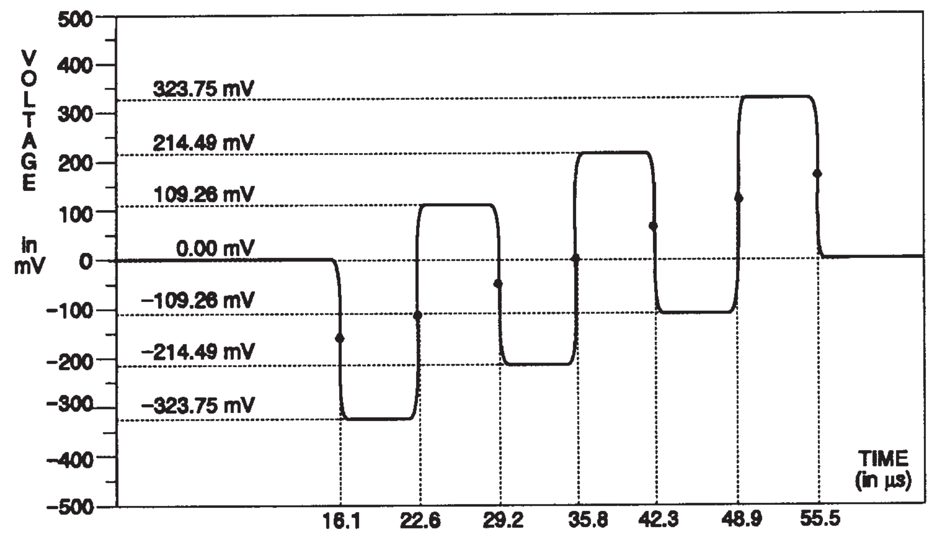


Figure 3–129: B–Y channel – 100% color bars

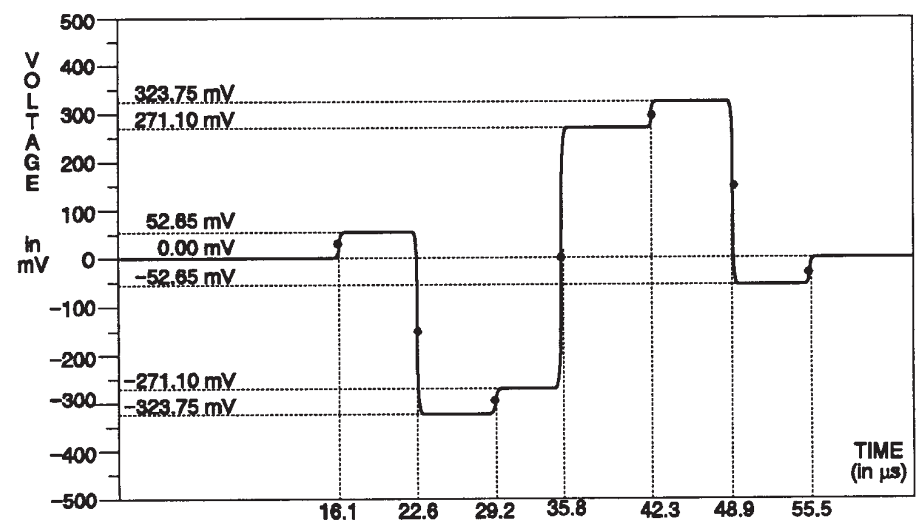


Figure 3–130: R–Y channel – 100% color bars

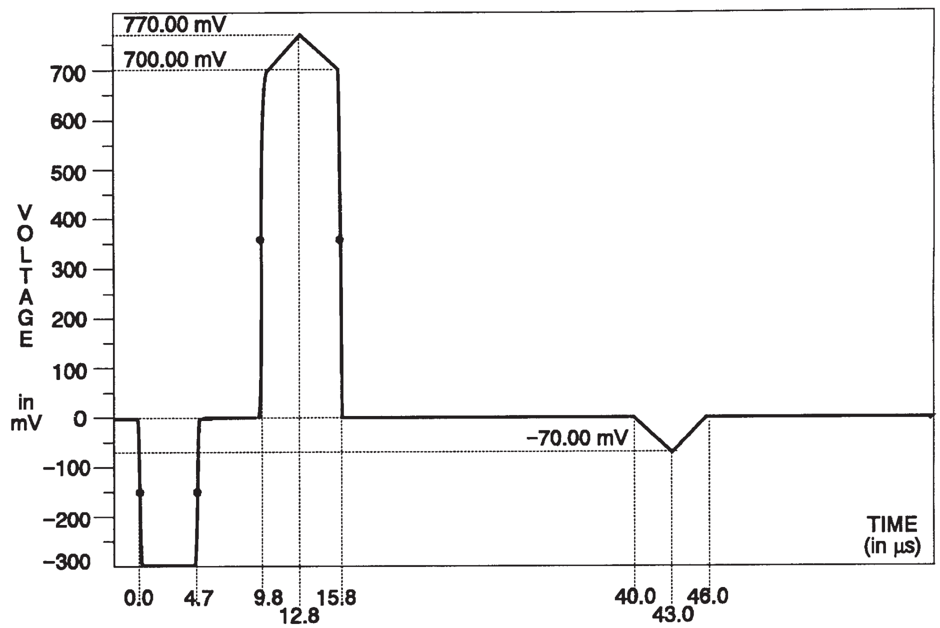


Figure 3–131: Y channel – clip components

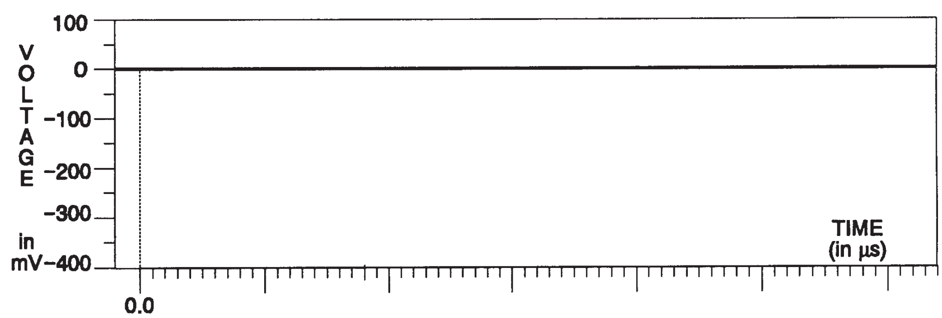


Figure 3–132: B–Y and R–Y channels – clip components

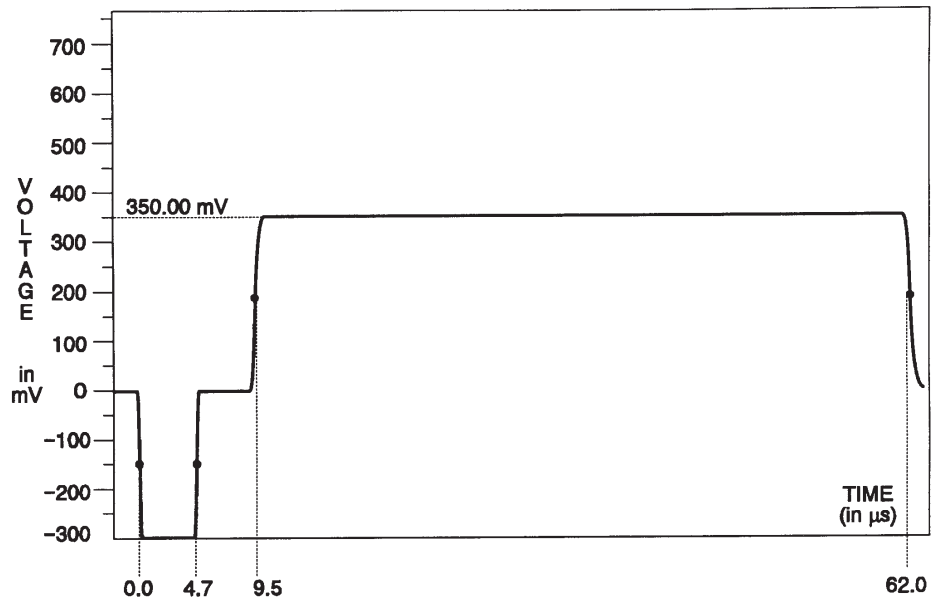


Figure 3–133: Y channel – 50% flat field

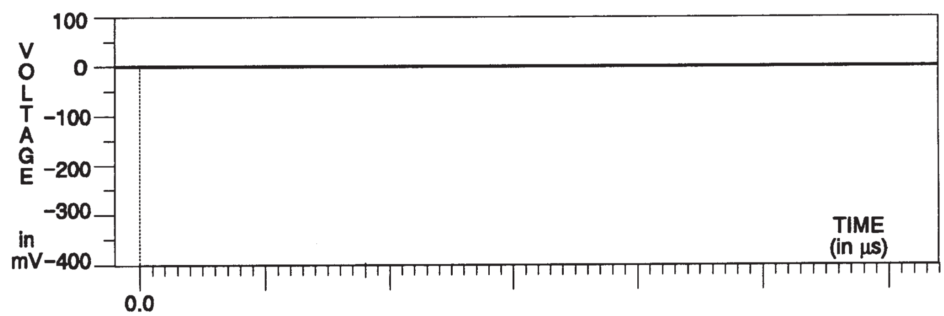


Figure 3–134: B–Y and R–Y channels – all flat fields

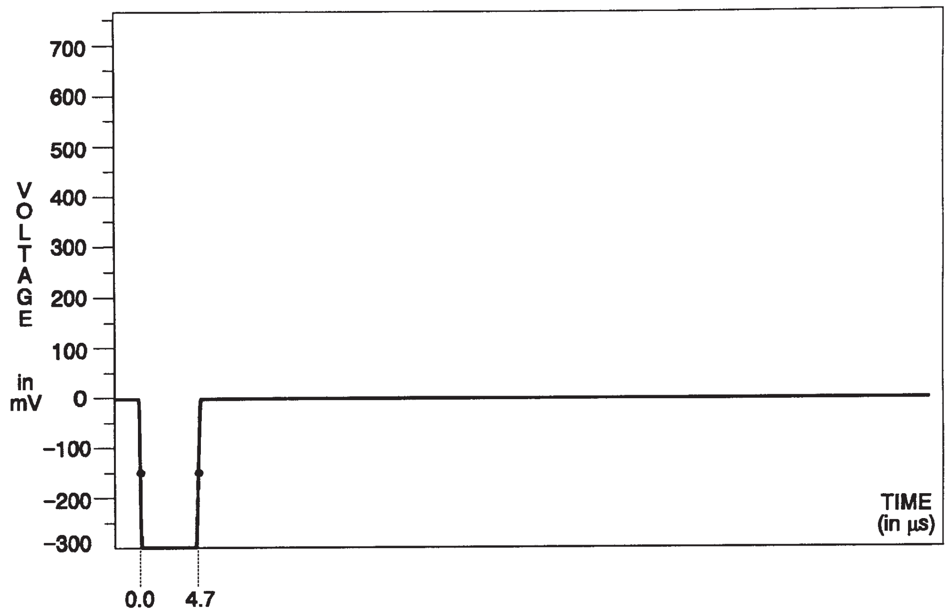


Figure 3–135: Y channel – 0% flat field

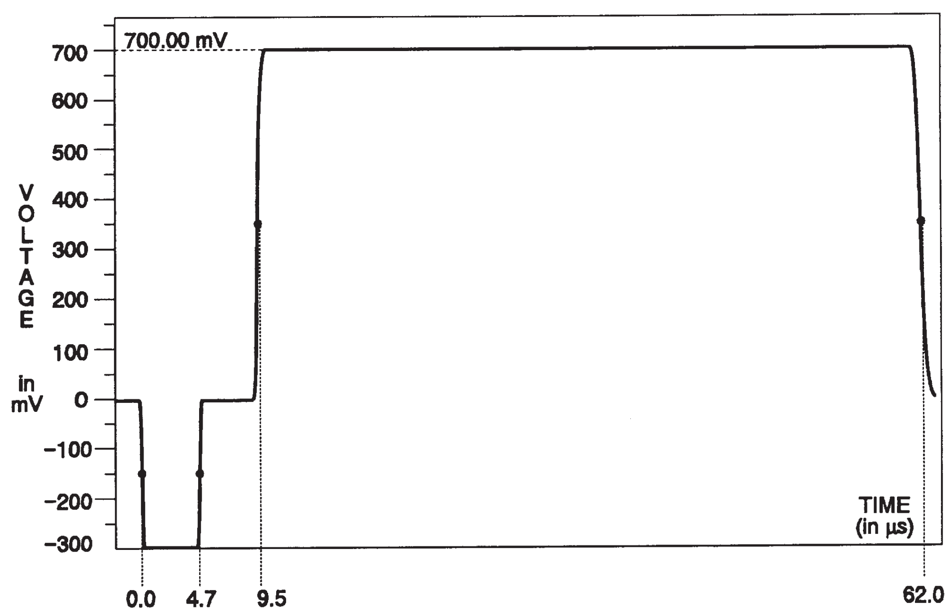


Figure 3–136: Y channel – 100% flat field

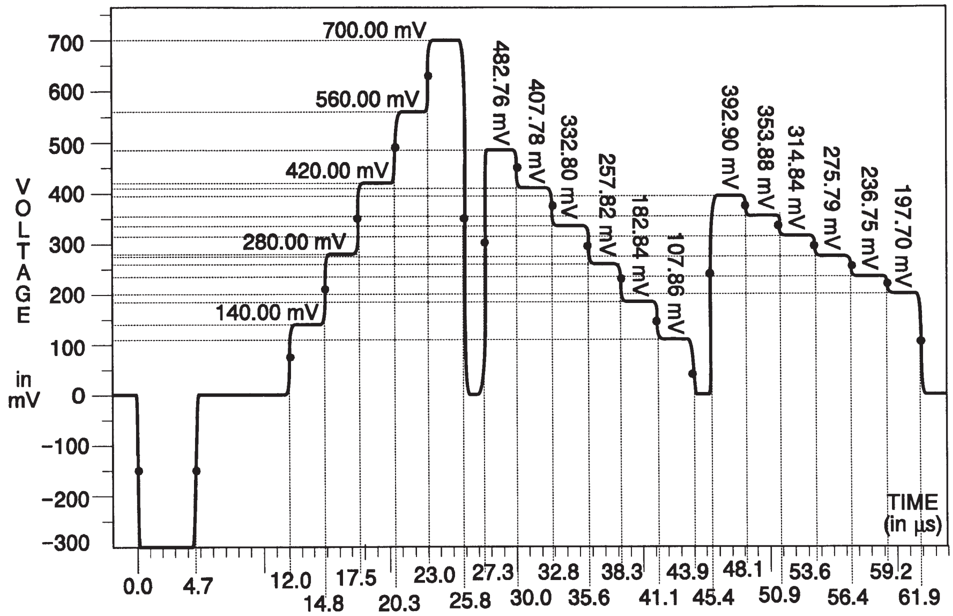


Figure 3–137: Y channel – valid sweep

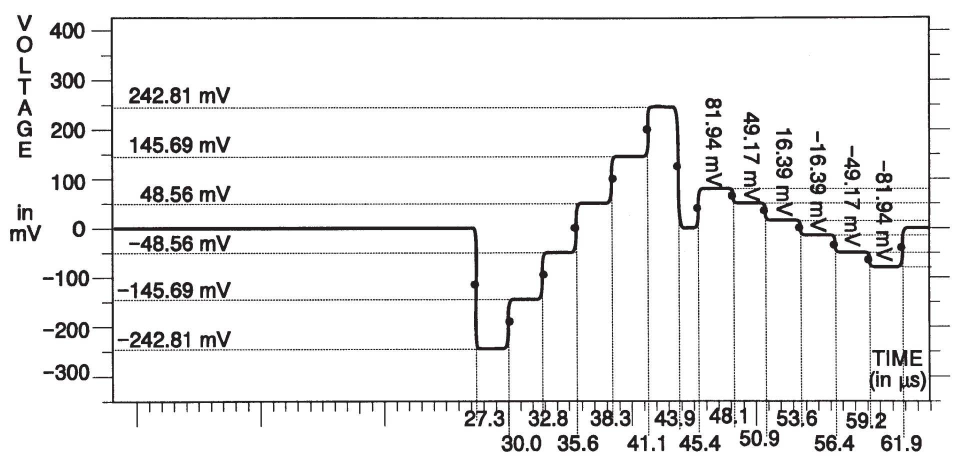


Figure 3–138: B–Y channel – valid 5 step

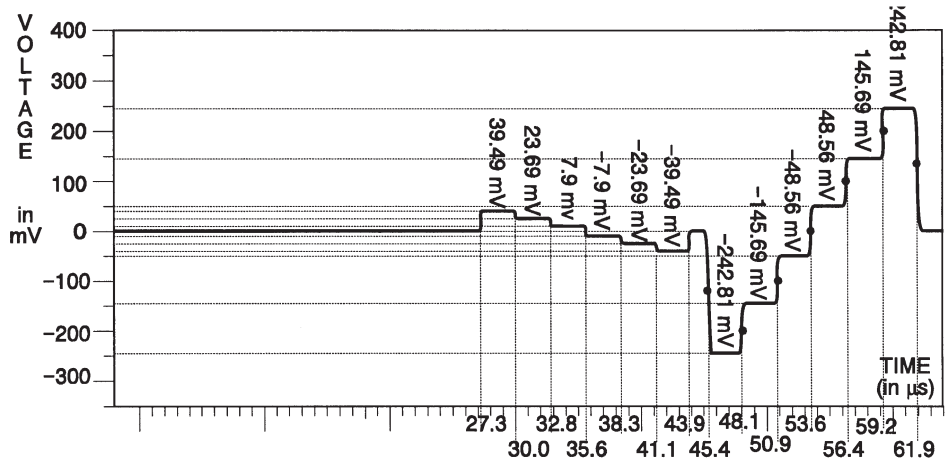


Figure 3–139: R–Y channel – valid 5 step

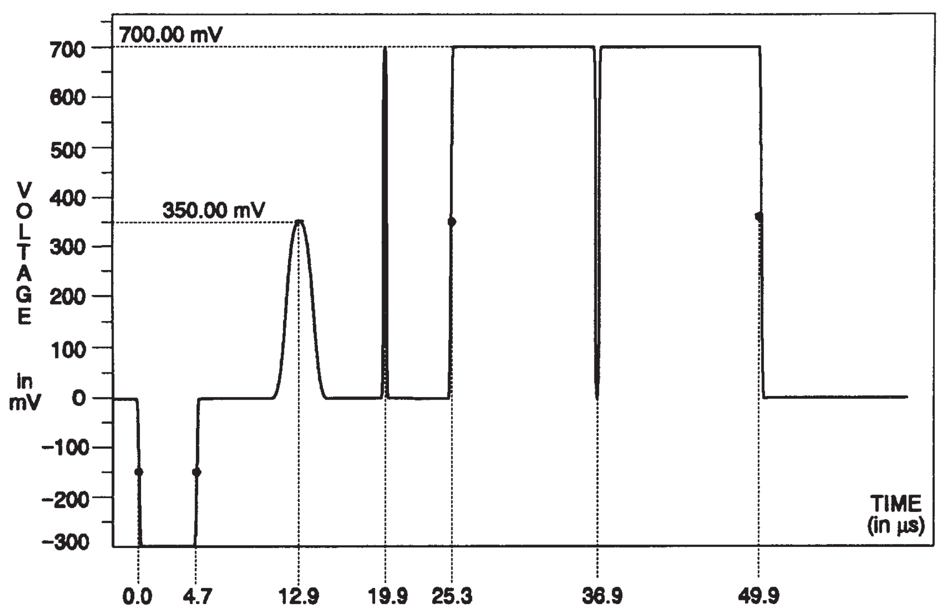


Figure 3–140: Y channel – pulse and bar

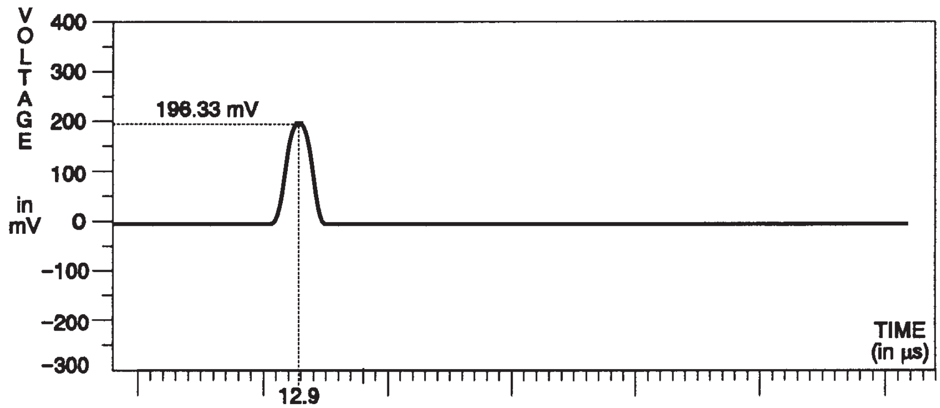


Figure 3–141: B–Y channel – pulse and bar

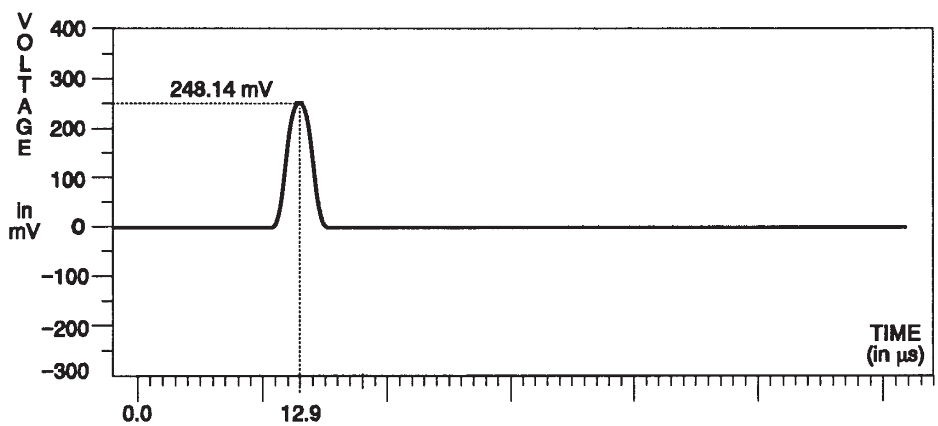


Figure 3–142: R–Y channel – pulse and bar

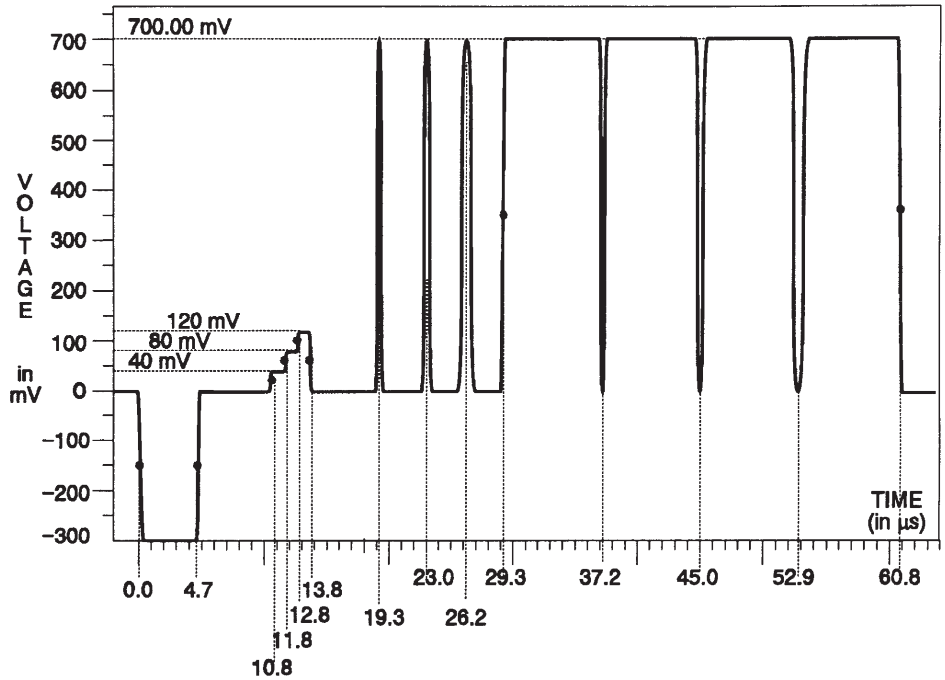


Figure 3–143: Y channel – T pulses

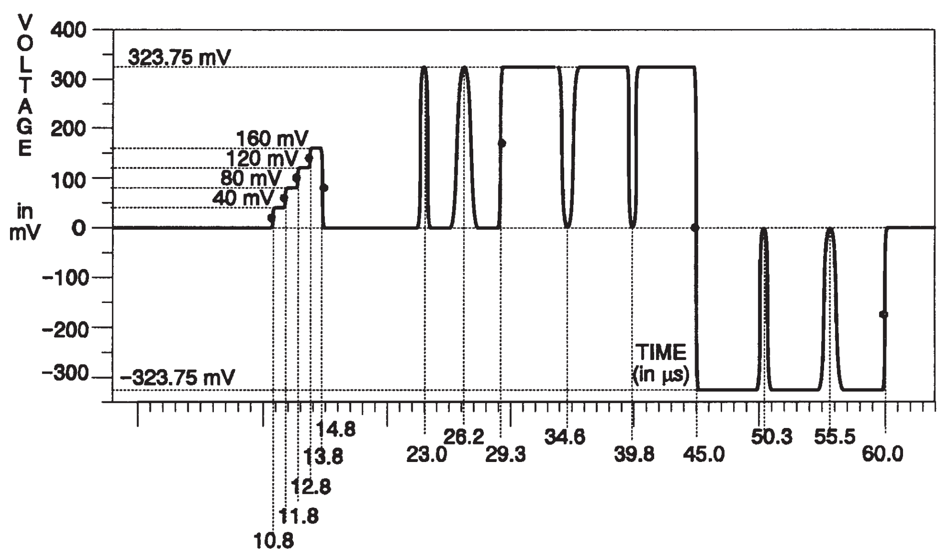


Figure 3–144: B–Y and R–Y channels – T pulses

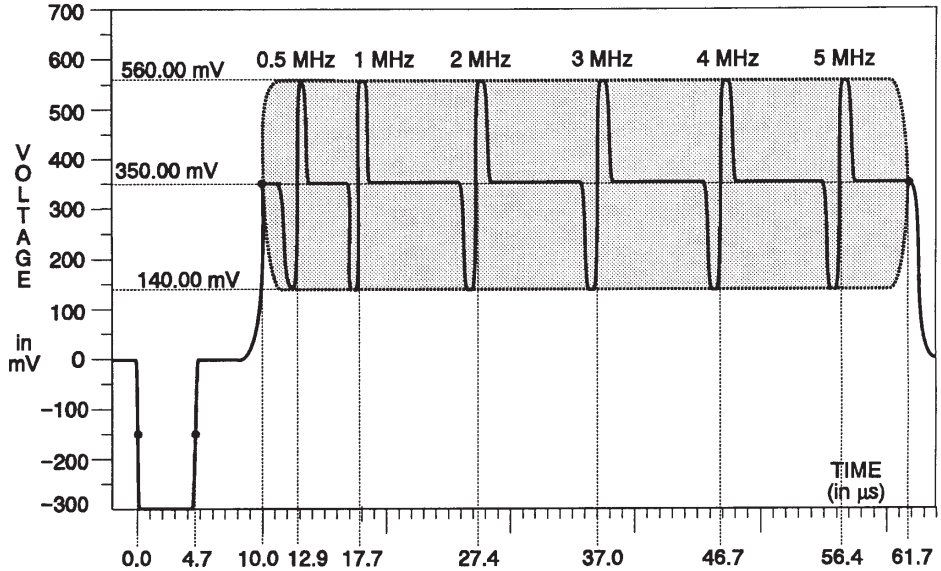


Figure 3–145: Y channel – line sweep

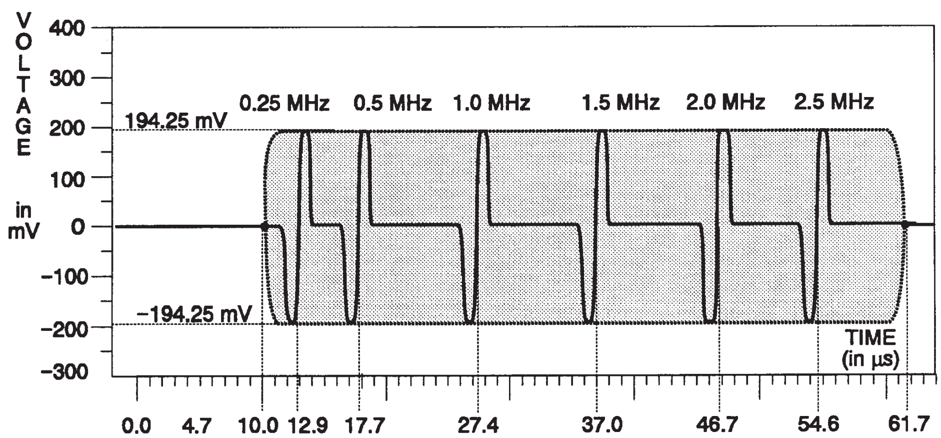


Figure 3–146: B–Y and R–Y channels – line sweep

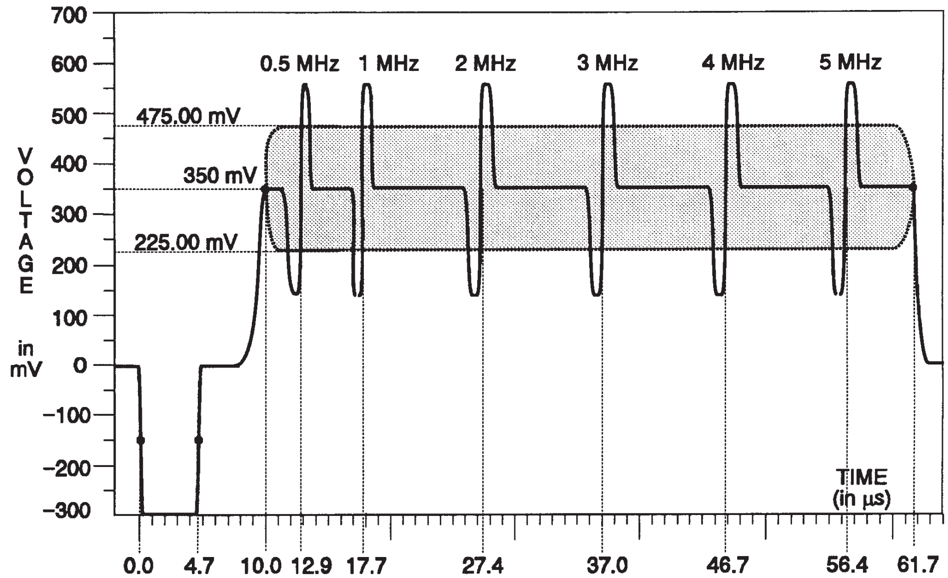


Figure 3–147: Y channel – reduced line sweep

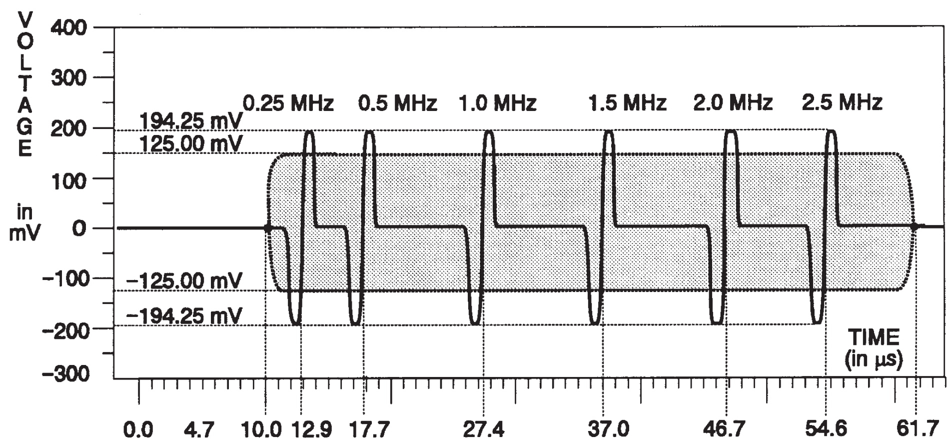


Figure 3–148: B–Y and R–Y channels – reduced line sweep

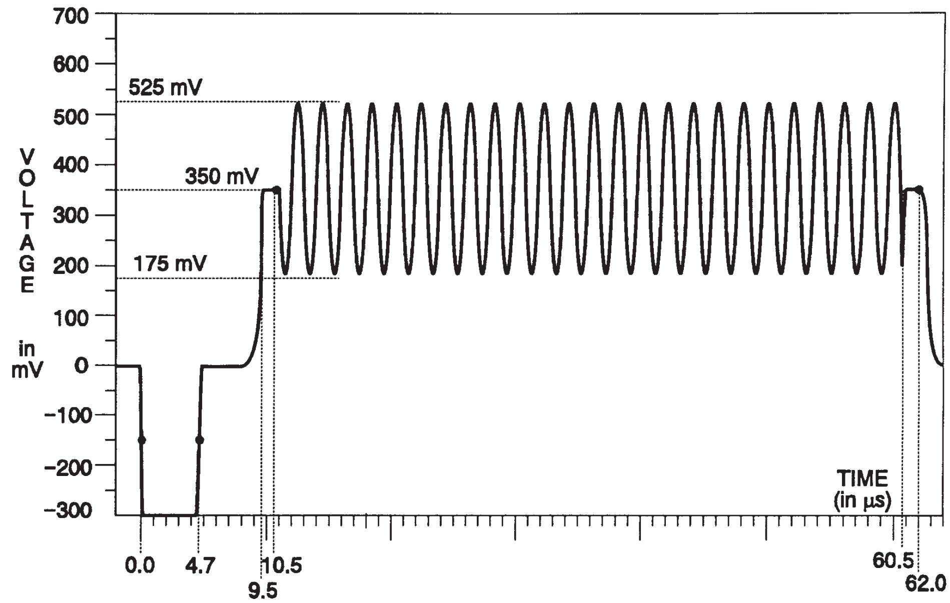


Figure 3–149: Y channel – inter–channel timing (bowtie)

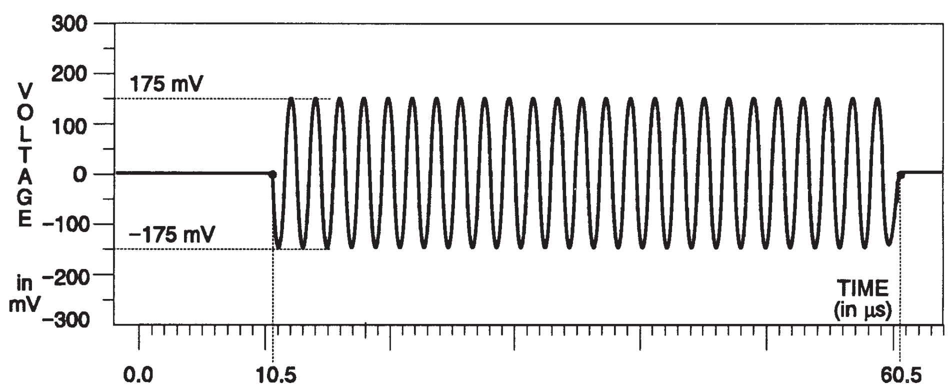


Figure 3–150: B–Y and R–Y channels – inter–channel timing

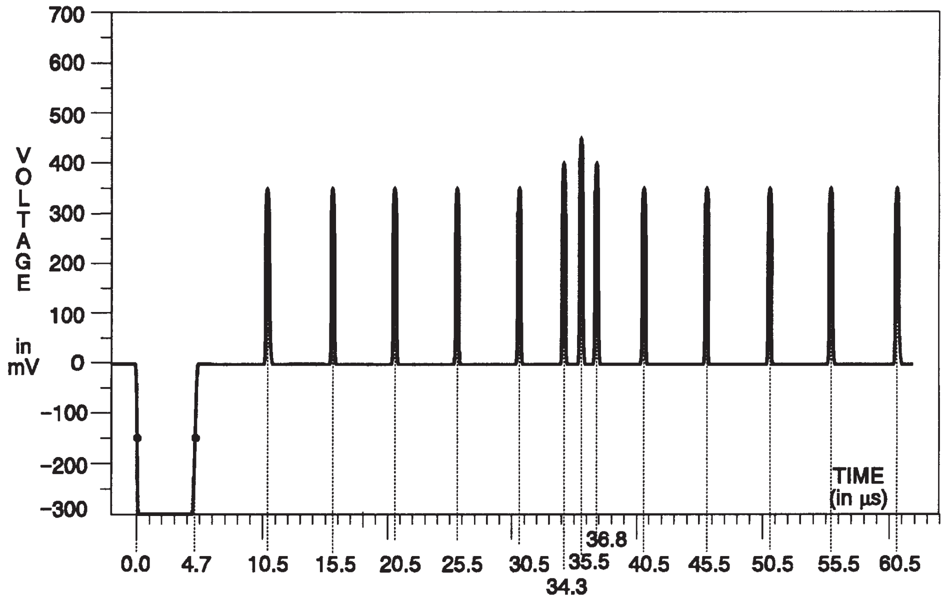


Figure 3–151: Y channel – timing markers

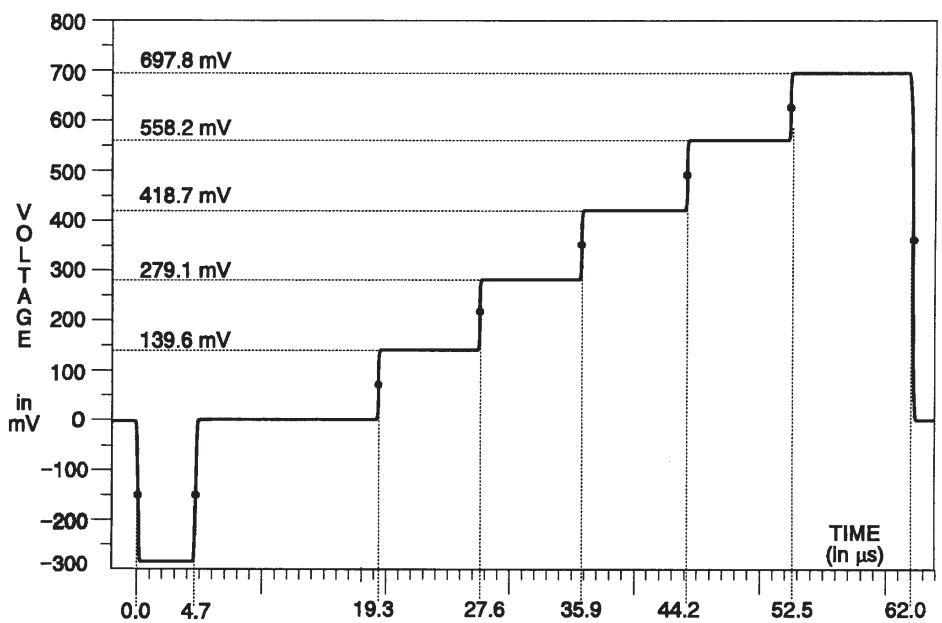


Figure 3–152: Y channel – 5 step (matrix only)

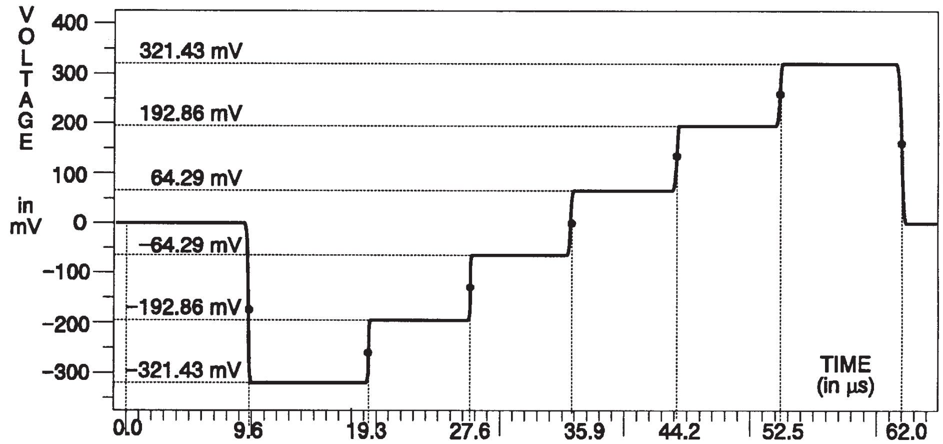


Figure 3–153: B–Y and R–Y channels – 5 step

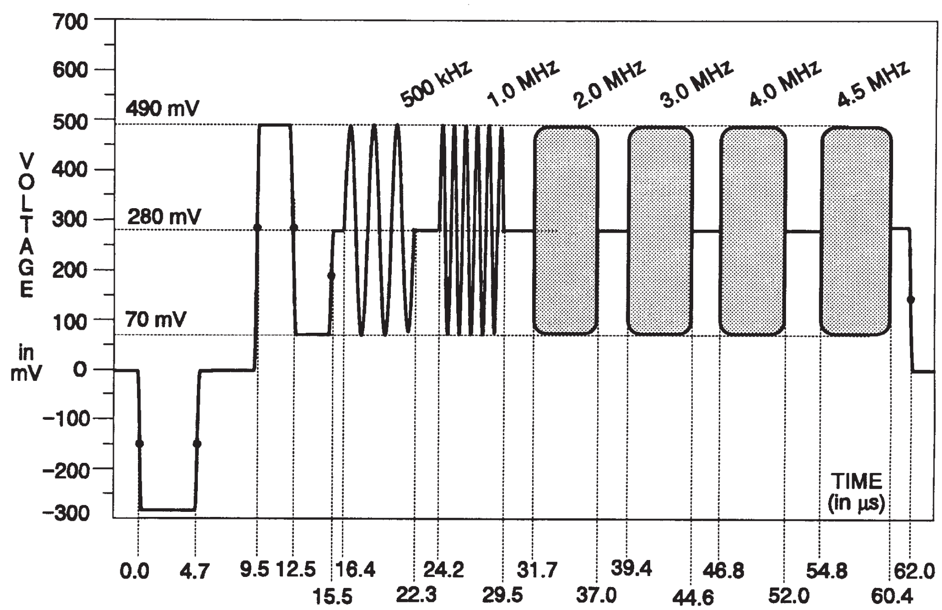


Figure 3–154: Y channel – multiburst

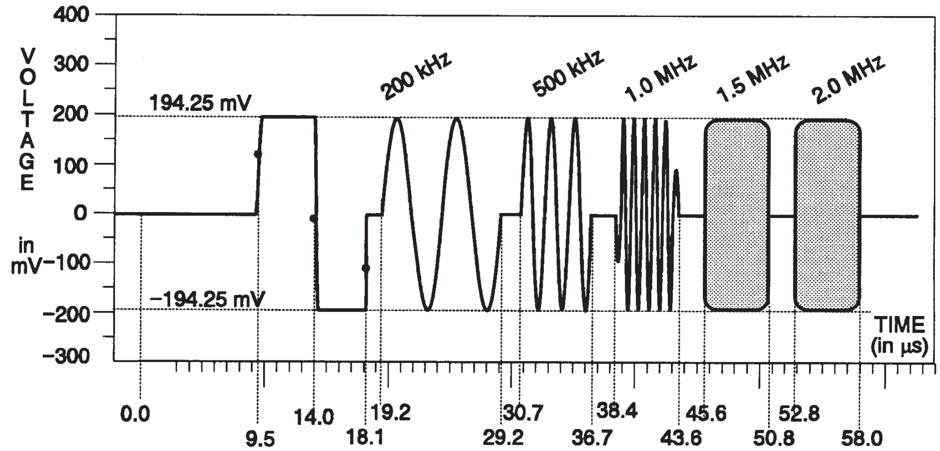


Figure 3–155: B–Y and R–Y channels – multiburst

MII 2–Wire Format

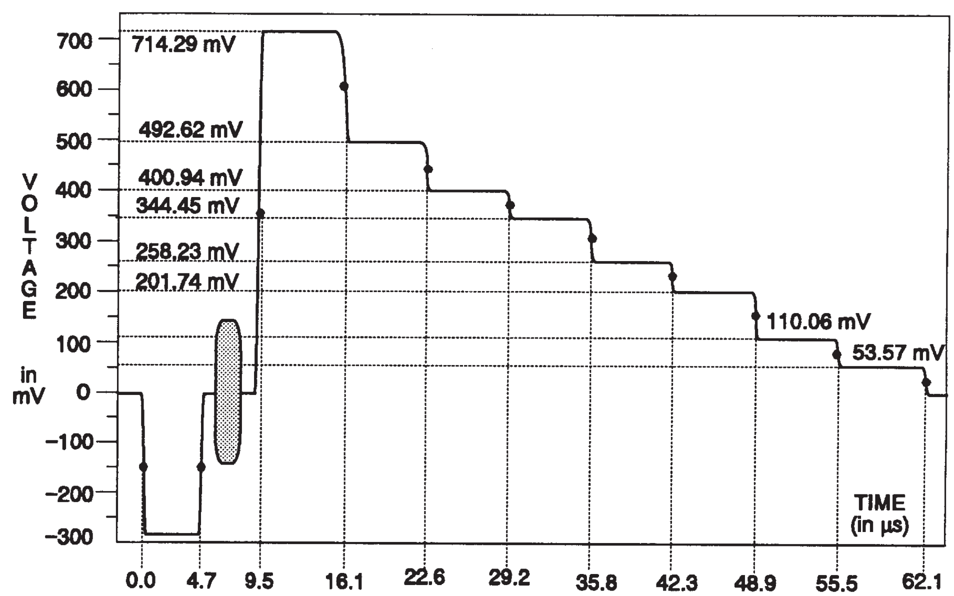


Figure 3–156: Y channel – 75% bars

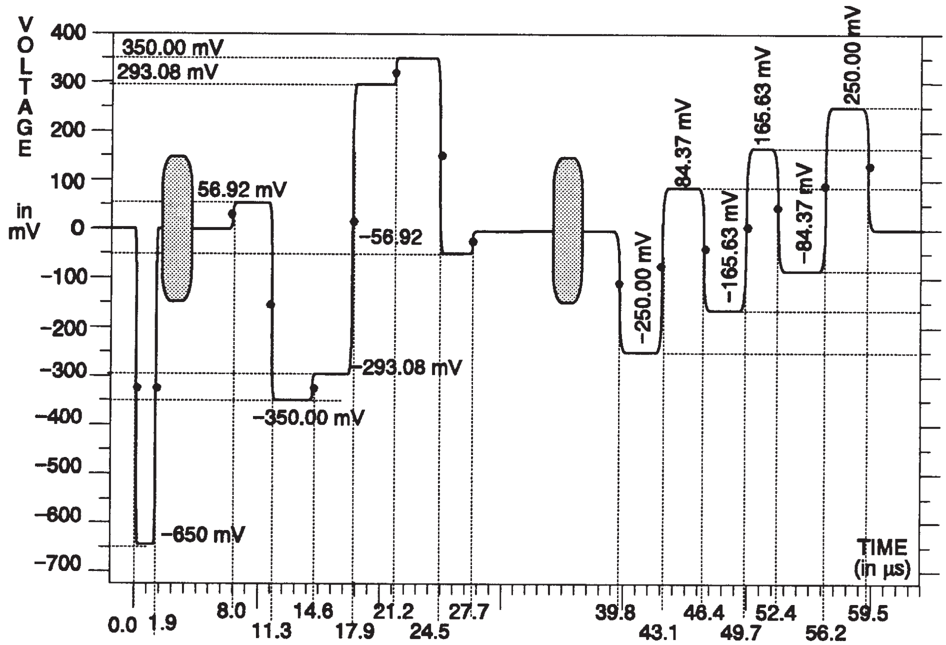


Figure 3–157: C channel – 75% bars

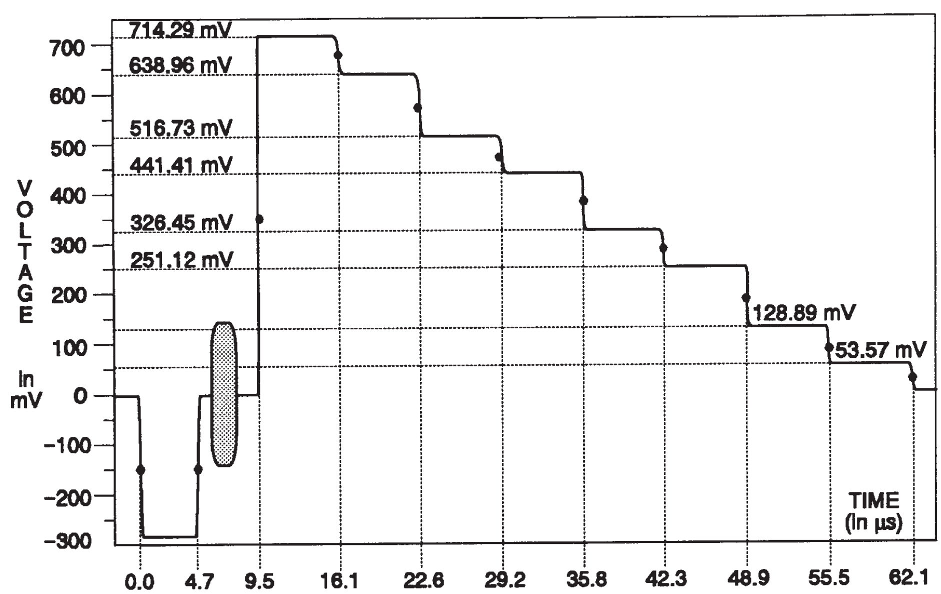


Figure 3–158: Y channel – 100% bars

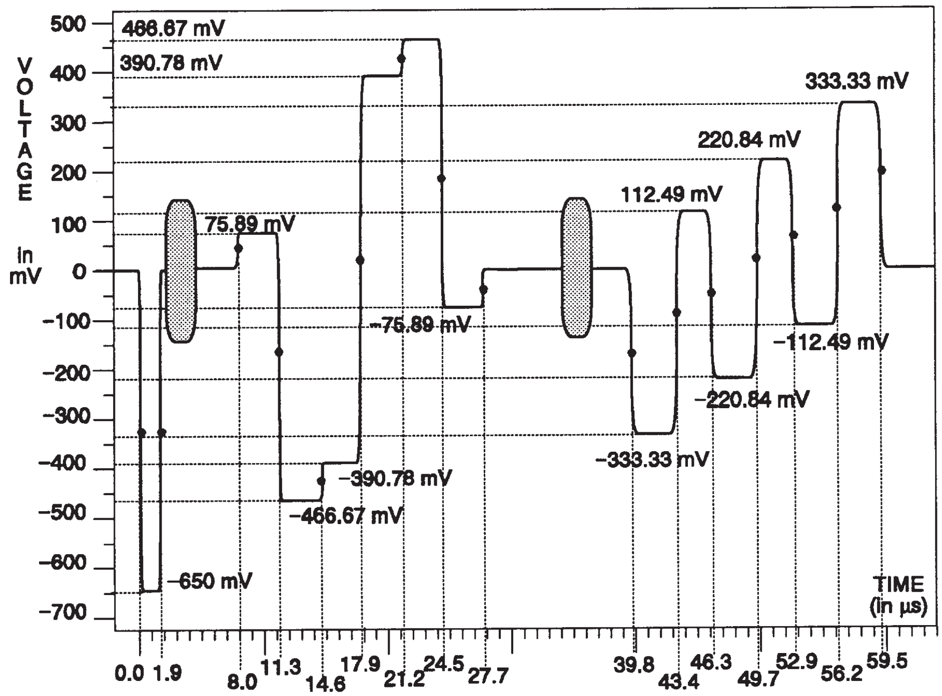


Figure 3–159: C channel – 100% bars

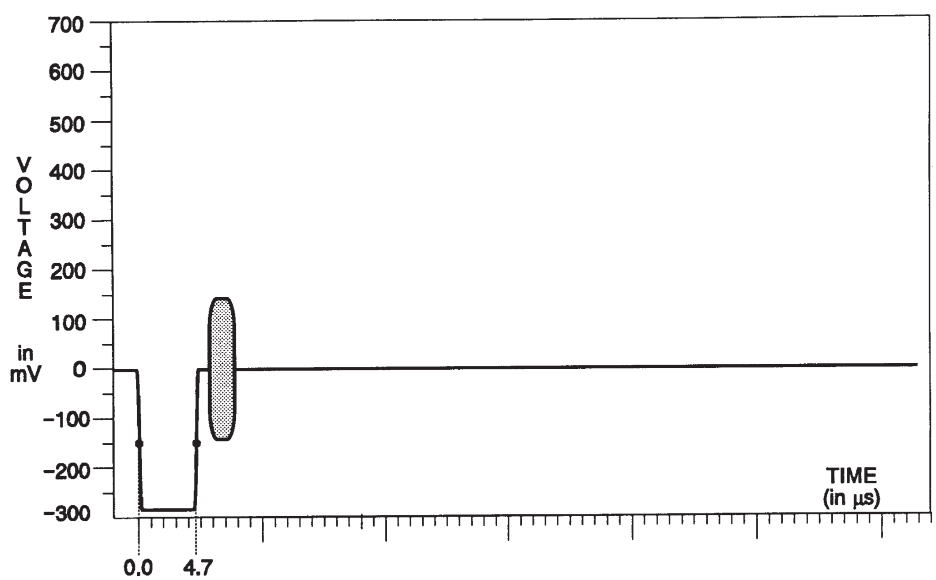


Figure 3–160: Y channel – 0% flat field

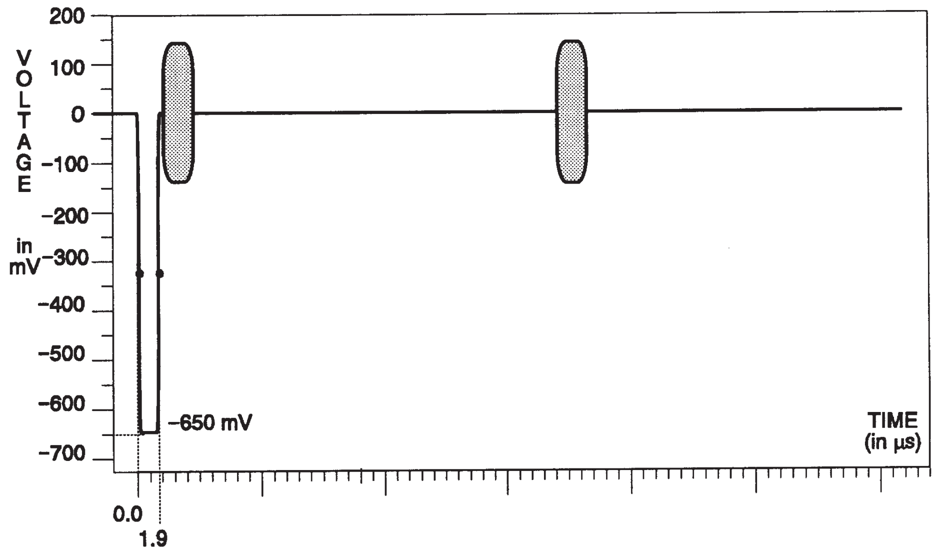


Figure 3–161: C channel – all flat field signals

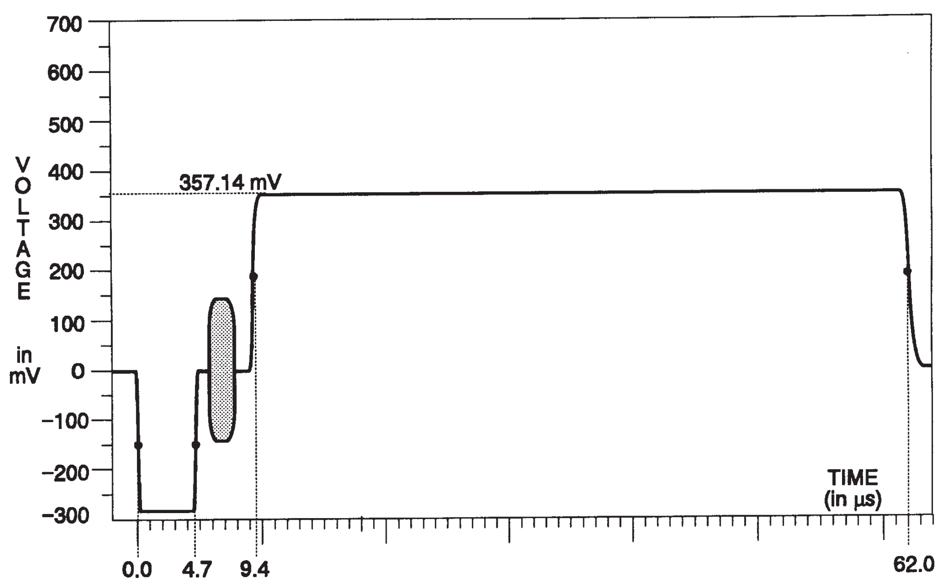


Figure 3–162: Y channel – 50% flat field

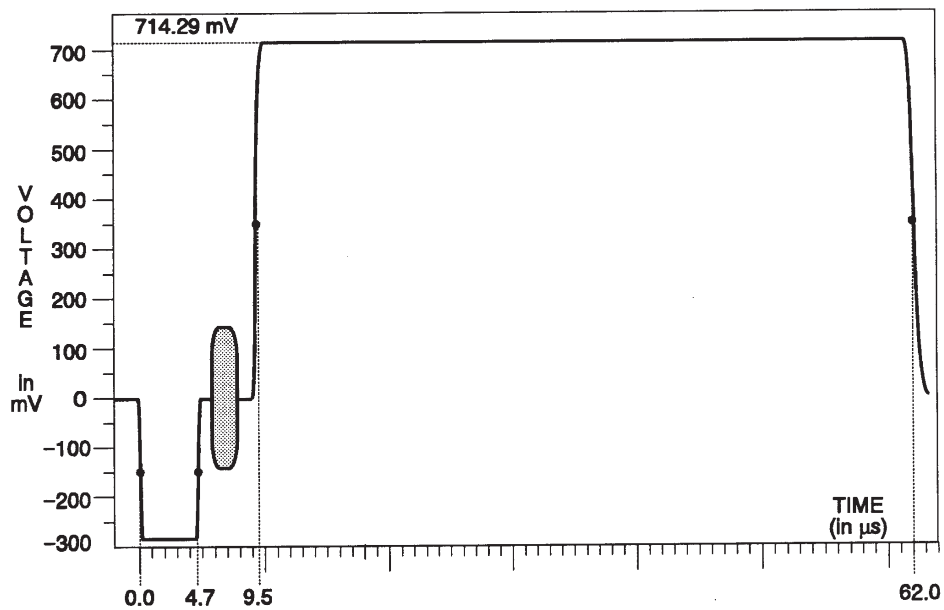


Figure 3–163: Y channel – 100% flat field

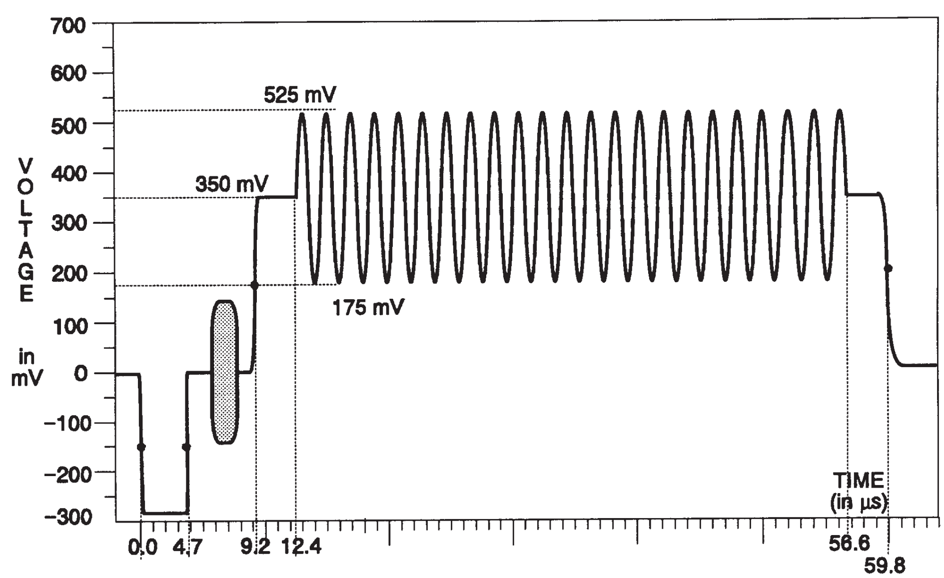


Figure 3–164: Y channel – inter–channel timing

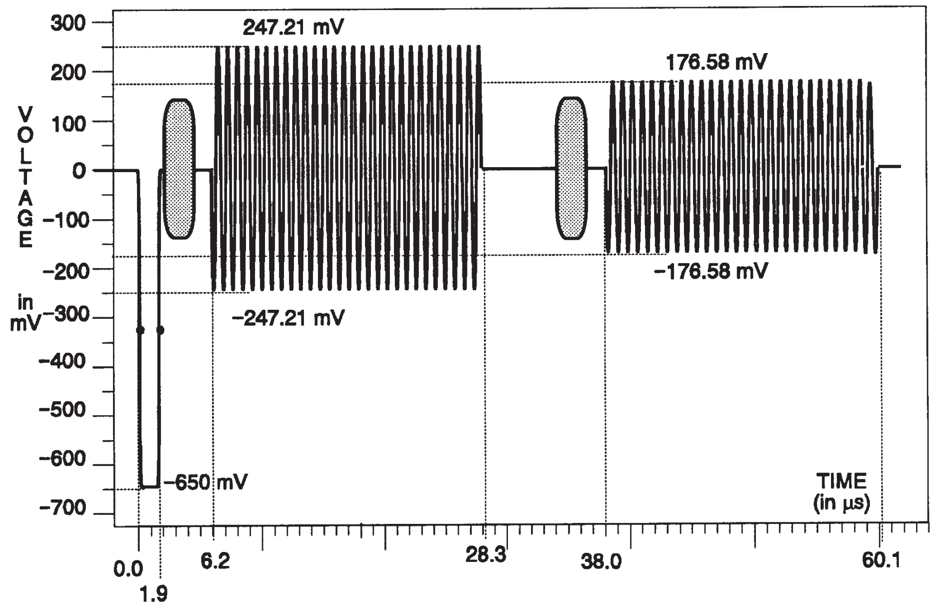


Figure 3–165: C channel – inter–channel timing

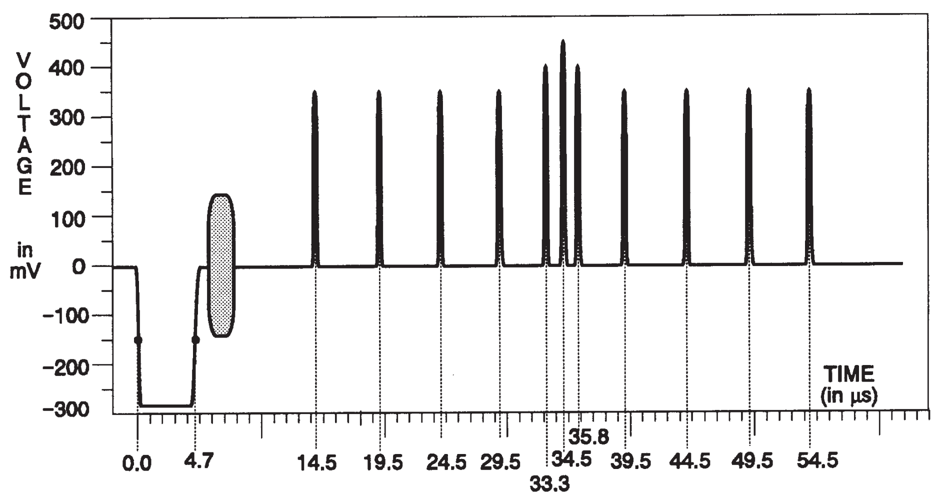


Figure 3–166: Y channel – inter-channel timing

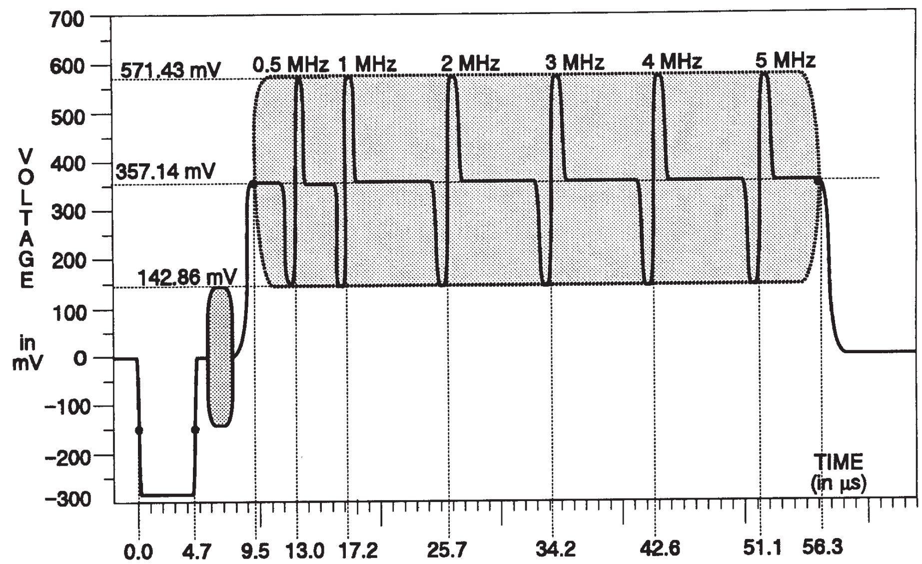


Figure 3–167: Y channel – sweep

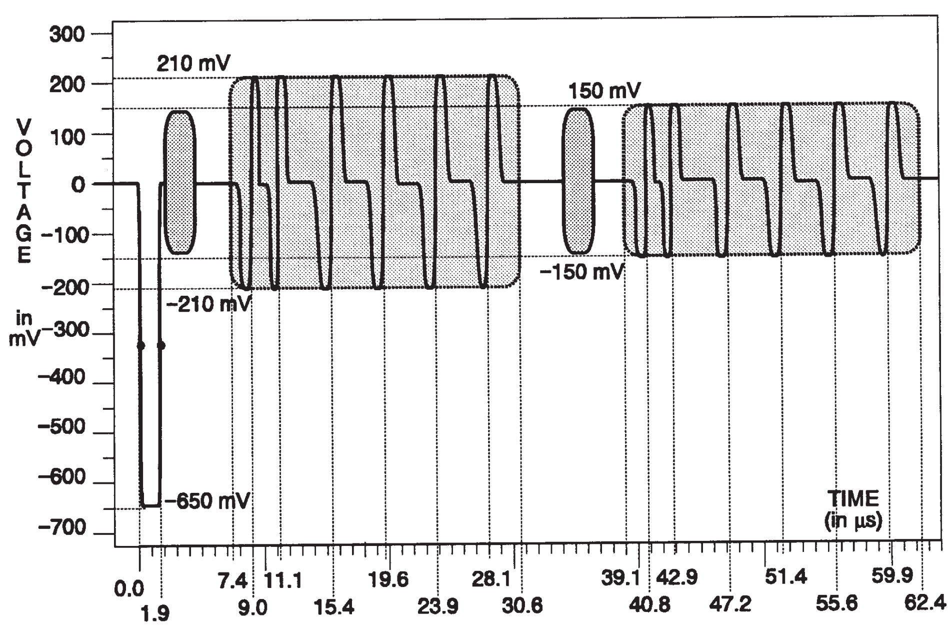


Figure 3–168: C channel – sweep

Option 2J Signals (Y–C Unique Signals)

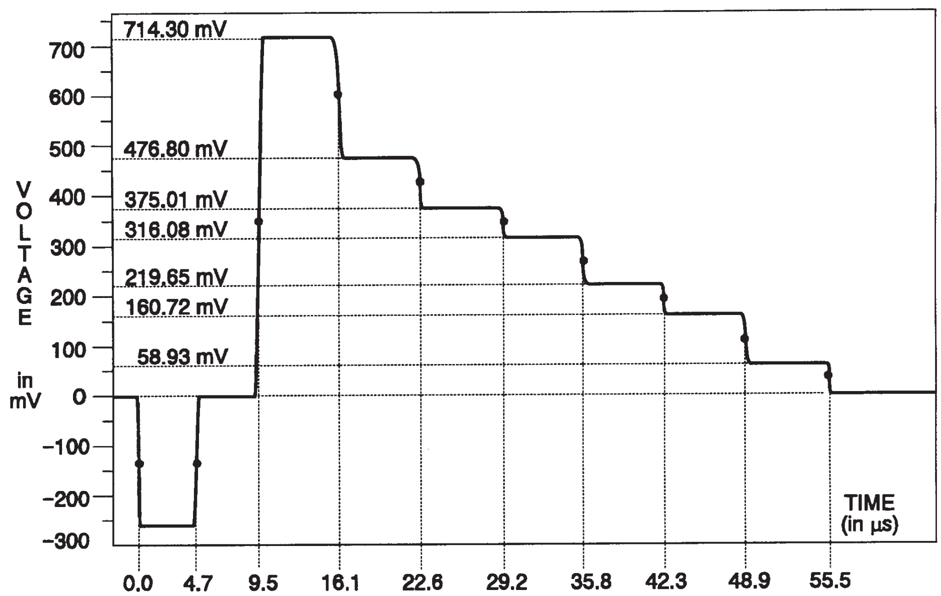


Figure 3–169: Y channel – 75% color bars (no setup)

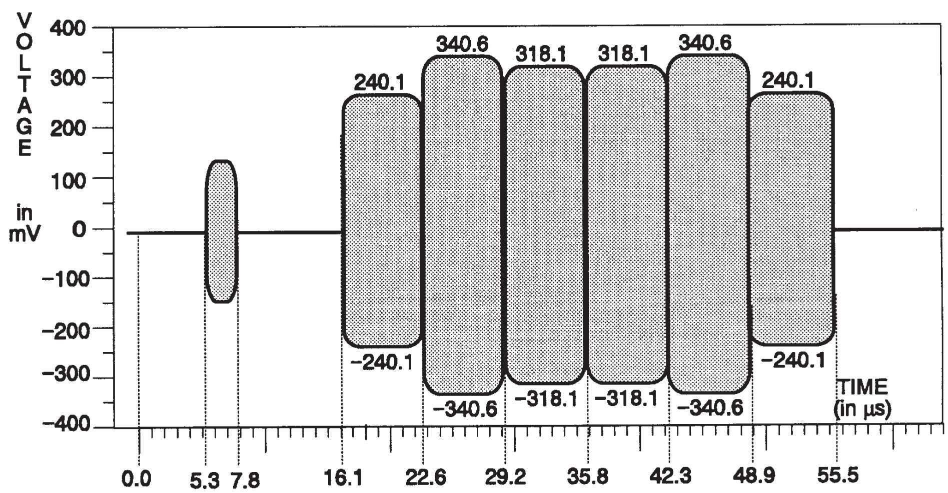


Figure 3–170: C channel – 75% color bars (no setup)

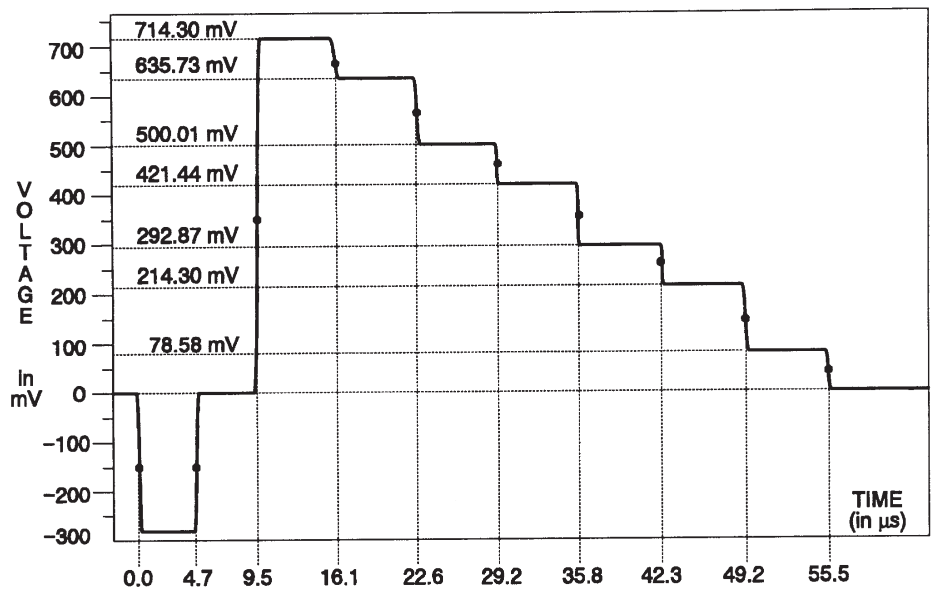


Figure 3–171: Y channel – 100% color bars (no setup)

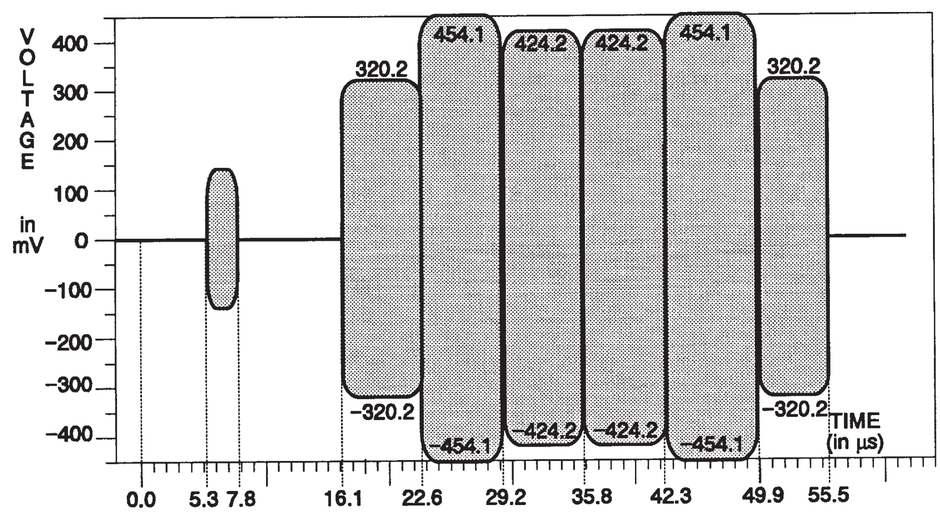


Figure 3–172: C channel – 100% color bars (no setup)

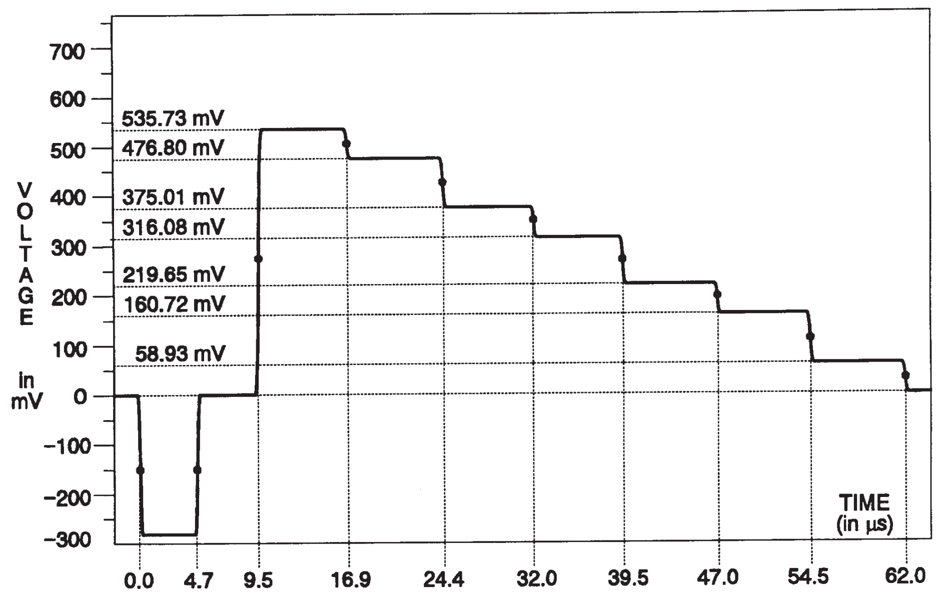


Figure 3–173: Y channel – SMPTE bars (no setup)

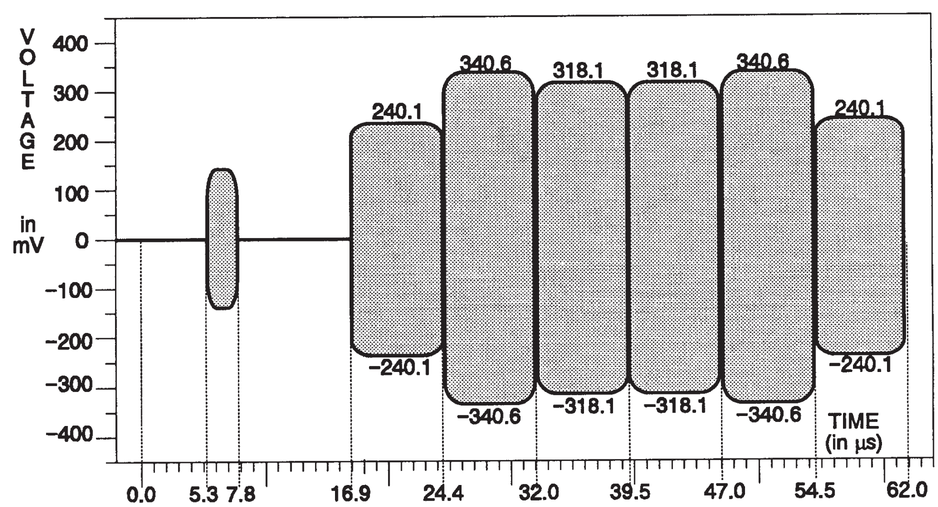


Figure 3–174: C channel – SMPTE bars (no setup)

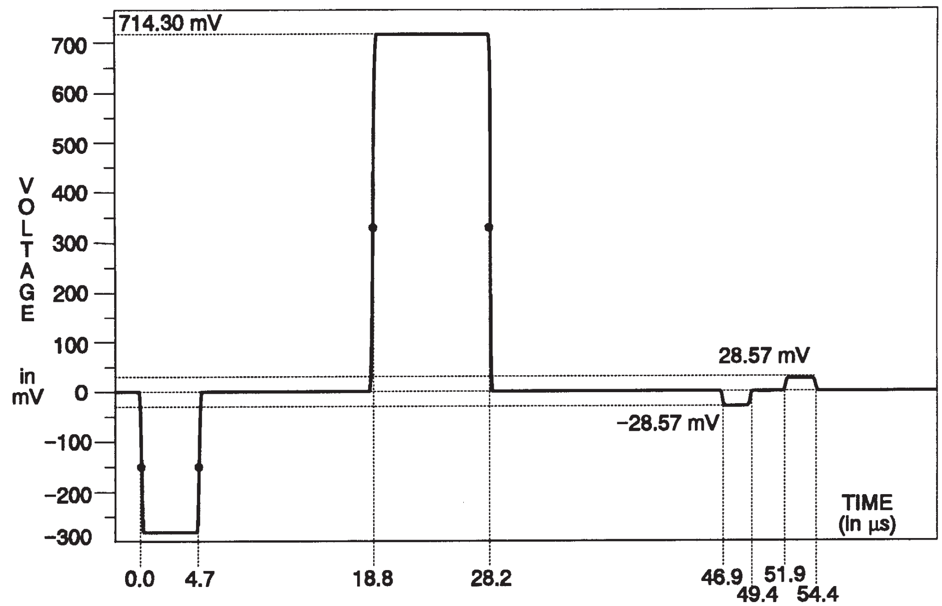


Figure 3–175: Y channel – IYQB (no setup)

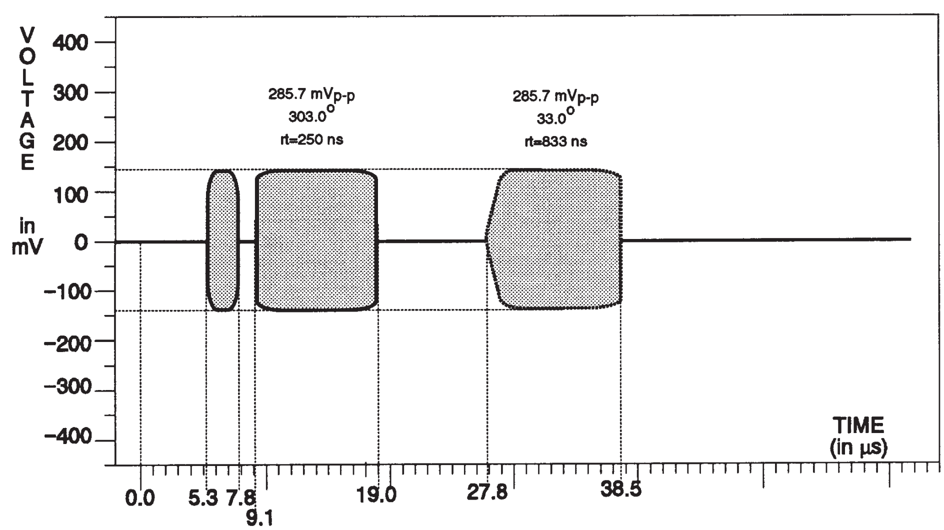


Figure 3–176: C channel – IYQB (no setup)

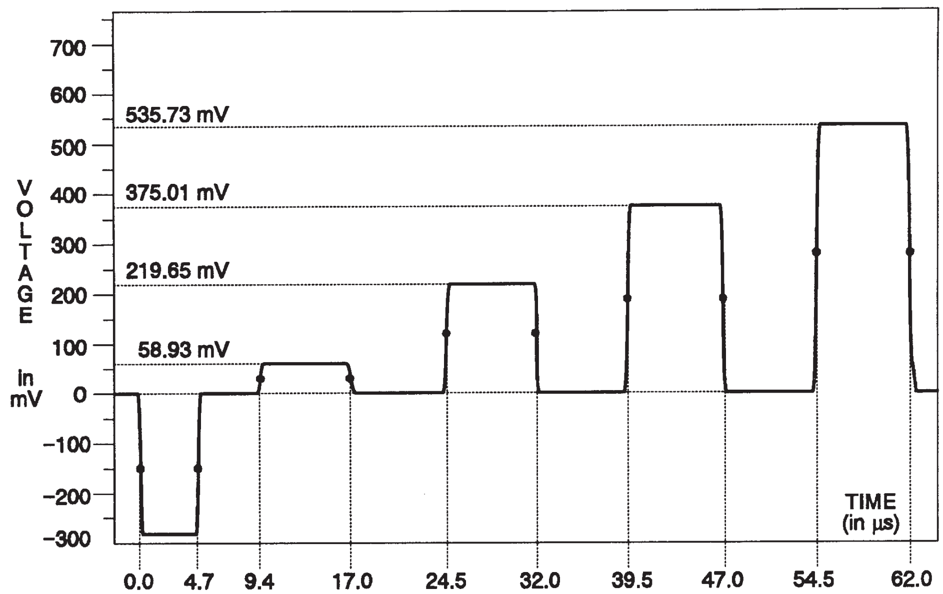


Figure 3–177: Y channel – reverse blue bars (no setup)

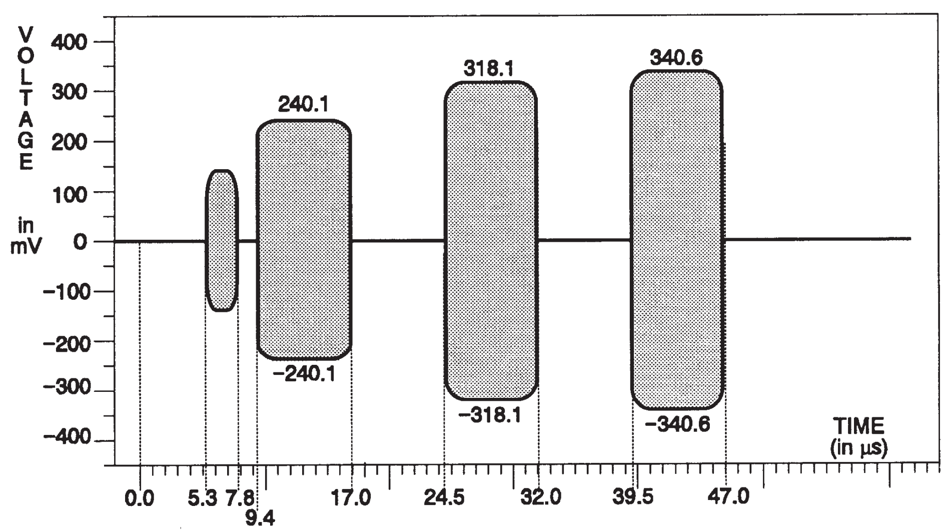


Figure 3–178: C channel – reverse blue bars (no setup)

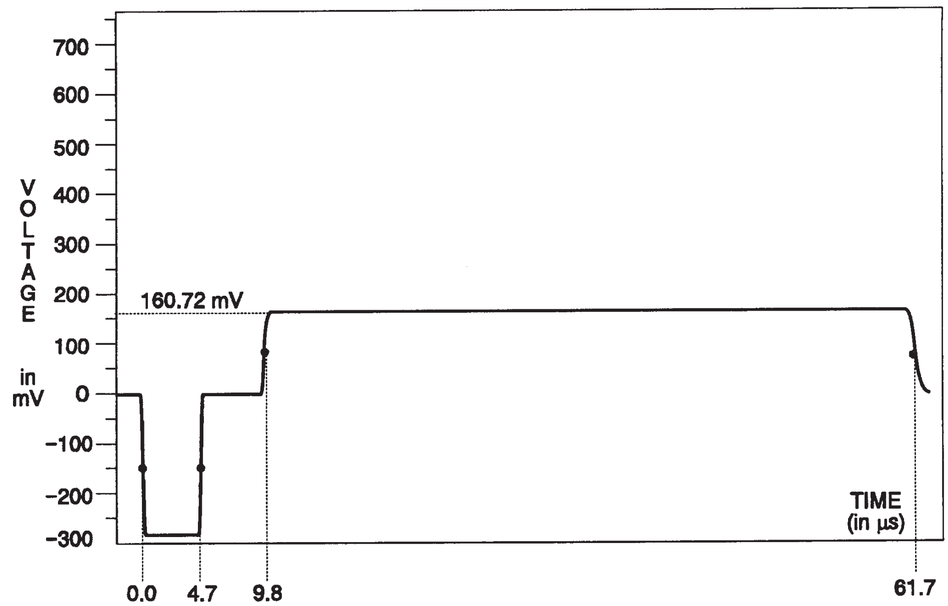


Figure 3–179: Y channel – red field (no setup)

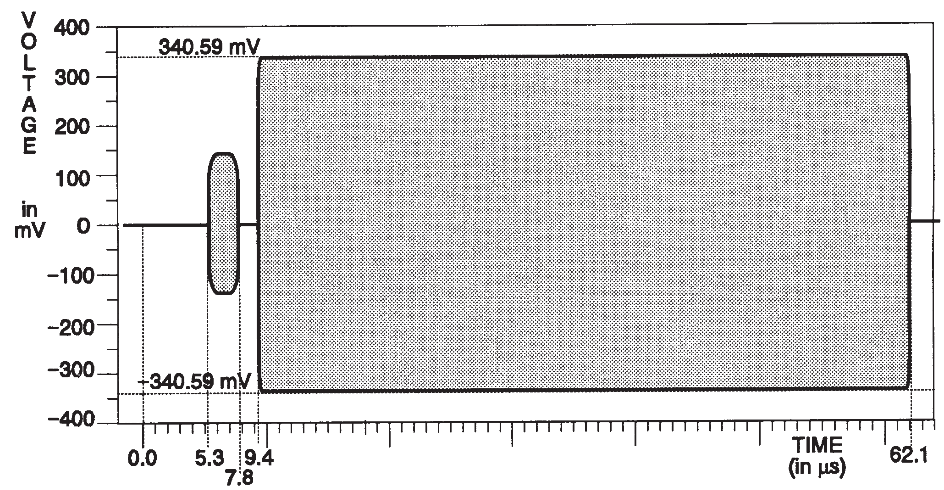


Figure 3–180: C channel – red field (no setup, SN B019999 and below)

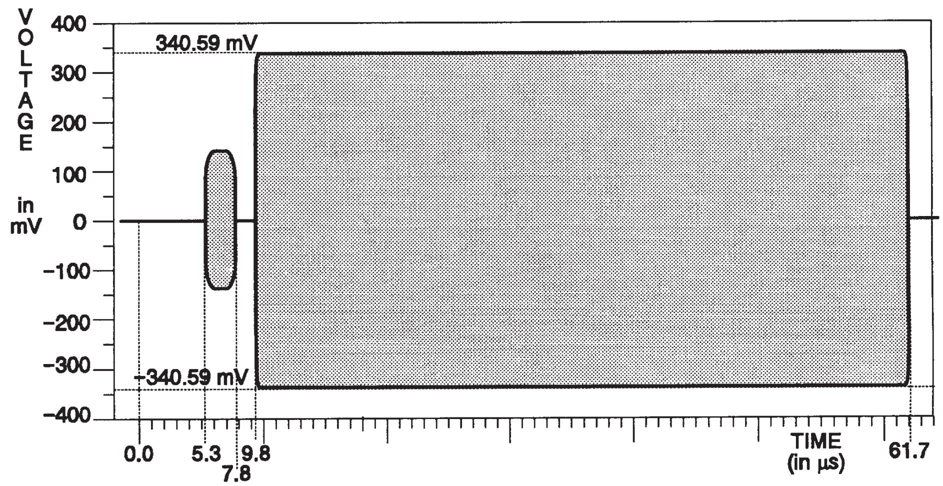


Figure 3–181: C channel – red field (no setup, SN B020000 to B039999)

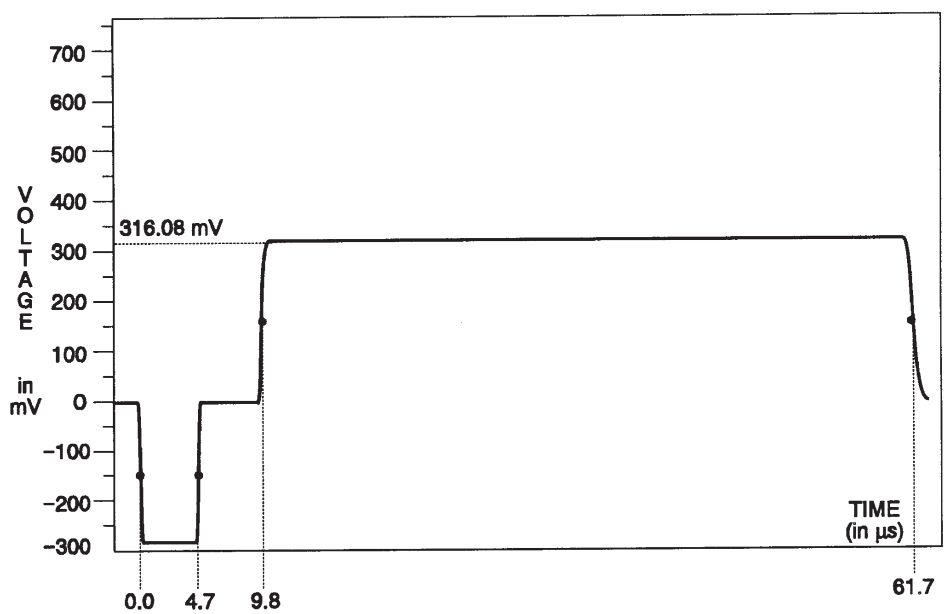


Figure 3–182: Y channel – green field (no setup)

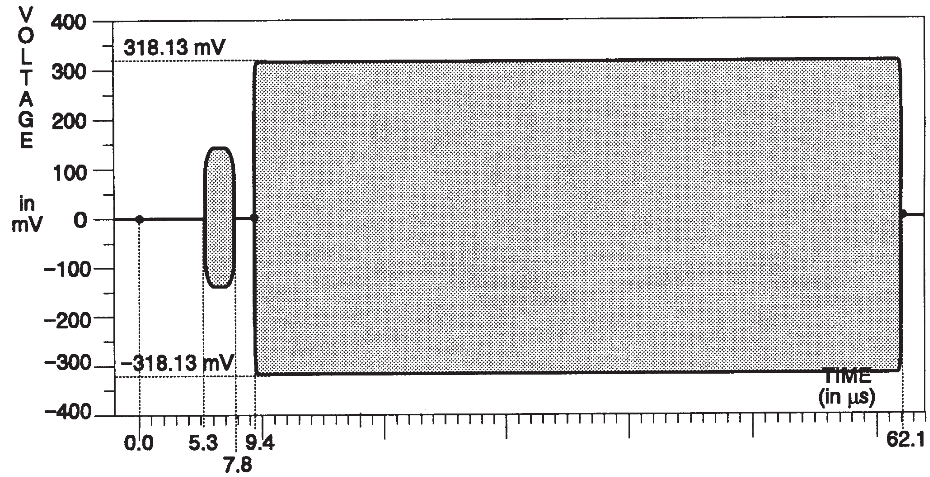


Figure 3–183: C channel – green field (no setup, SN B019999 and below)

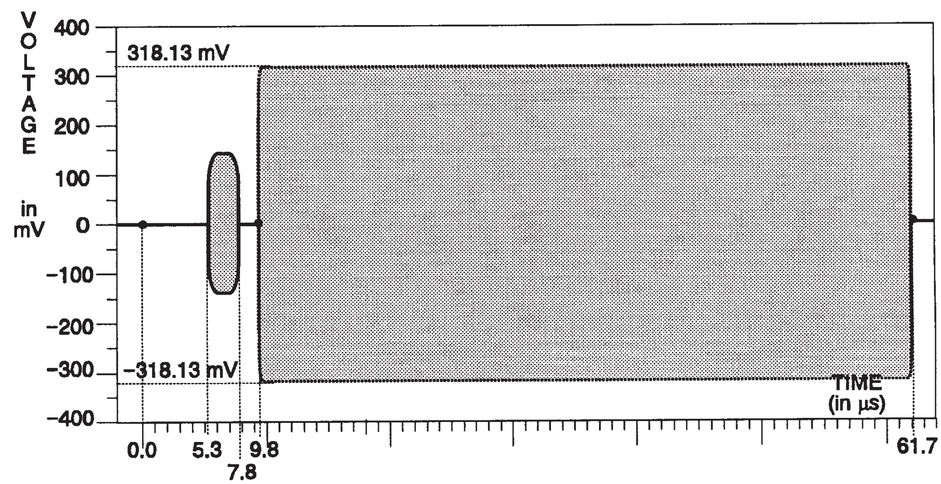


Figure 3–184: C channel – green field (no setup, SN B020000 to B039999)

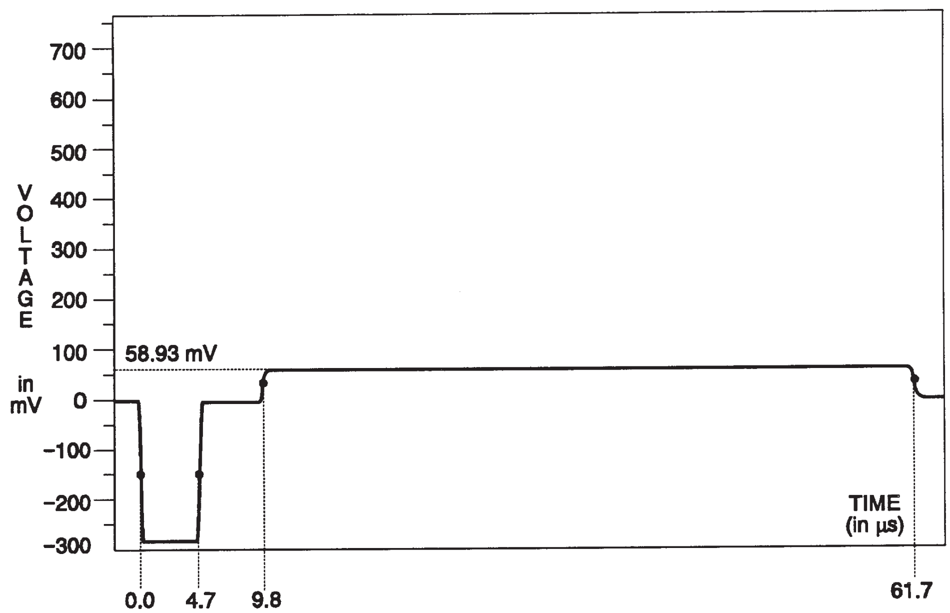


Figure 3–185: Y channel – blue field (no setup)

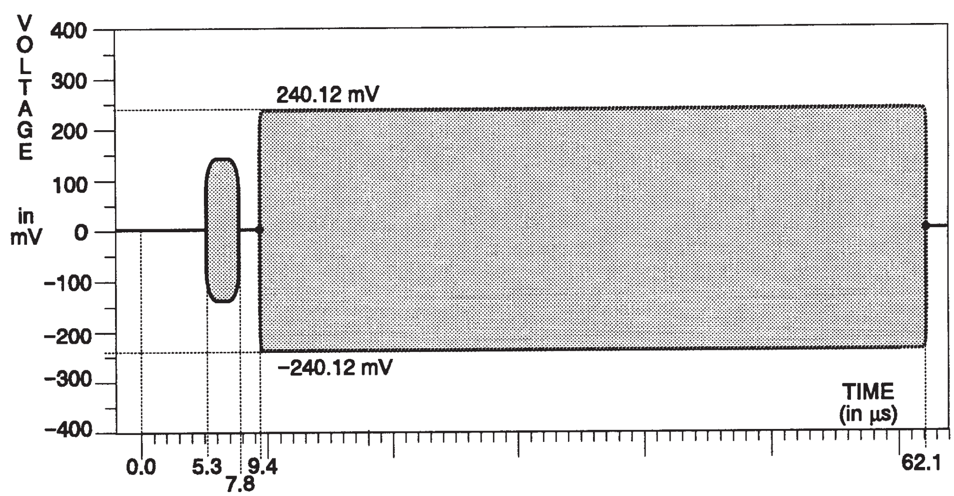


Figure 3–186: C channel – blue field (no setup, SN B019999 and below)

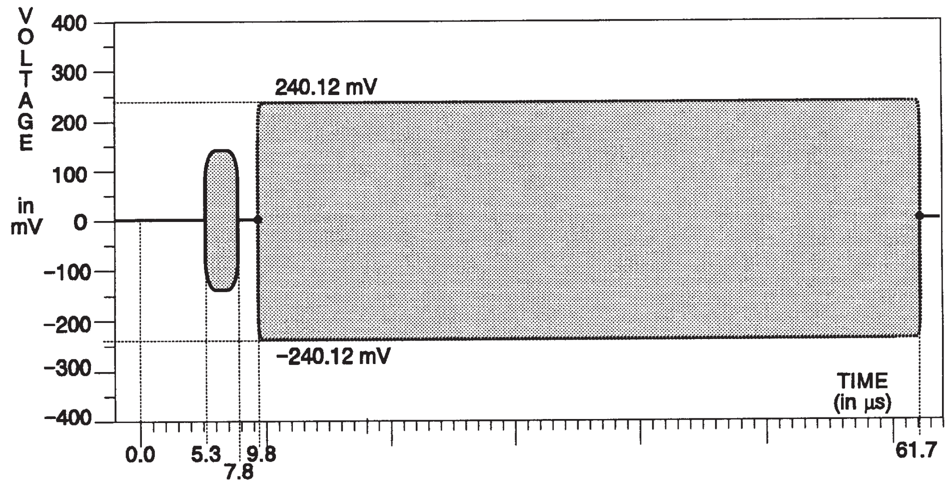


Figure 3–187: C channel – blue field (no setup, SN B020000 to B039999)

Option 2J Signals (Y, B–Y, R–Y Unique Signals)

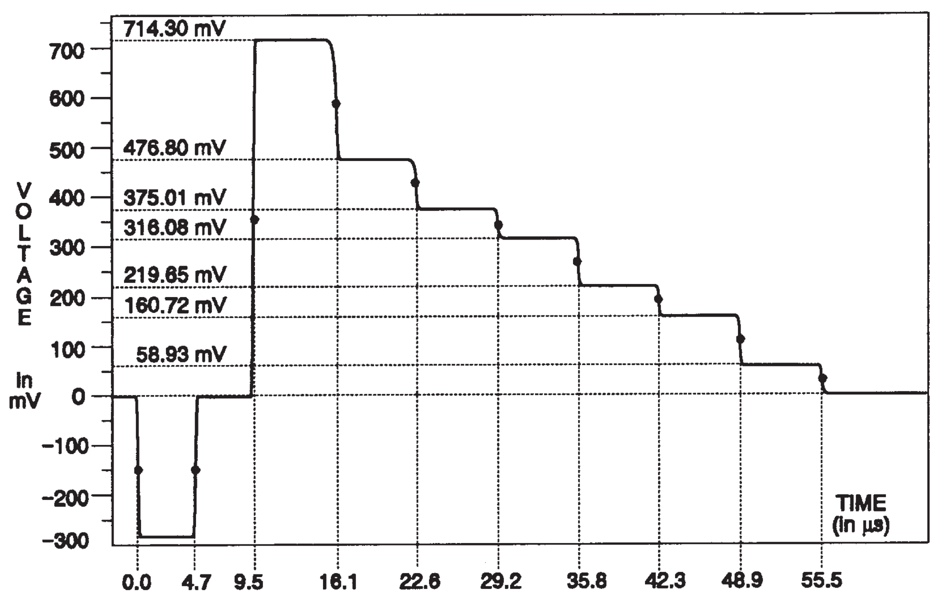


Figure 3–188: Y channel – 75% color bars (no setup)

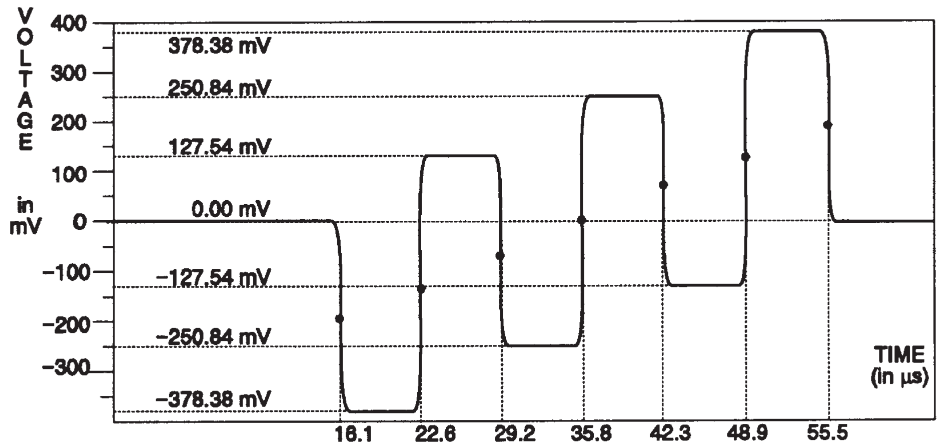


Figure 3–189: B–Y channel – 75% color bars (no setup)

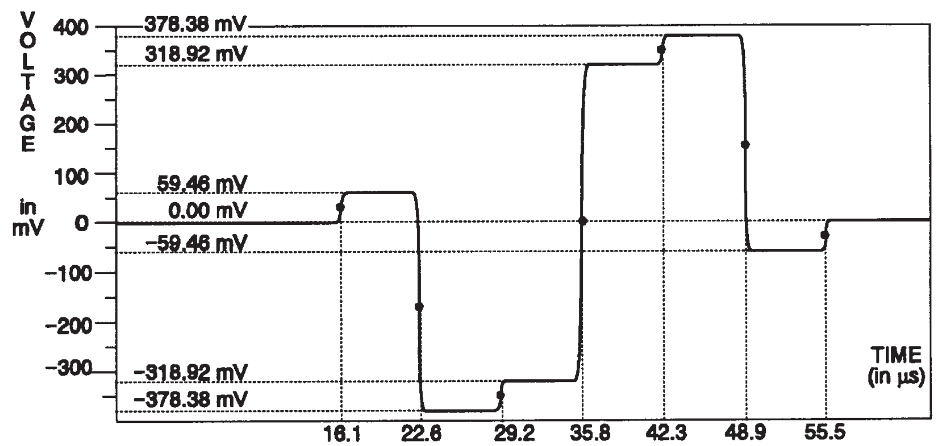


Figure 3–190: R–Y channel – 75% color bars (no setup)

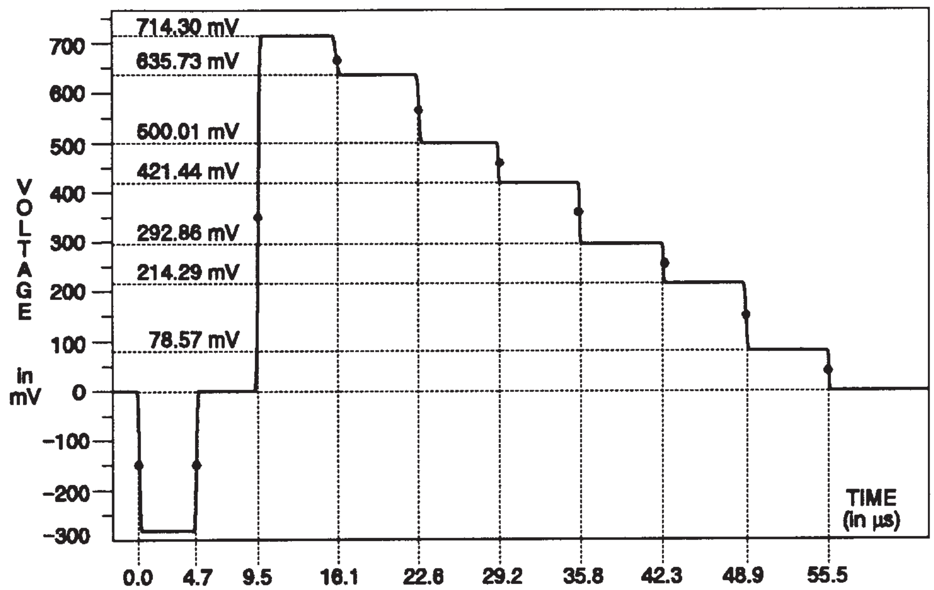


Figure 3–191: Y channel – 100% bars (no setup)

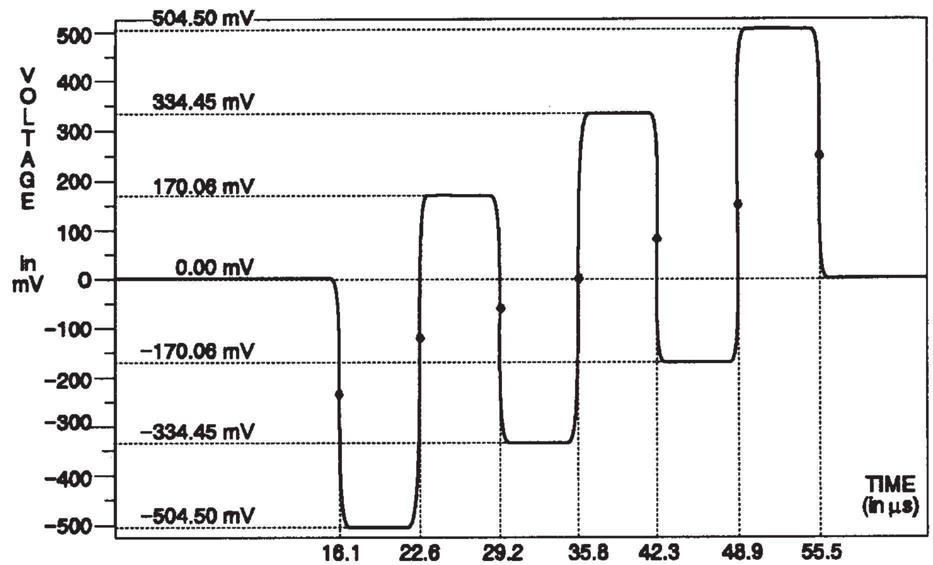


Figure 3–192: B–Y channel – 100% bars (no setup)

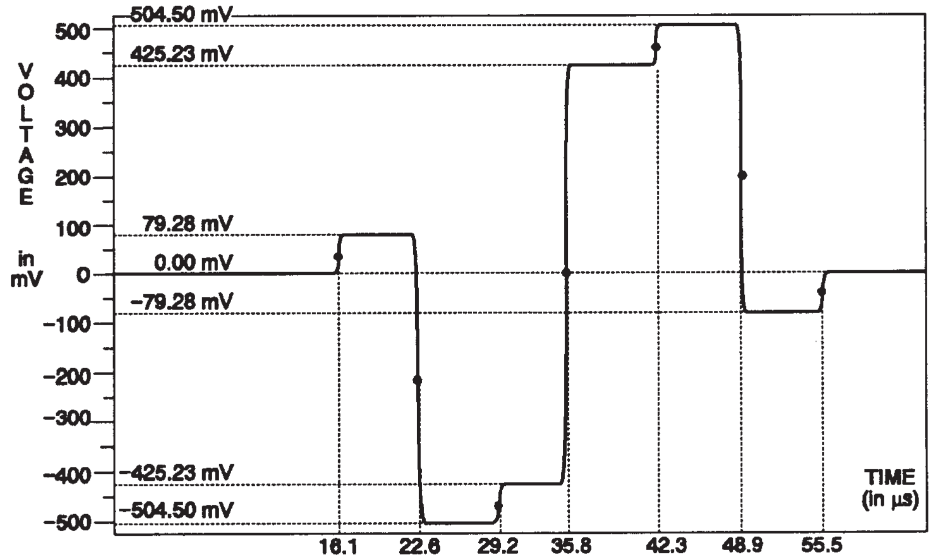


Figure 3–193: R–Y channel – 100% bars (no setup)

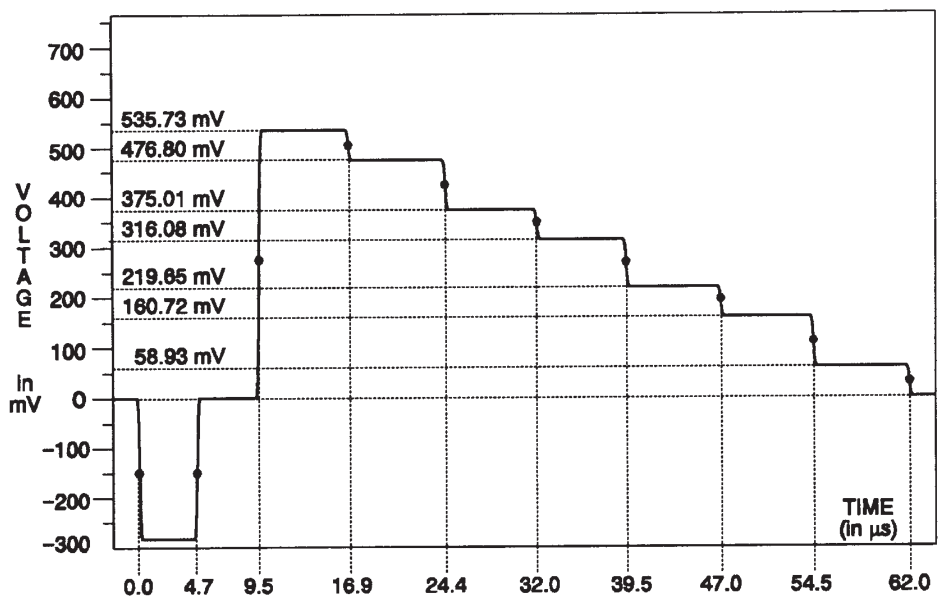


Figure 3–194: Y channel – SMPTE bars (no setup)

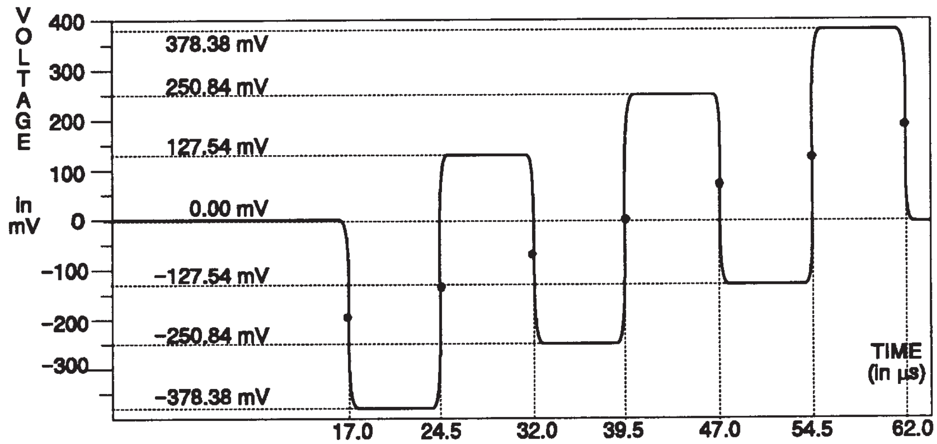


Figure 3–195: B–Y channel – SMPTE bars (no setup)

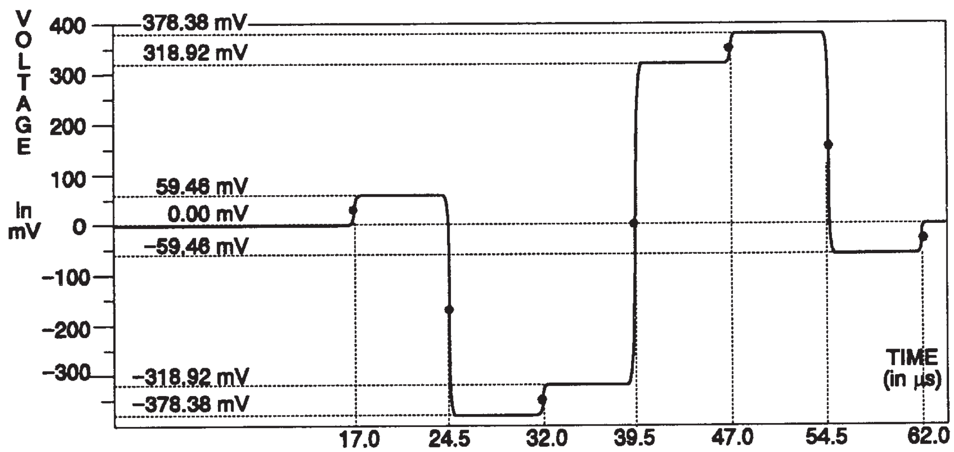


Figure 3–196: R–Y channel – SMPTE bars (no setup)

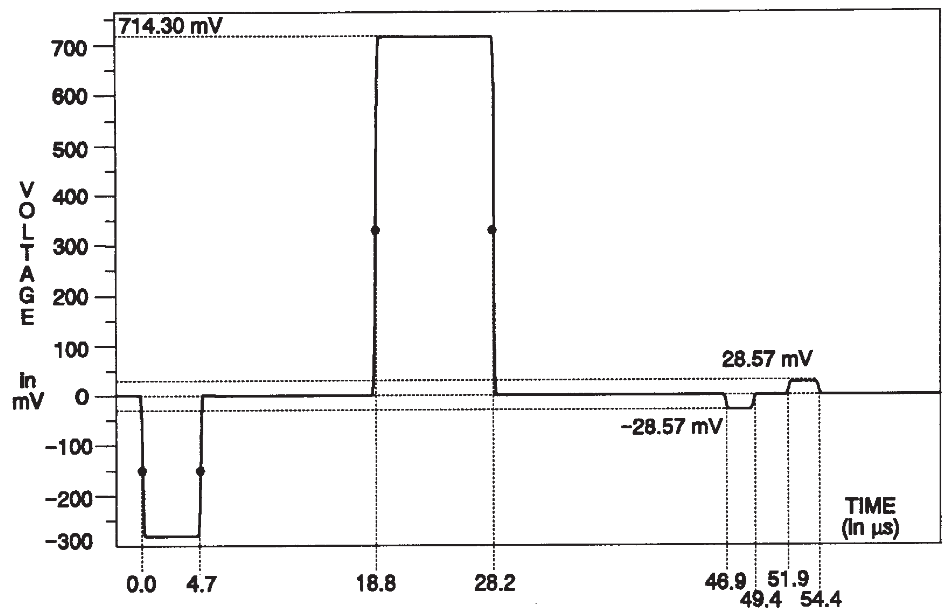


Figure 3–197: Y channel – IYQB (no setup)

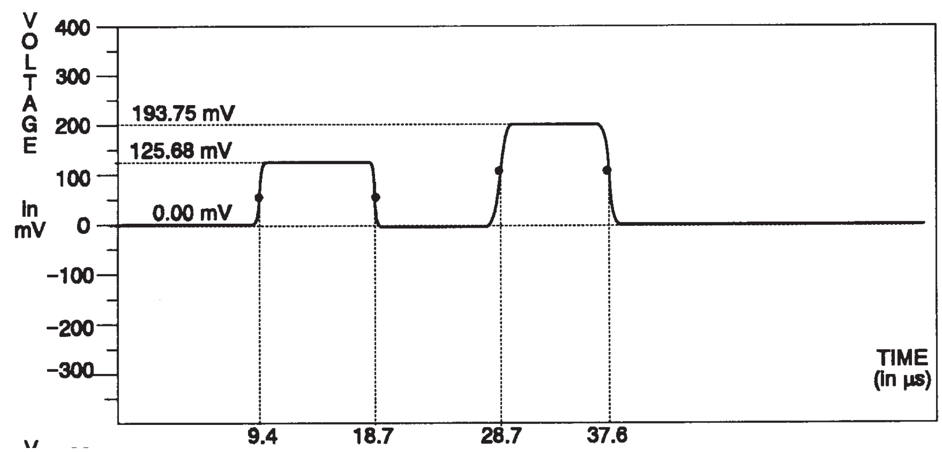


Figure 3–198: B–Y channel – IYQB (no setup)

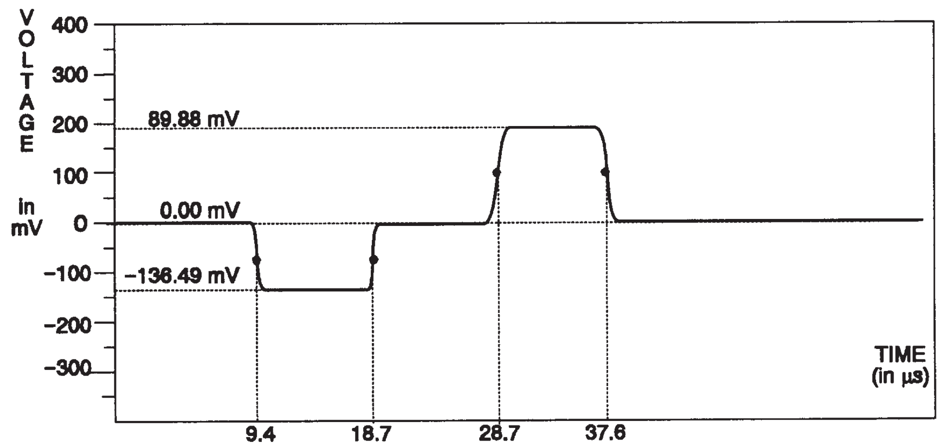


Figure 3–199: R–Y channel – IYQB (no setup)

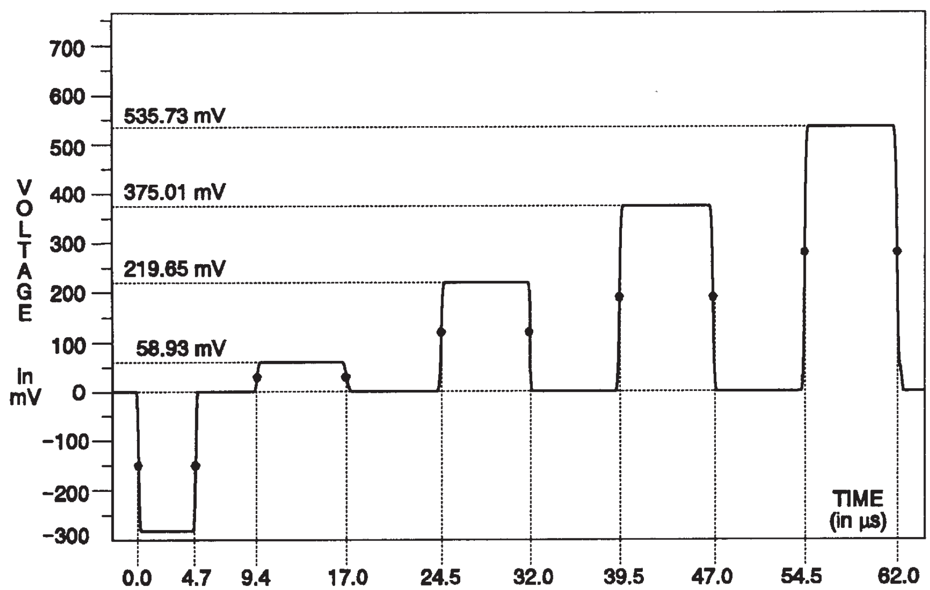


Figure 3–200: Y channel – reverse blue bars (no setup)

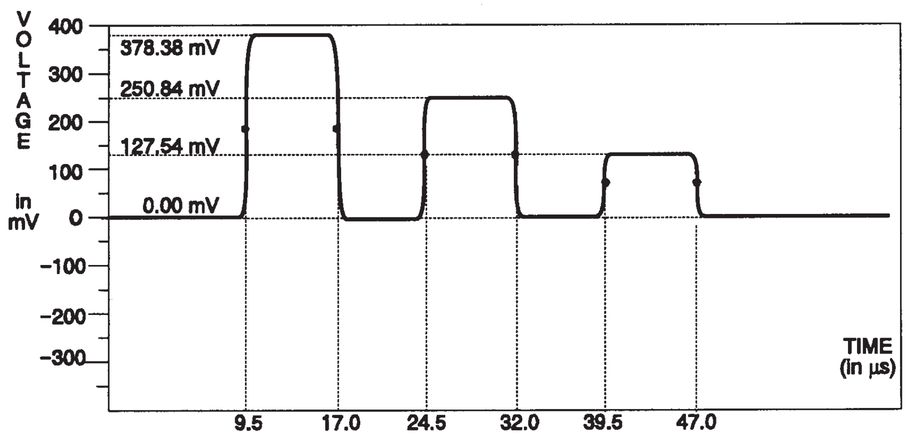


Figure 3–201: B–Y channel – reverse blue bars

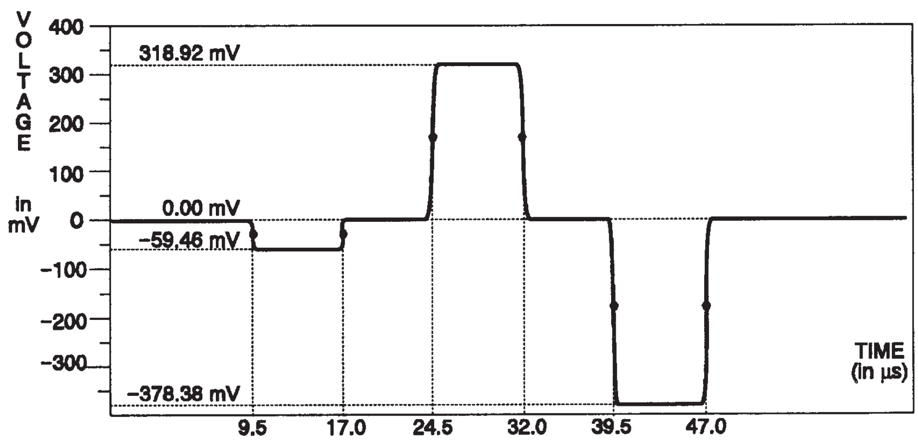


Figure 3–202: R–Y channel – reverse blue bars

Option 03 Signals (Y–C Unique Signals)

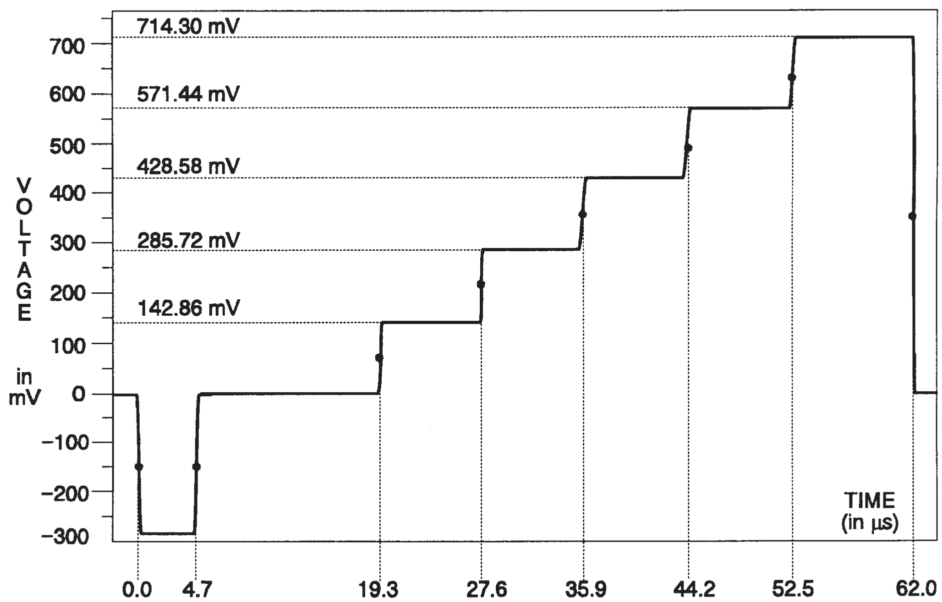


Figure 3–203: Y channel – 5 step

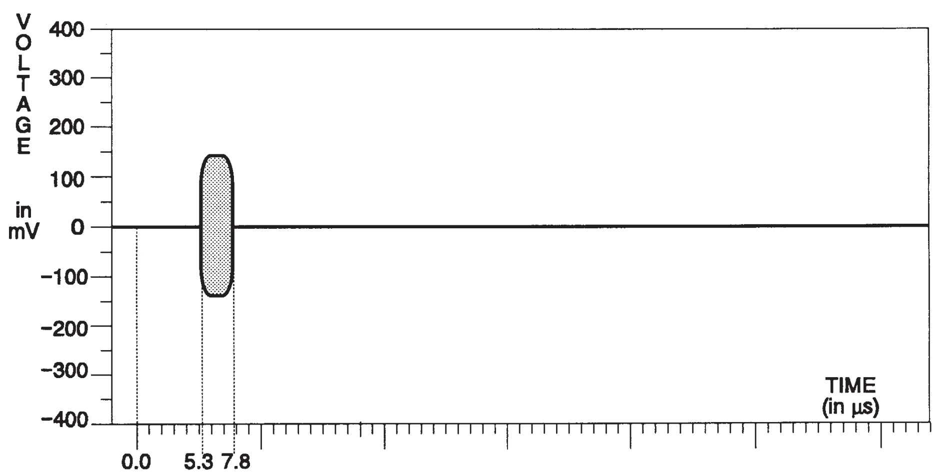


Figure 3–204: C channel – 5 step

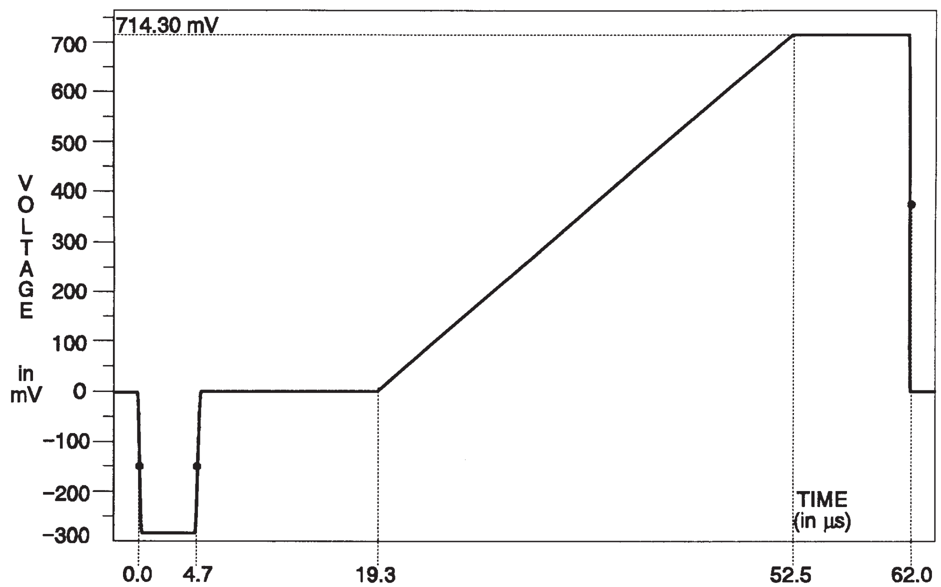


Figure 3–205: Y channel – ramp

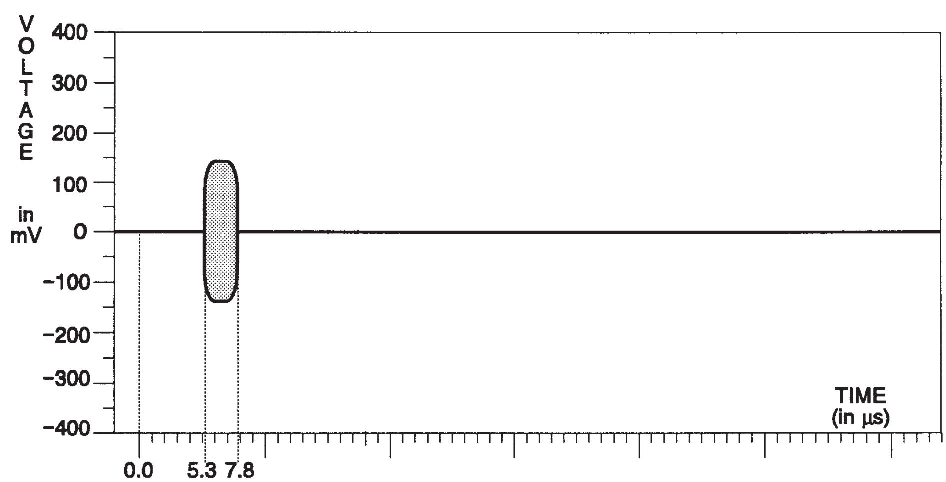


Figure 3–206: C channel – ramp

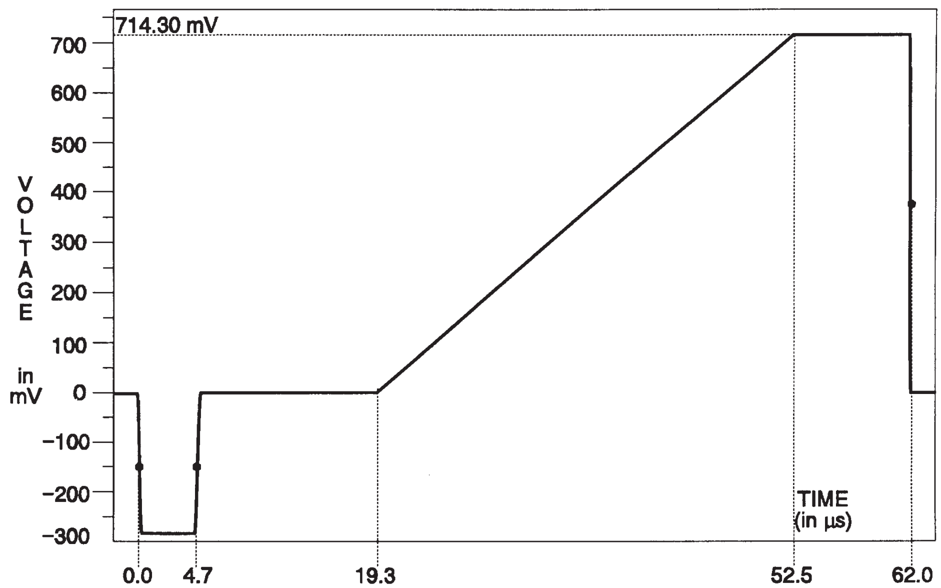


Figure 3–207: Y channel – modulated ramp

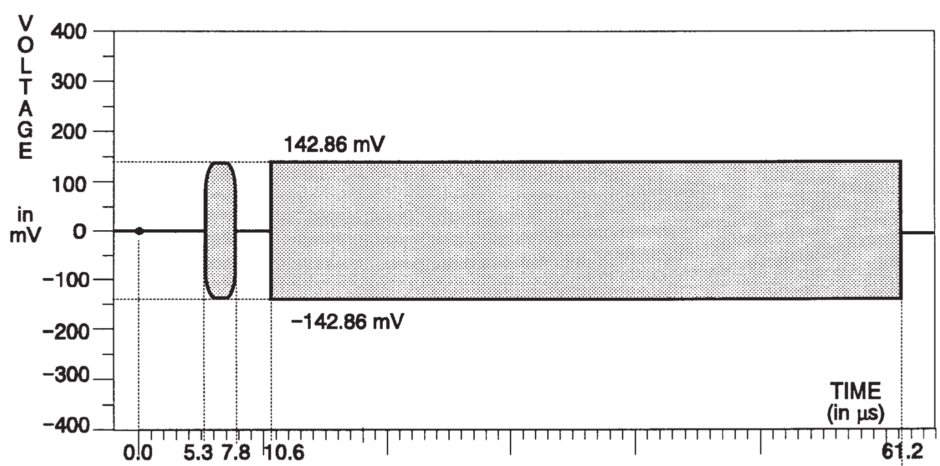


Figure 3–208: C channel – modulated ramp

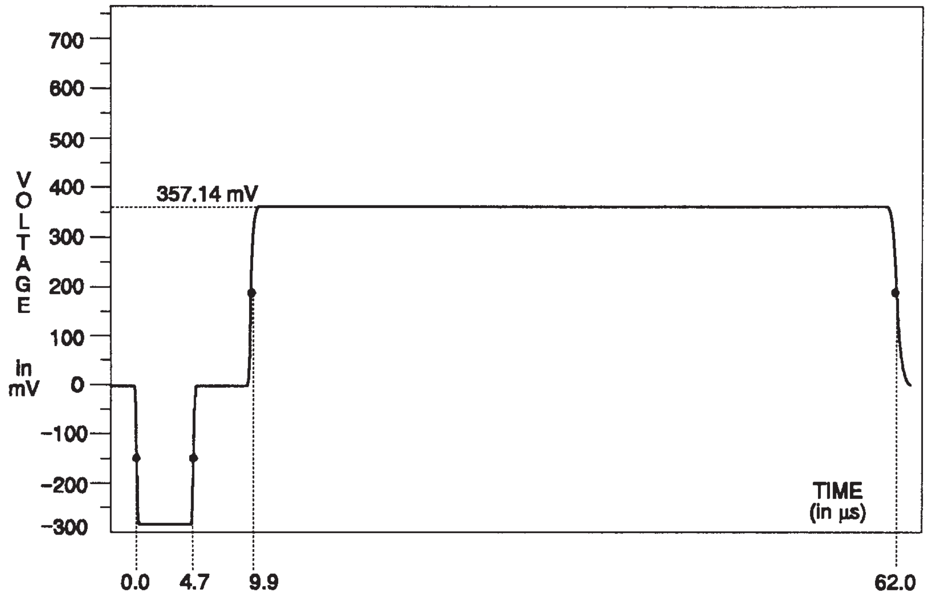


Figure 3–209: Y channel – chroma response (SN B020000 to B039999)

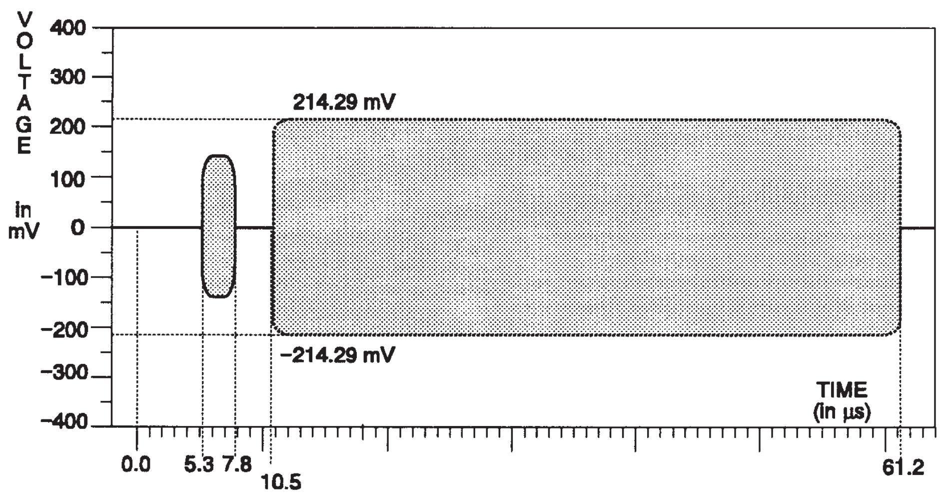


Figure 3–210: C channel – chroma response (SN B020000 to B039999)

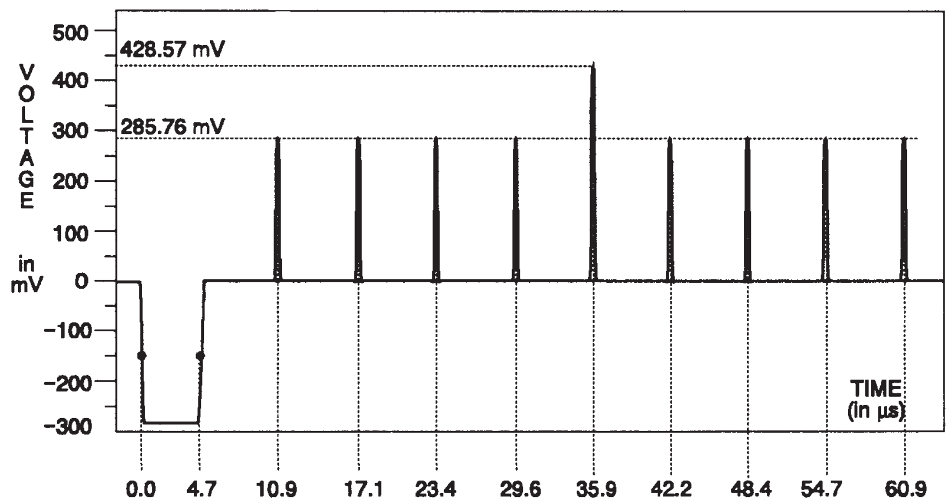


Figure 3–211: Y channel – chroma response markers (SN B020000 to B039999)

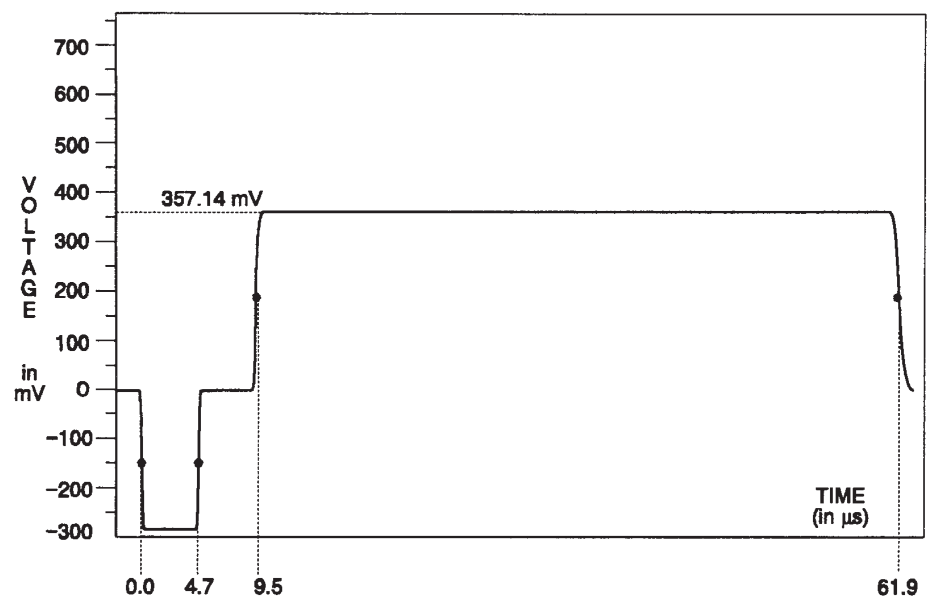


Figure 3–212: Y channel – chroma response (SN B019999 and below)

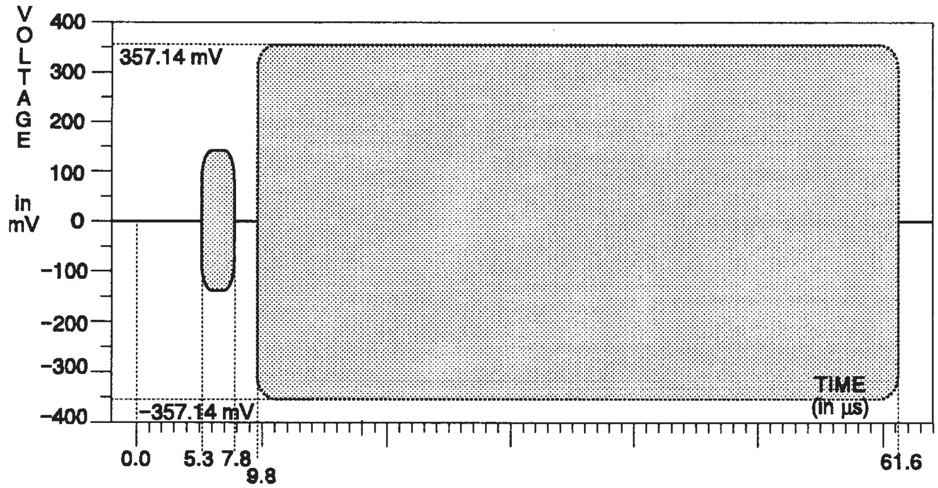


Figure 3–213: C channel – chroma response (SN B019999 and below)

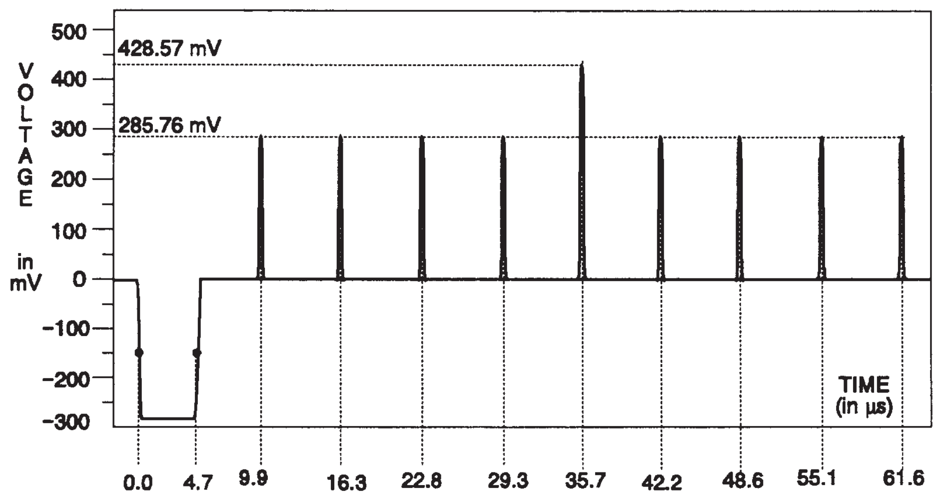


Figure 3–214: Y channel – chroma response markers (SN B019999 and below)

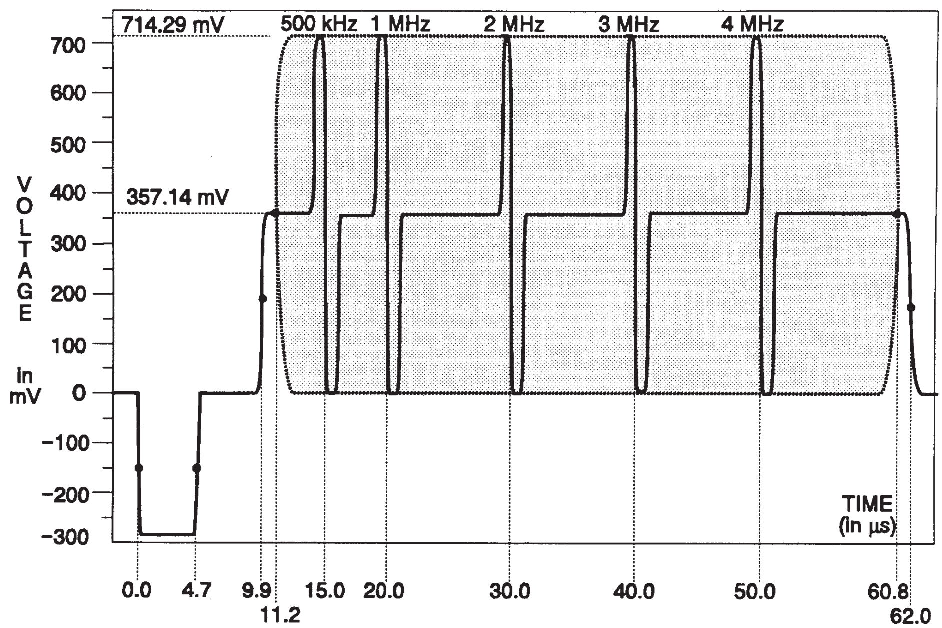


Figure 3–215: Y channel – sweep

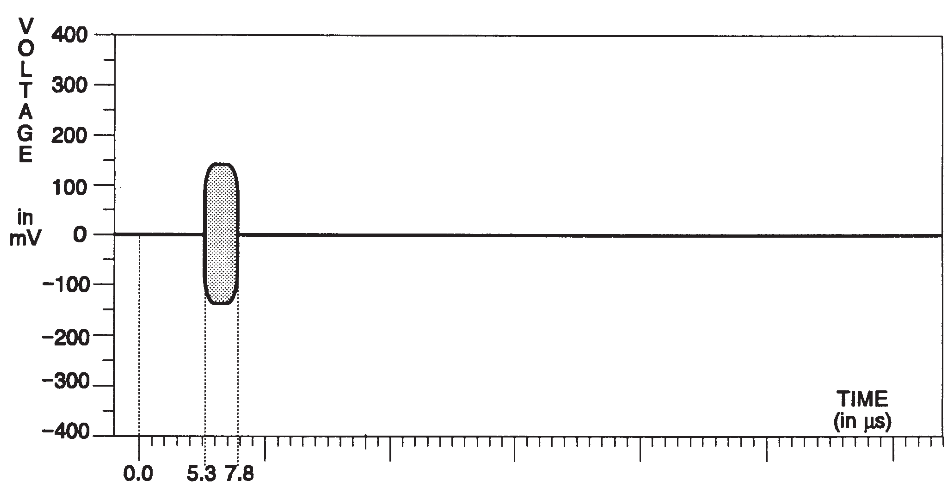


Figure 3–216: C channel – sweep

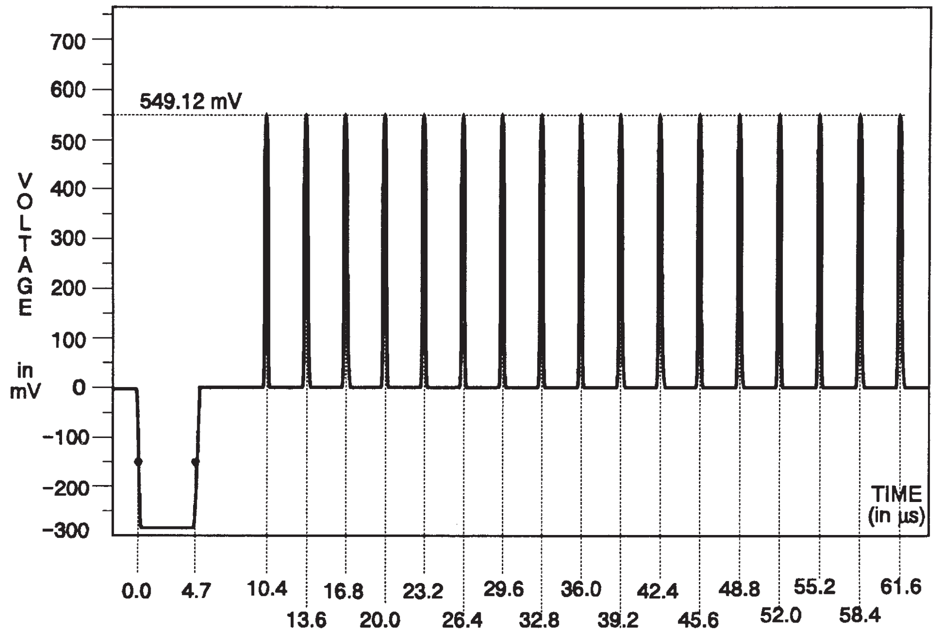


Figure 3–217: Y channel – convergence (vertical)

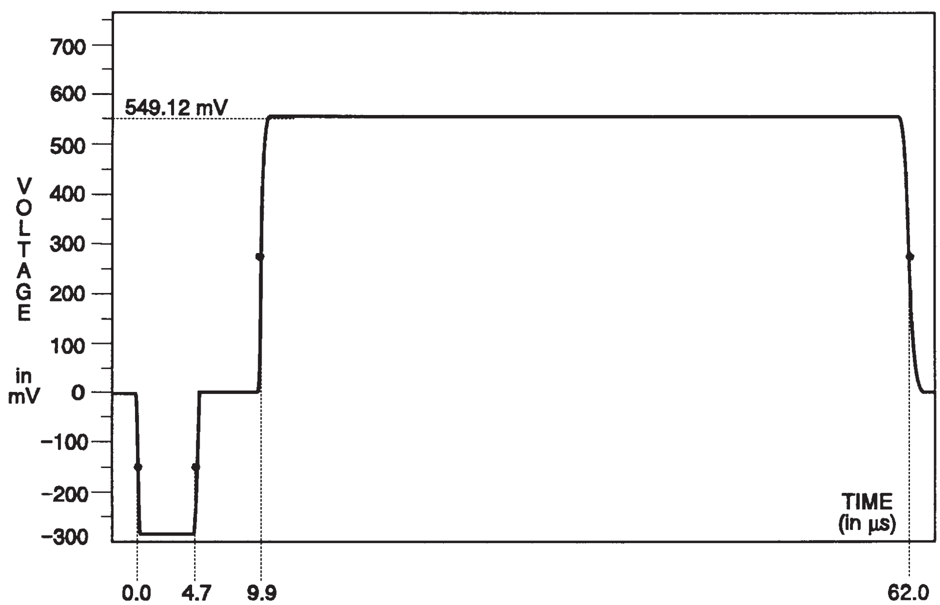


Figure 3–218: Y channel – convergence (horizontal)

Option 03 Signals (Betacam 3–Wire Unique Signals)

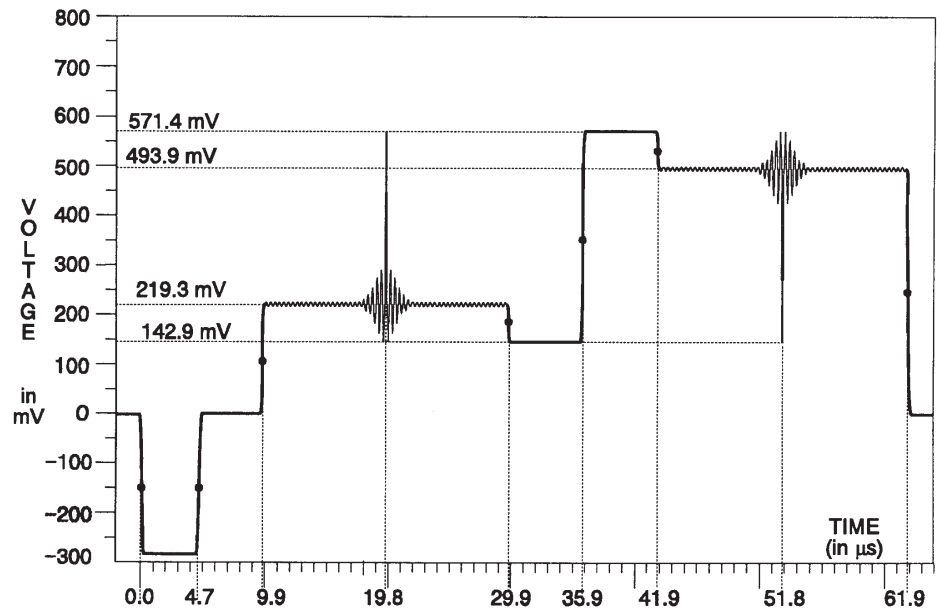


Figure 3–219: Y channel – sin(x)/x

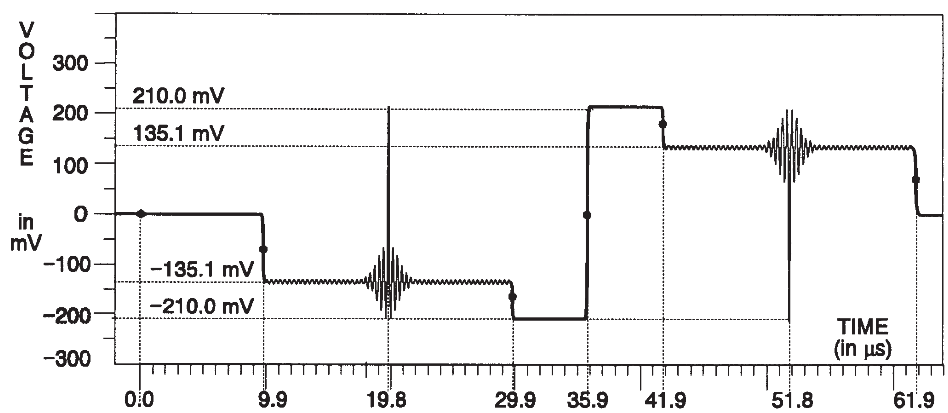


Figure 3–220: B–Y and R–Y channels – sin(x)/x

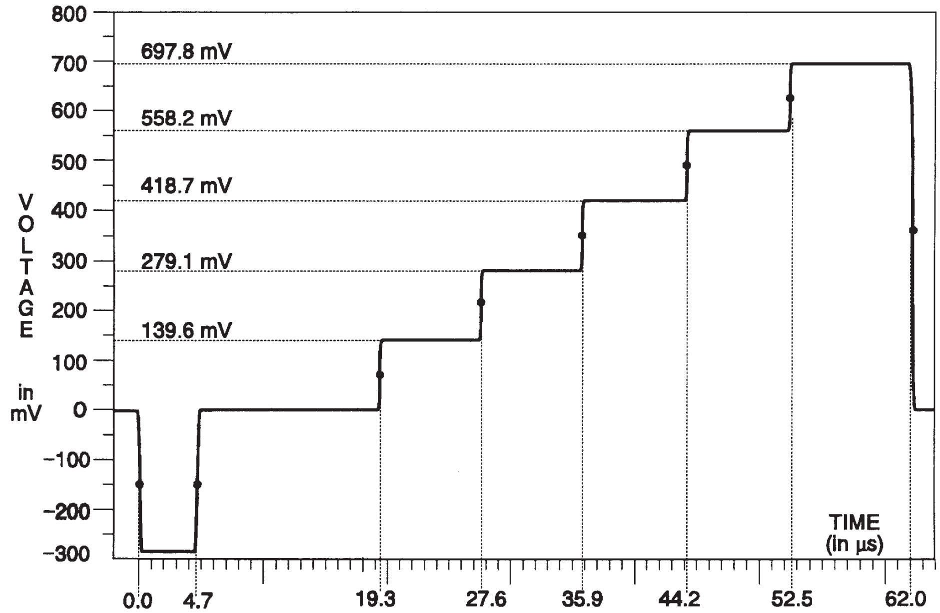


Figure 3–221: Y channel – 5 step

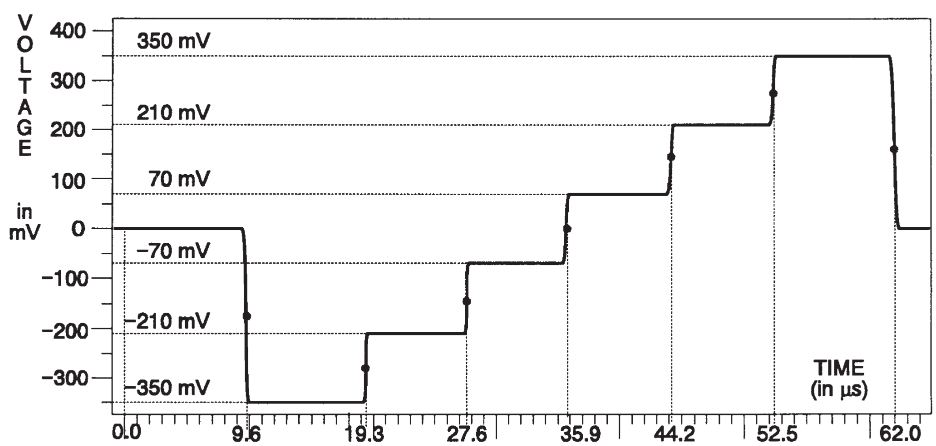


Figure 3–222: B–Y and R–Y channels – 5 step

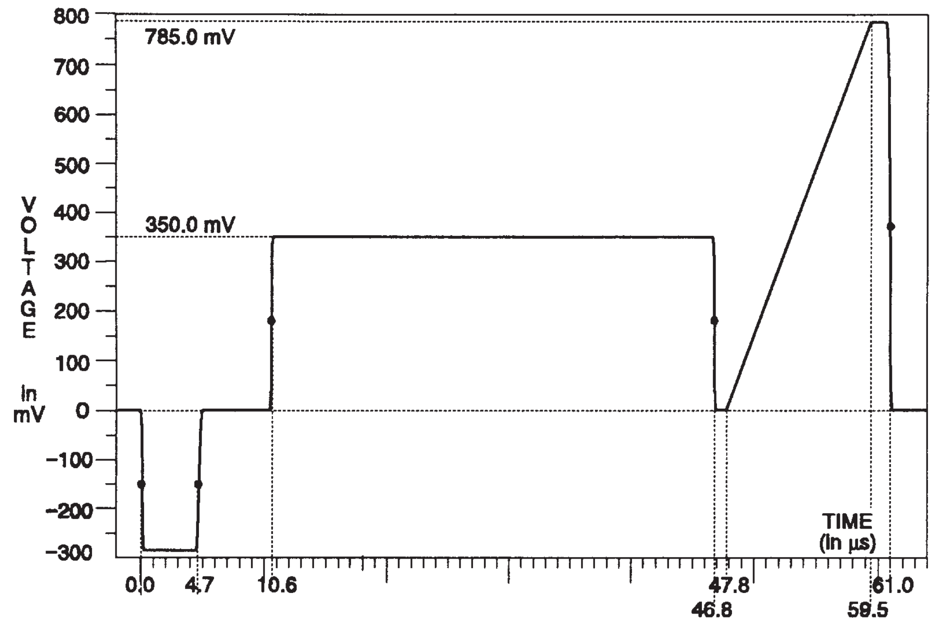


Figure 3–223: Y channel – quad phase

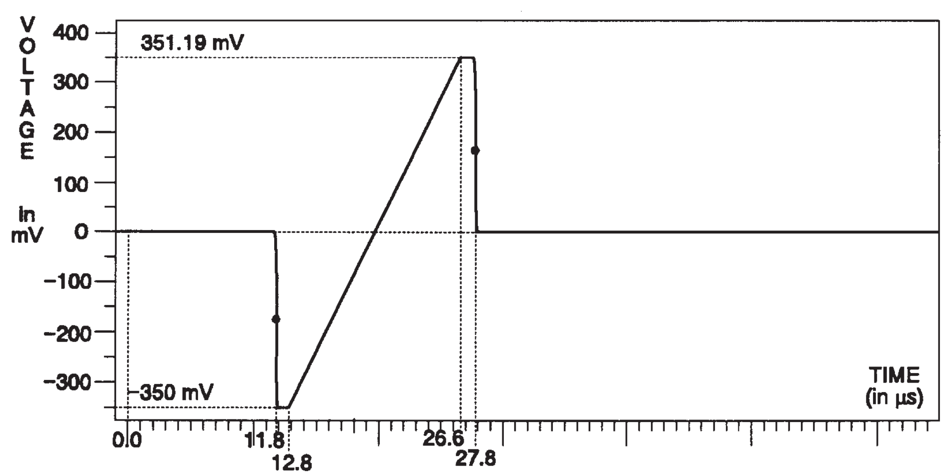


Figure 3–224: B–Y channel – quad phase

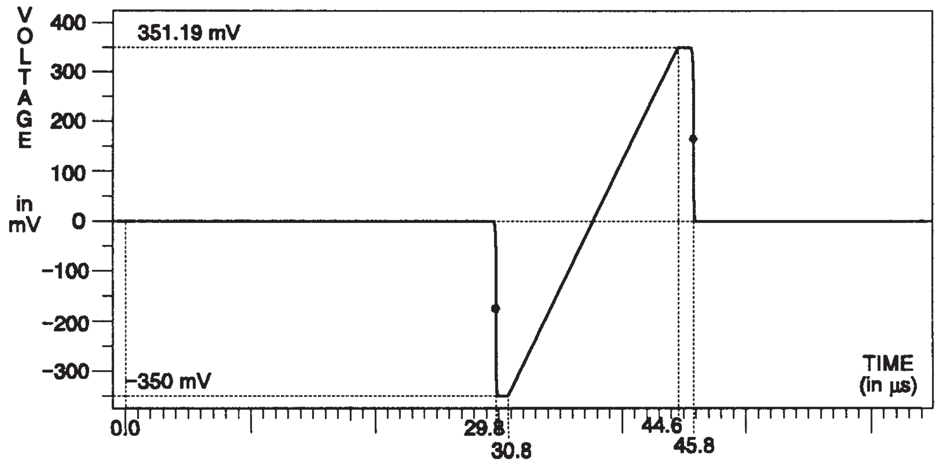


Figure 3–225: R–Y channel – quad phase

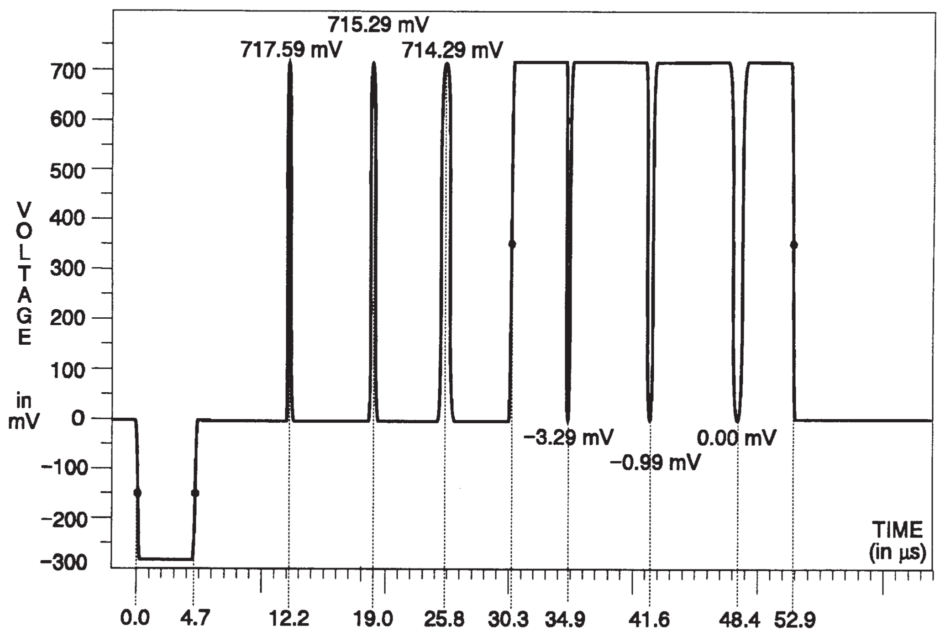


Figure 3–226: Y channel – T pulses

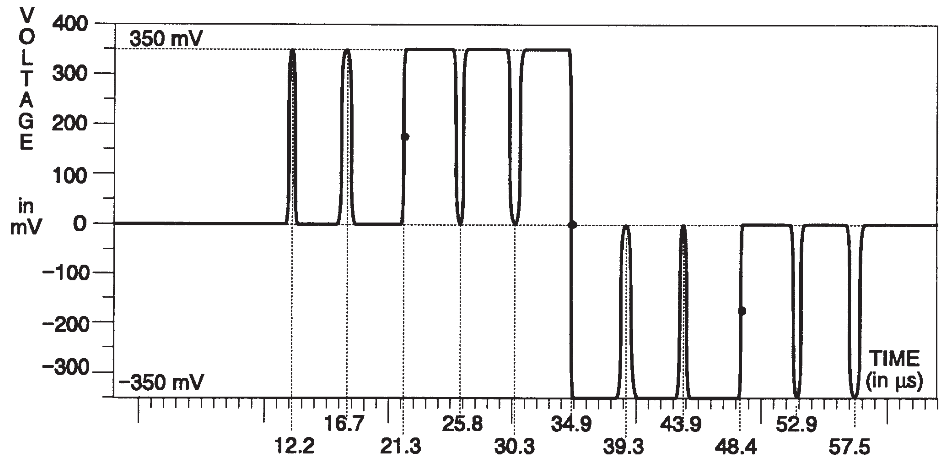


Figure 3–227: B–Y channel – T pulses

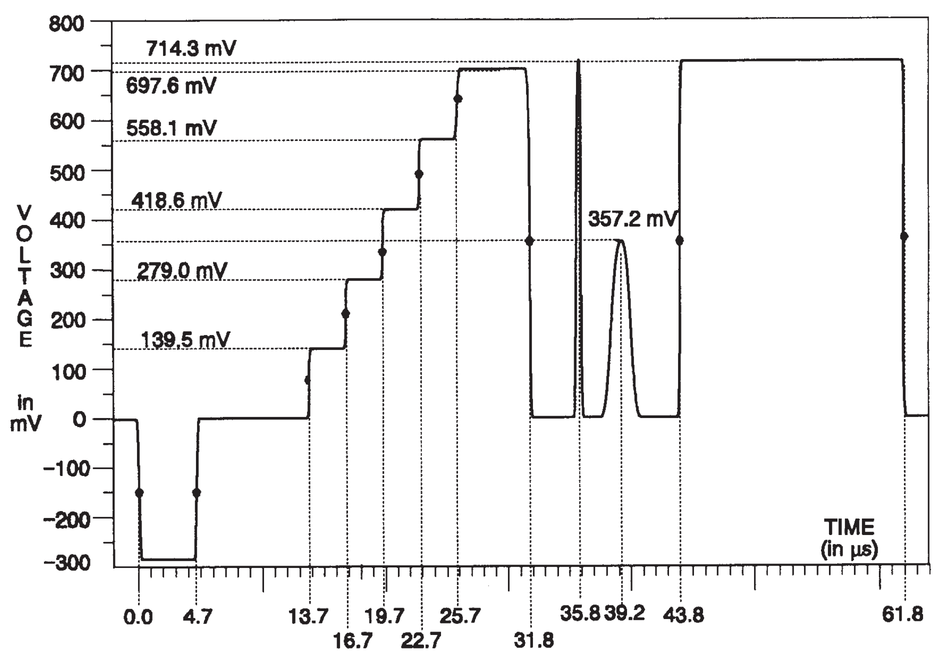


Figure 3–228: Y channel – line 17

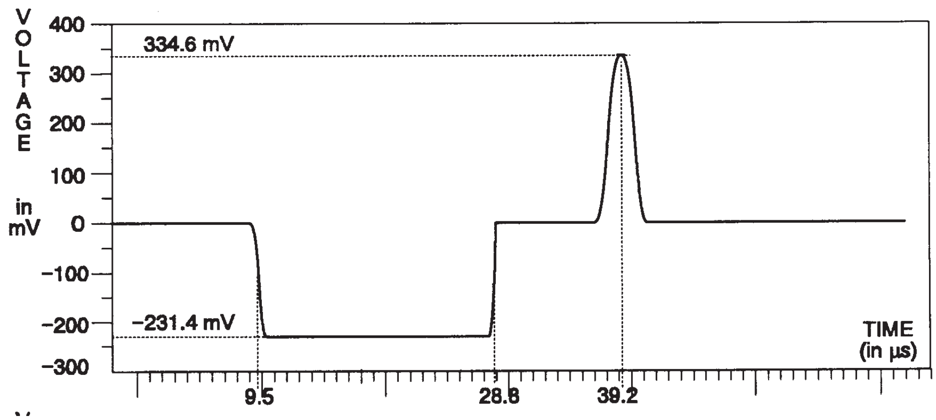


Figure 3–229: B–Y channel – line 17

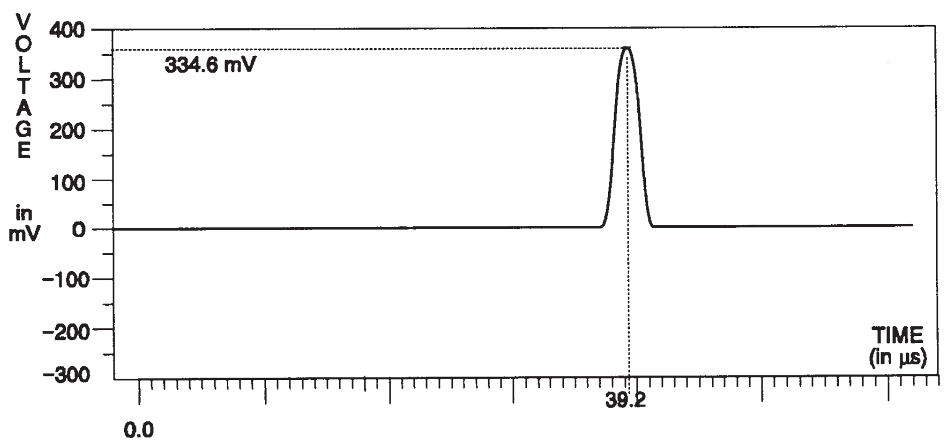


Figure 3–230: R–Y channel – line 17

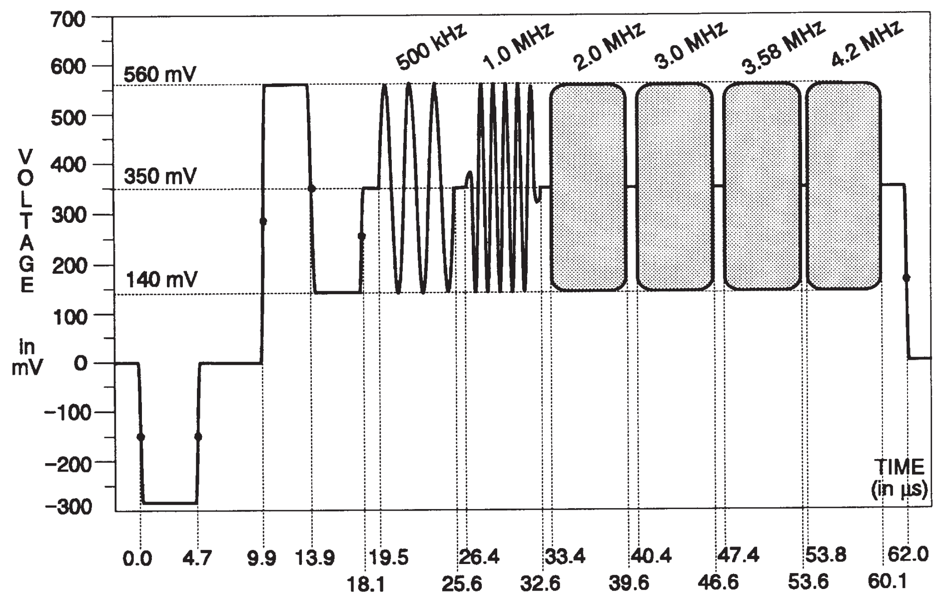


Figure 3–231: Y channel – 60% multiburst

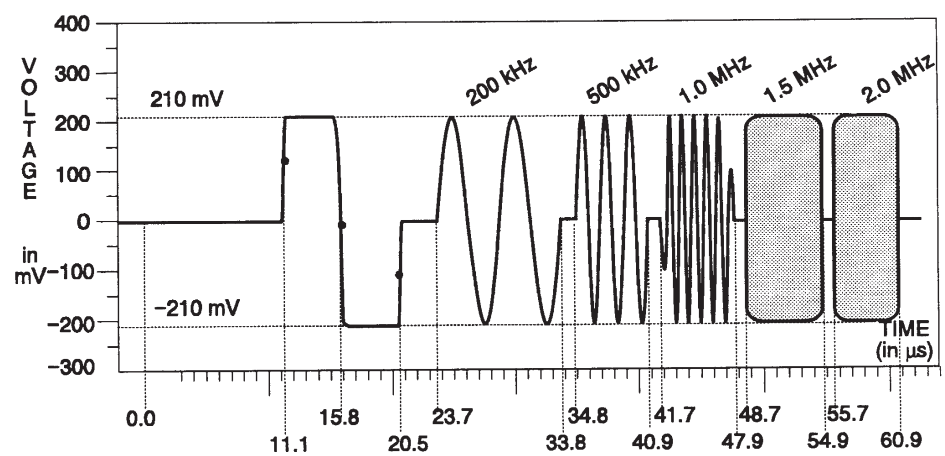


Figure 3–232: B–Y and R–Y channels – 60% multiburst

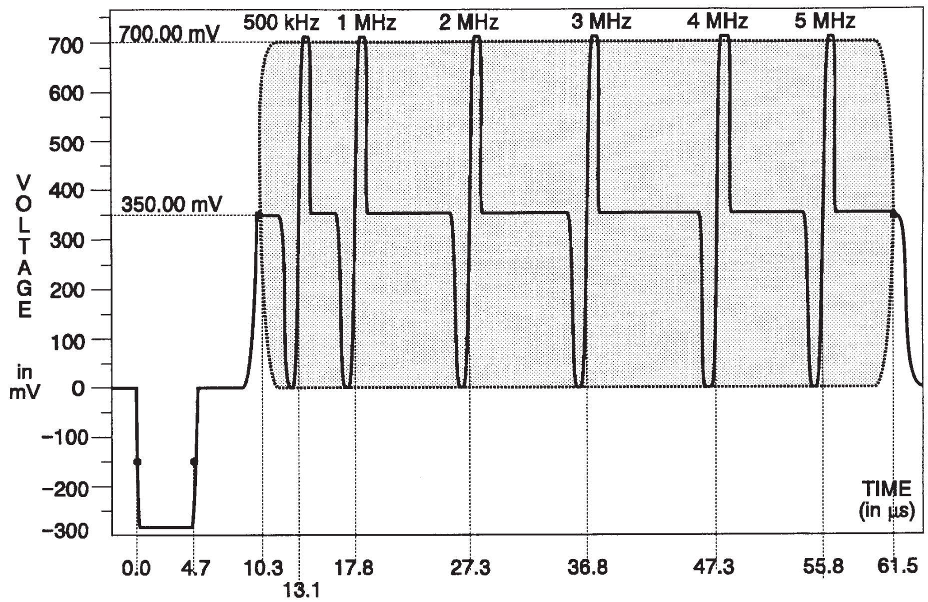


Figure 3–233: Y channel – 100% narrow sweep

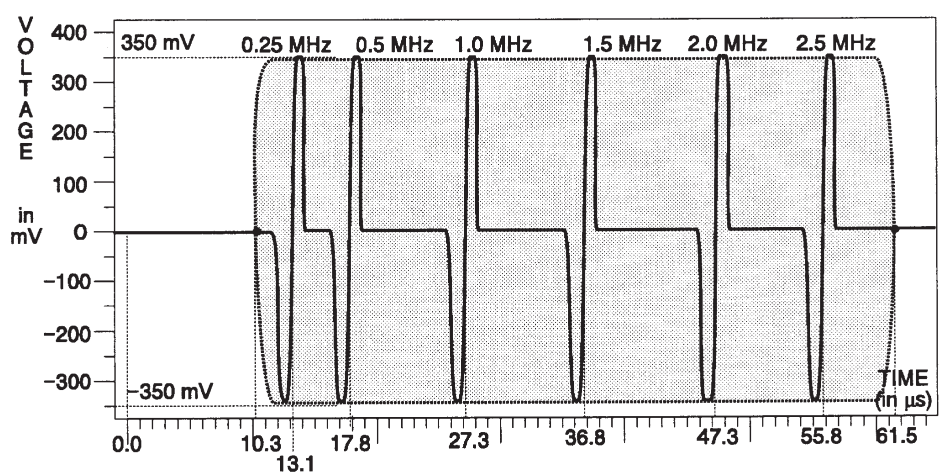


Figure 3–234: B–Y and R–Y channels – 100% narrow sweep

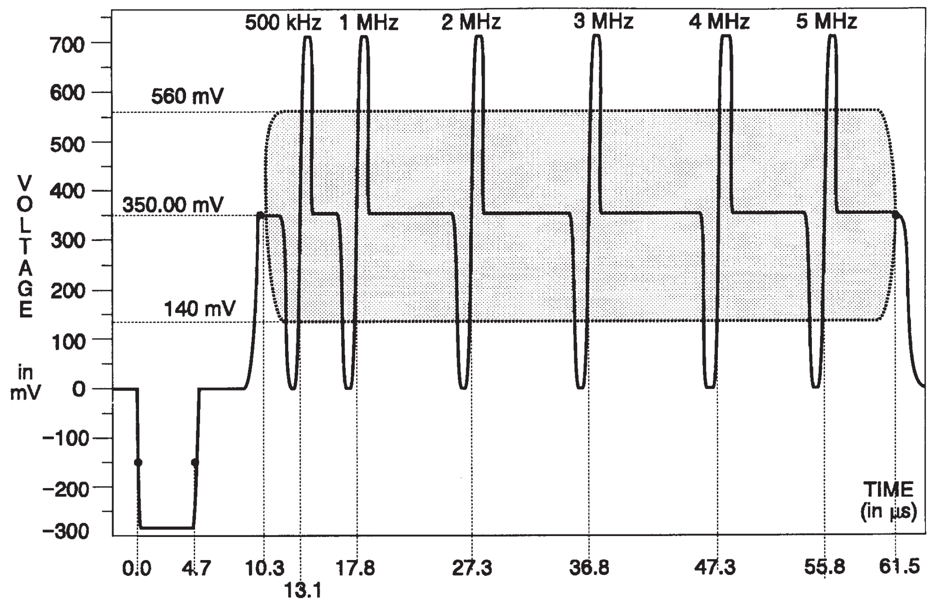


Figure 3–235: Y channel – 60% narrow sweep

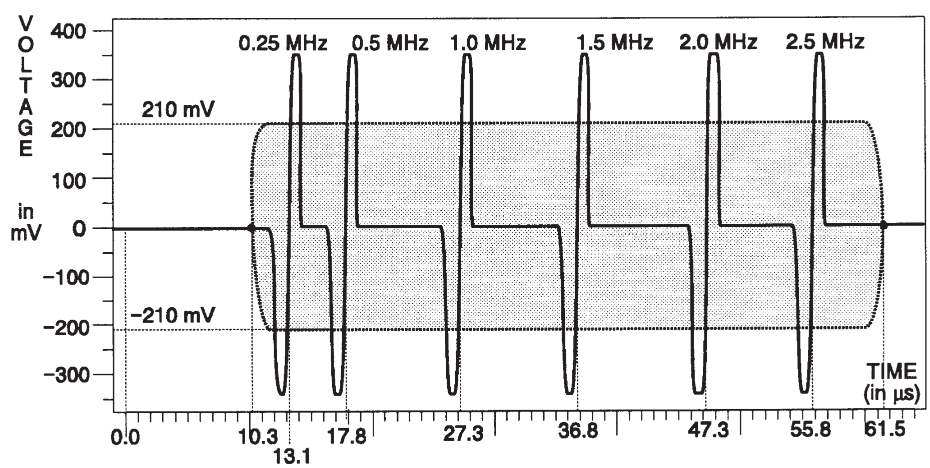


Figure 3–236: B–Y and R–Y channels – 60% narrow sweep

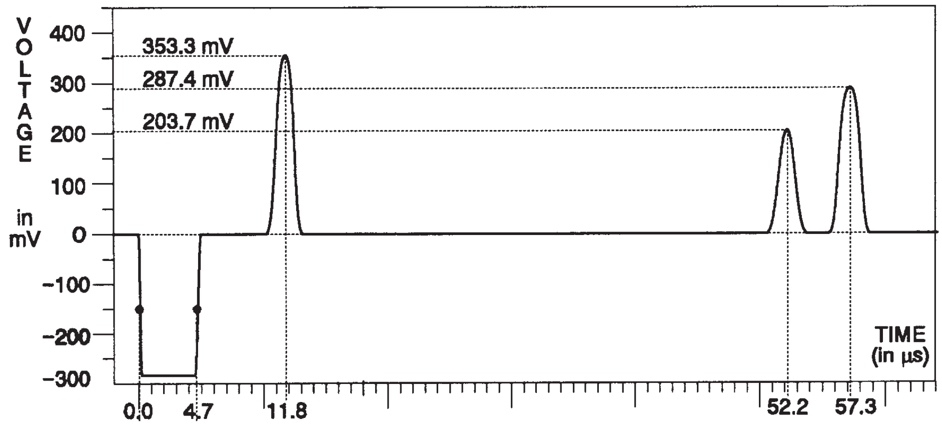


Figure 3–237: Y channel – 12.5T pulses

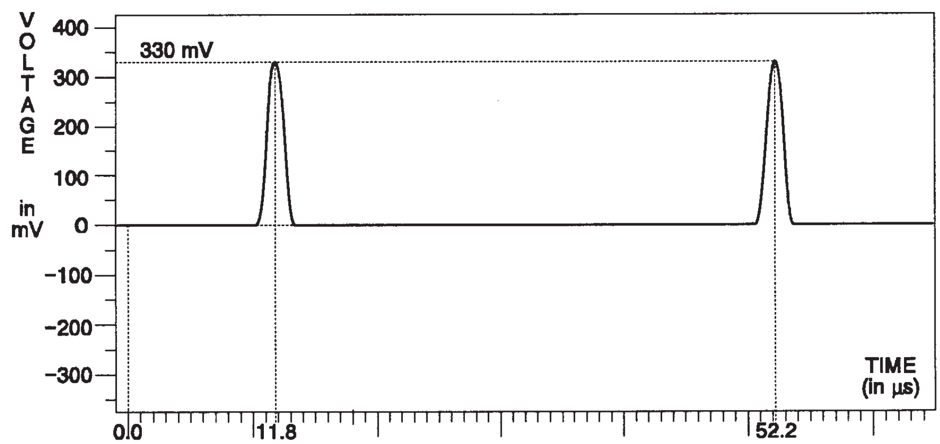


Figure 3–238: B–Y channel – 12.5T pulses

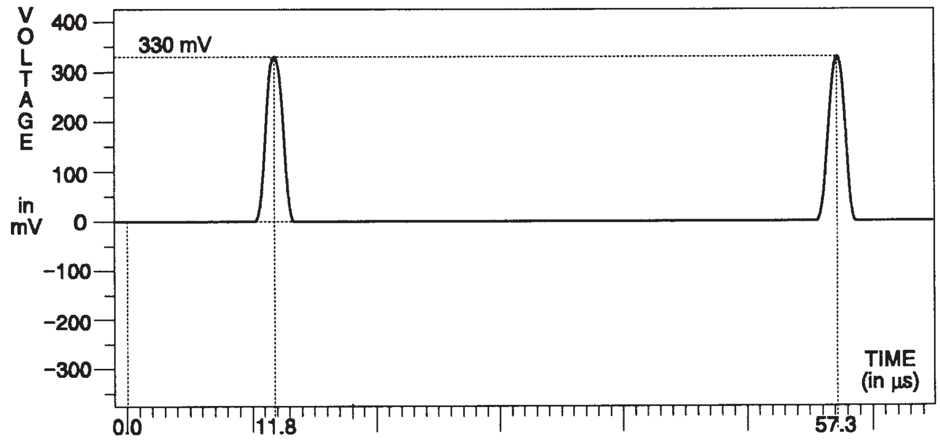


Figure 3–239: R–Y channel – 12.5T pulses

Option 04 Signals (Y–C Unique Signals)

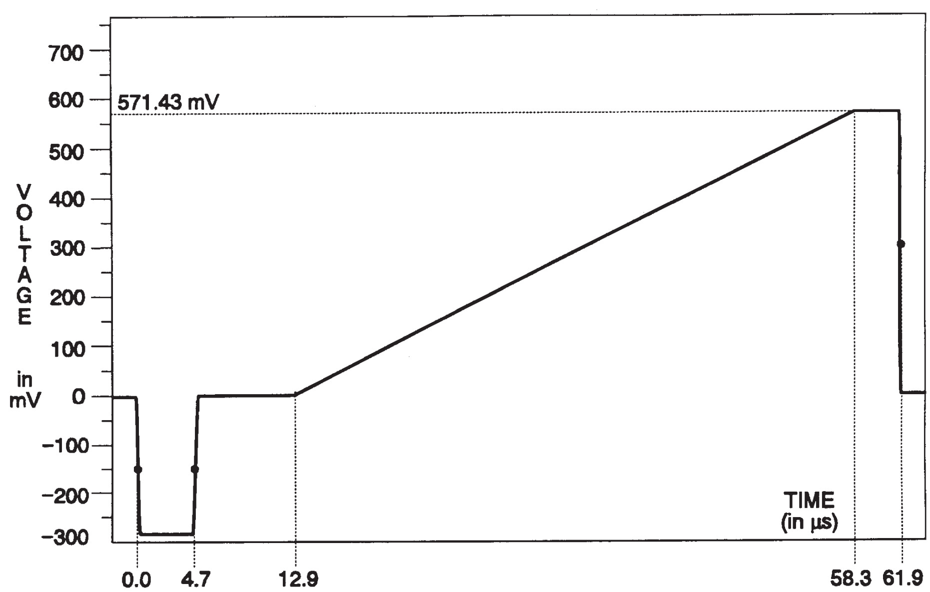


Figure 3–240: Y channel – 0–80 IRE mod ramp

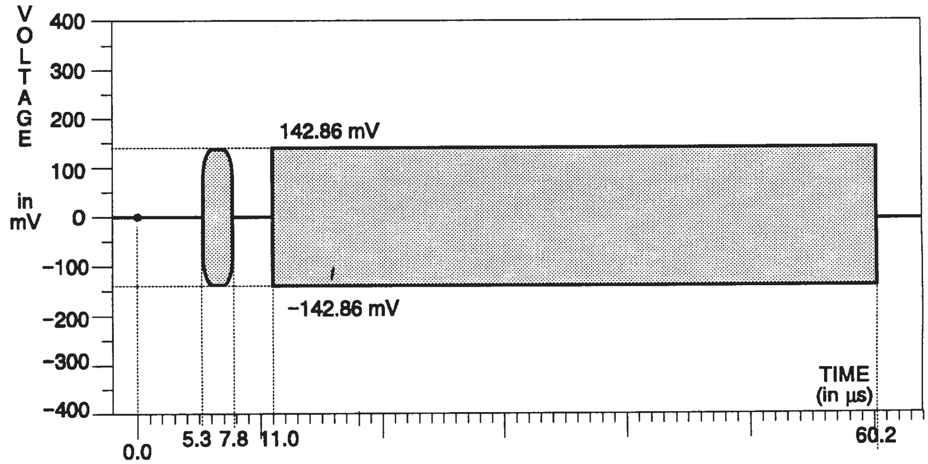


Figure 3–241: C channel – 0–80 IRE mod ramp

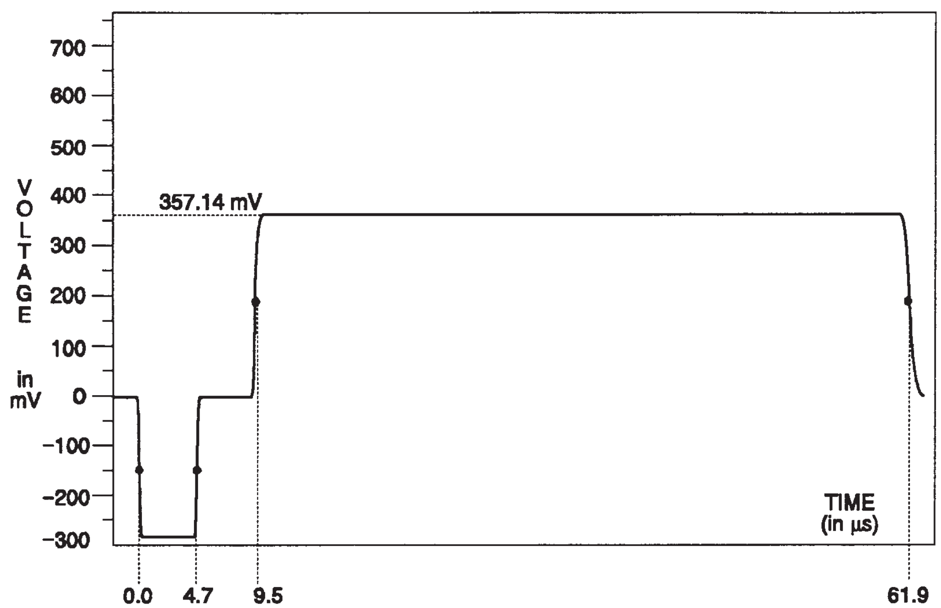


Figure 3–242: Y channel – chroma response

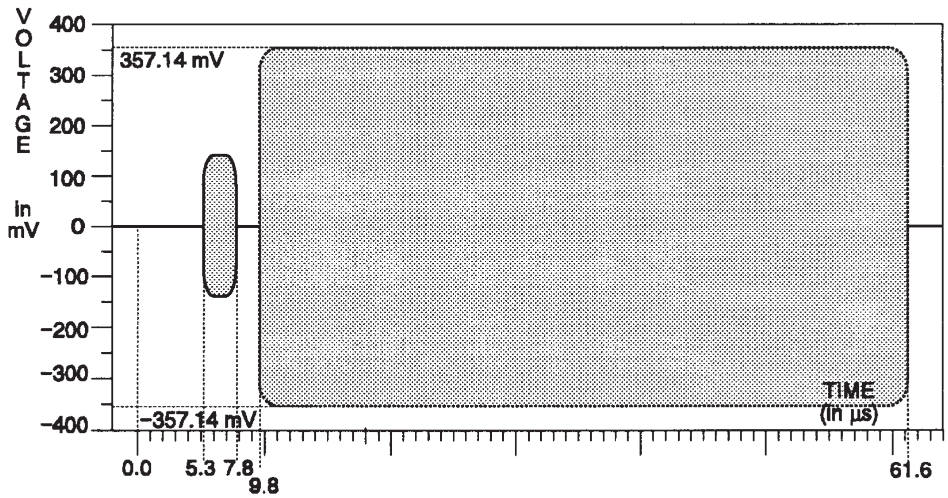


Figure 3–243: C channel – chroma response

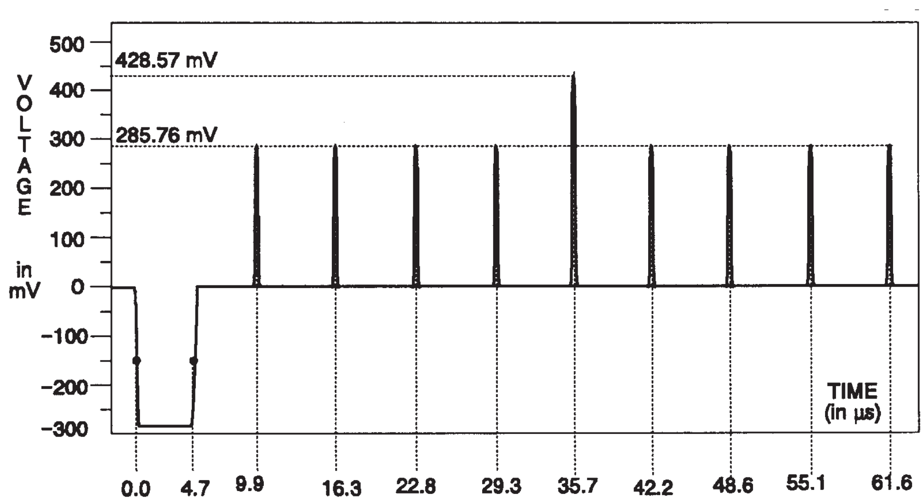


Figure 3–244: Y channel – chroma response markers

Option 04 Signals (MII 3-Wire Unique Signals)

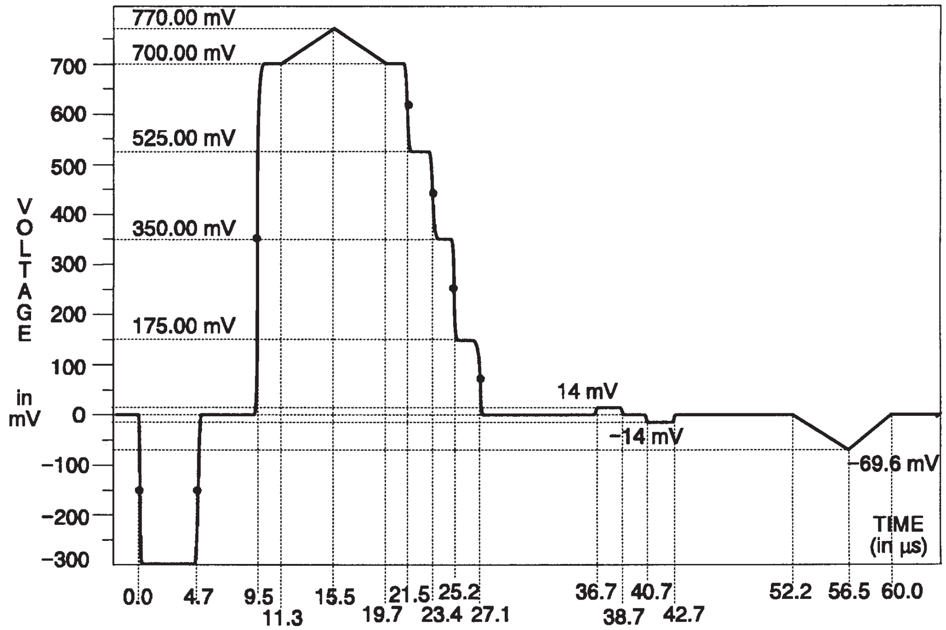


Figure 3–245: Y channel – level reference (lines 182–262)

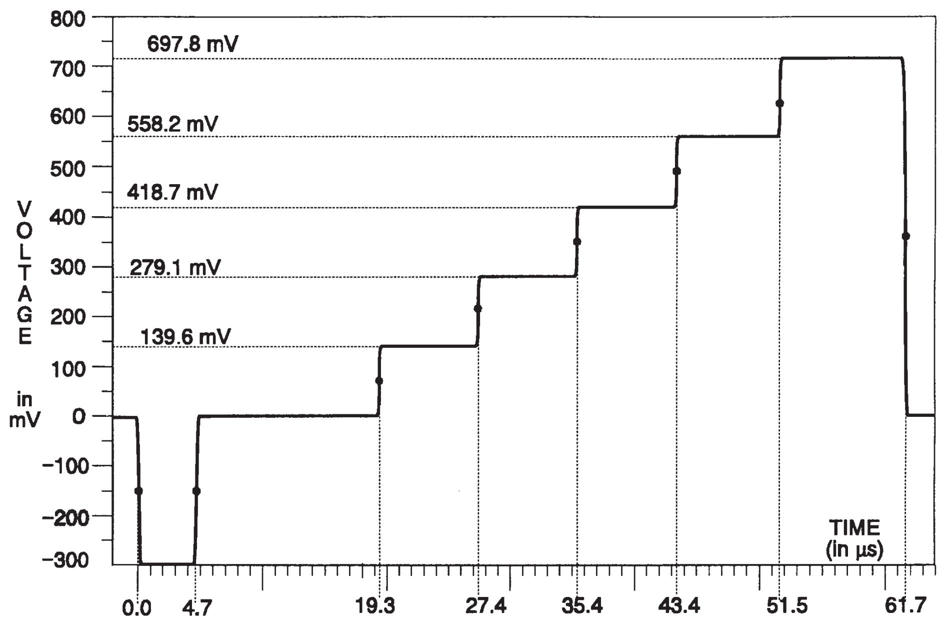


Figure 3–246: Y channel – 5 step

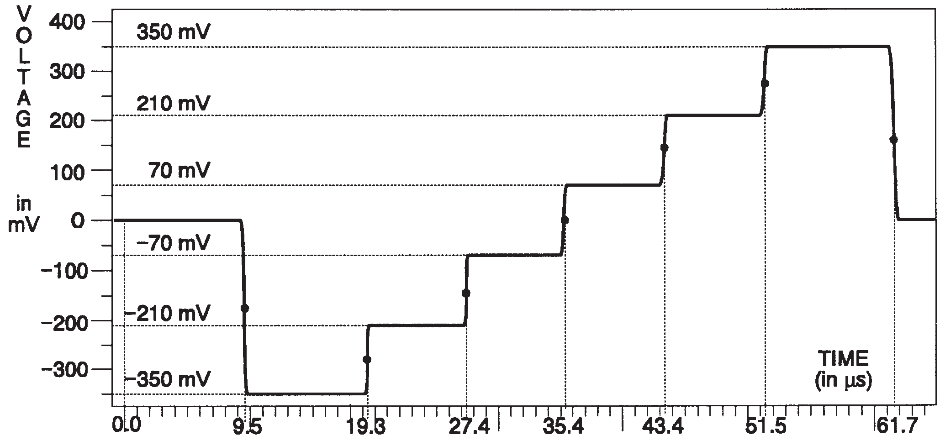


Figure 3–247: B–Y and R–Y channels – 5 step

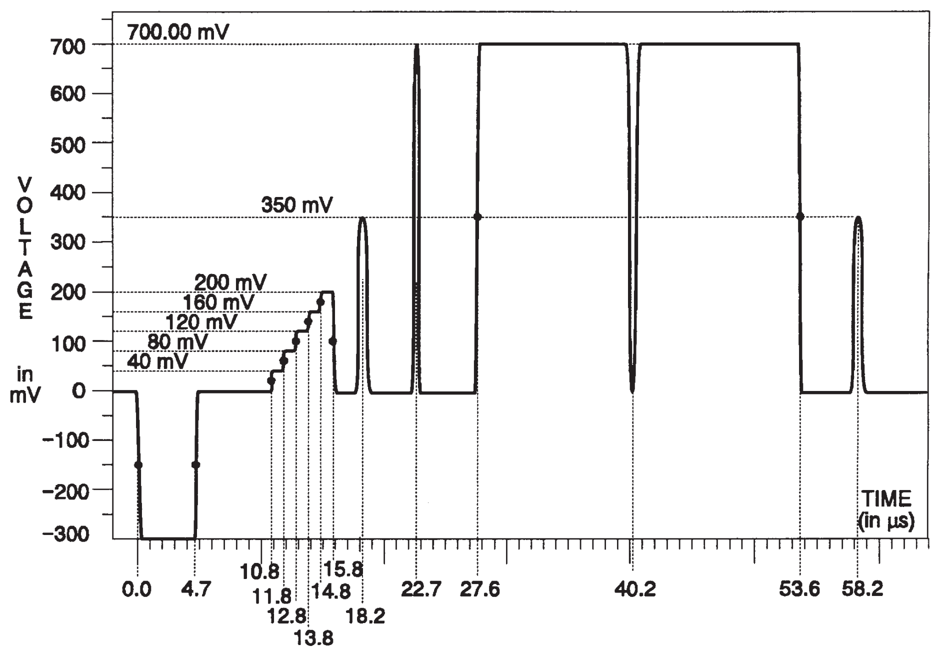


Figure 3–248: Y channel – T pulses

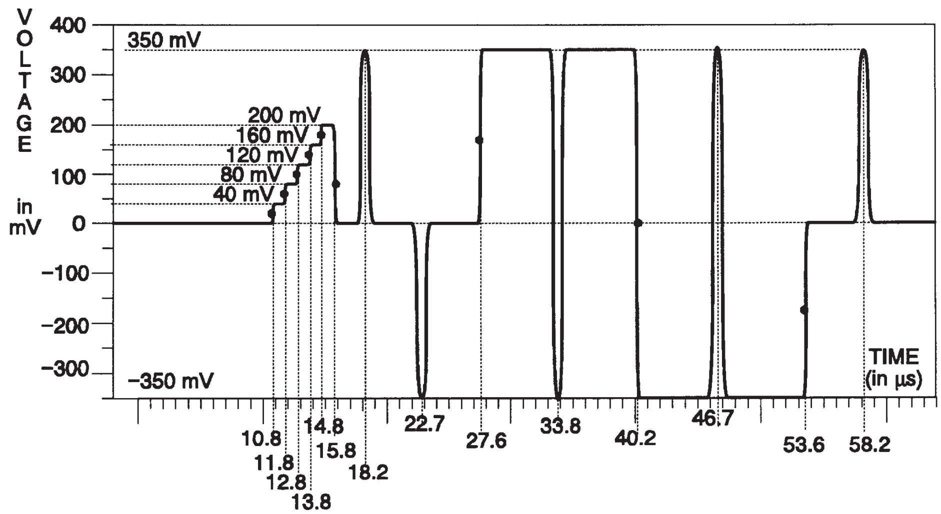


Figure 3–249: B–Y and R–Y channels – T pulses

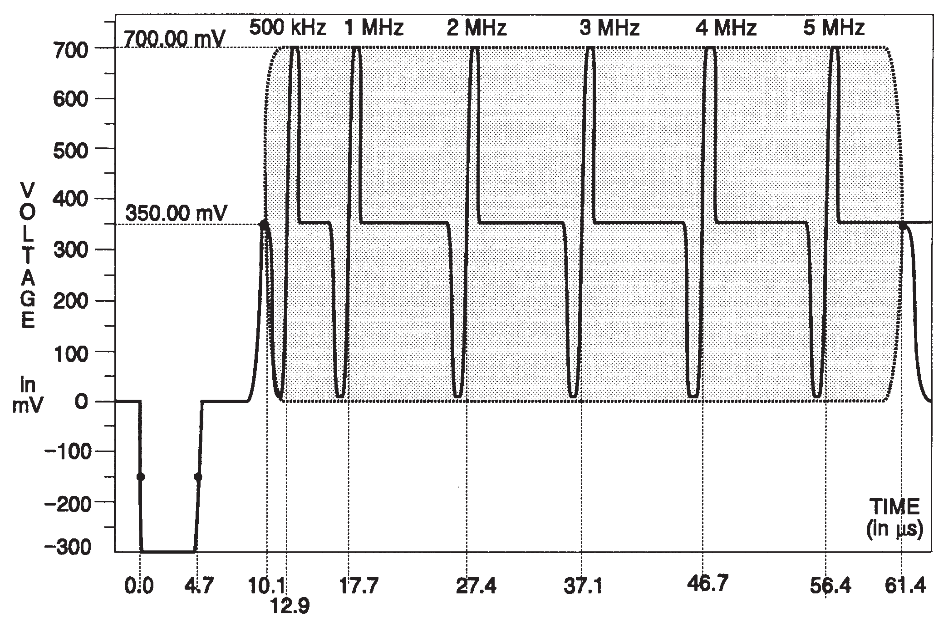


Figure 3–250: Y channel – 100% sweep

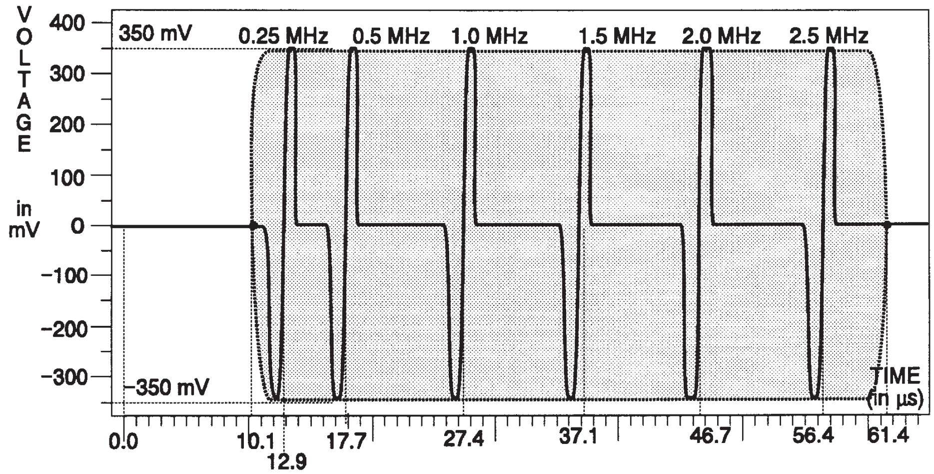


Figure 3–251: B–Y and R–Y channels – 100% sweep

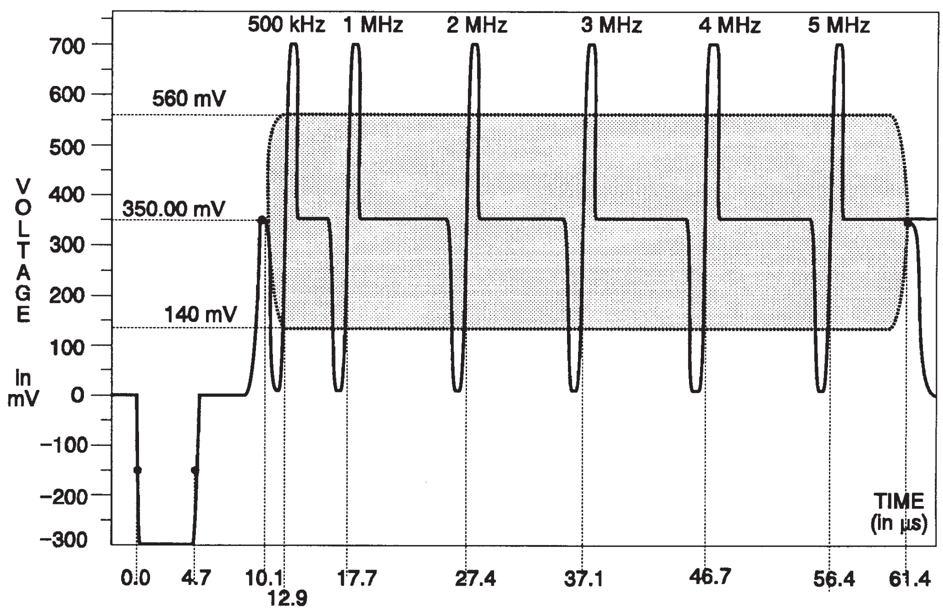


Figure 3–252: Y channel – 60% sweep

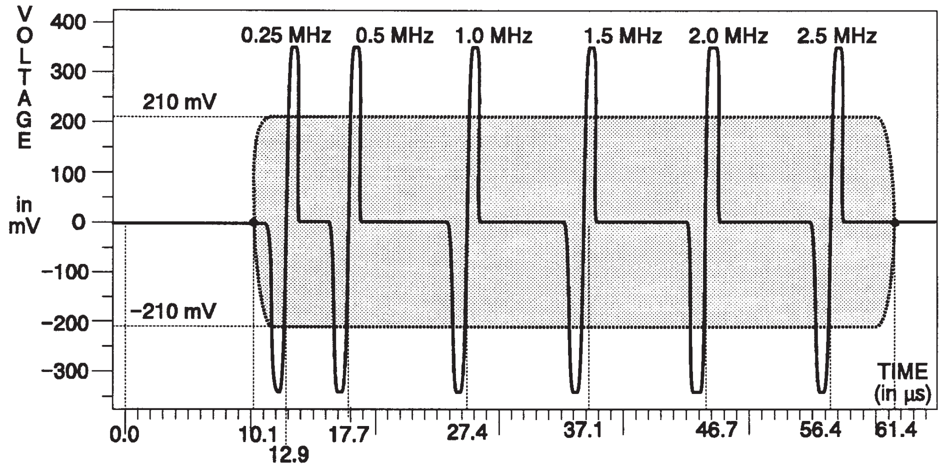


Figure 3–253: B–Y and R–Y channels – 60% sweep

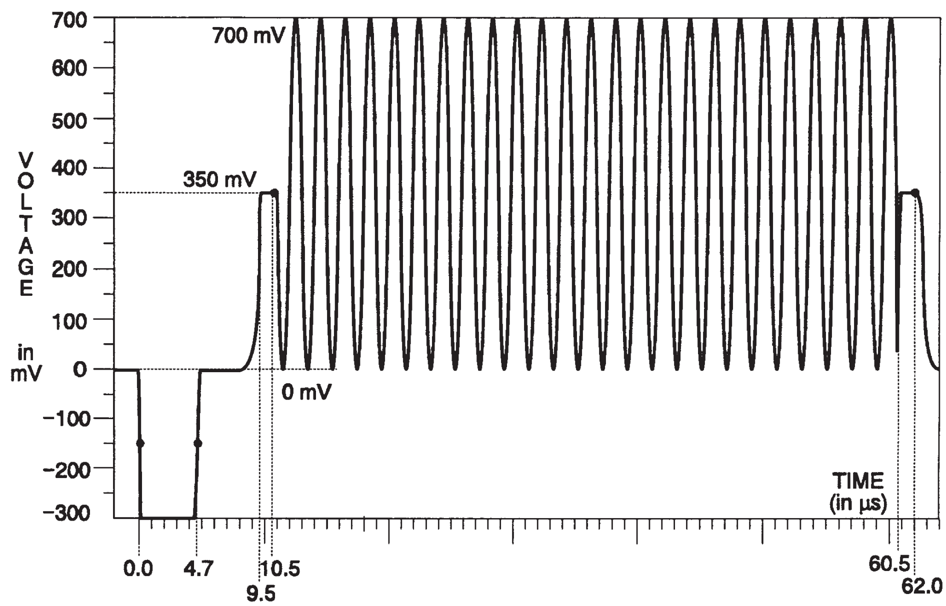


Figure 3–254: Y channel – 100% bowtie and markers

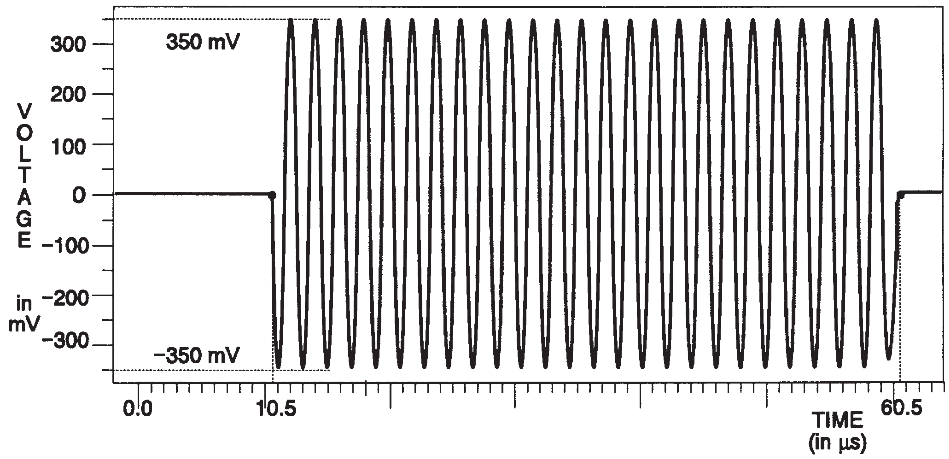


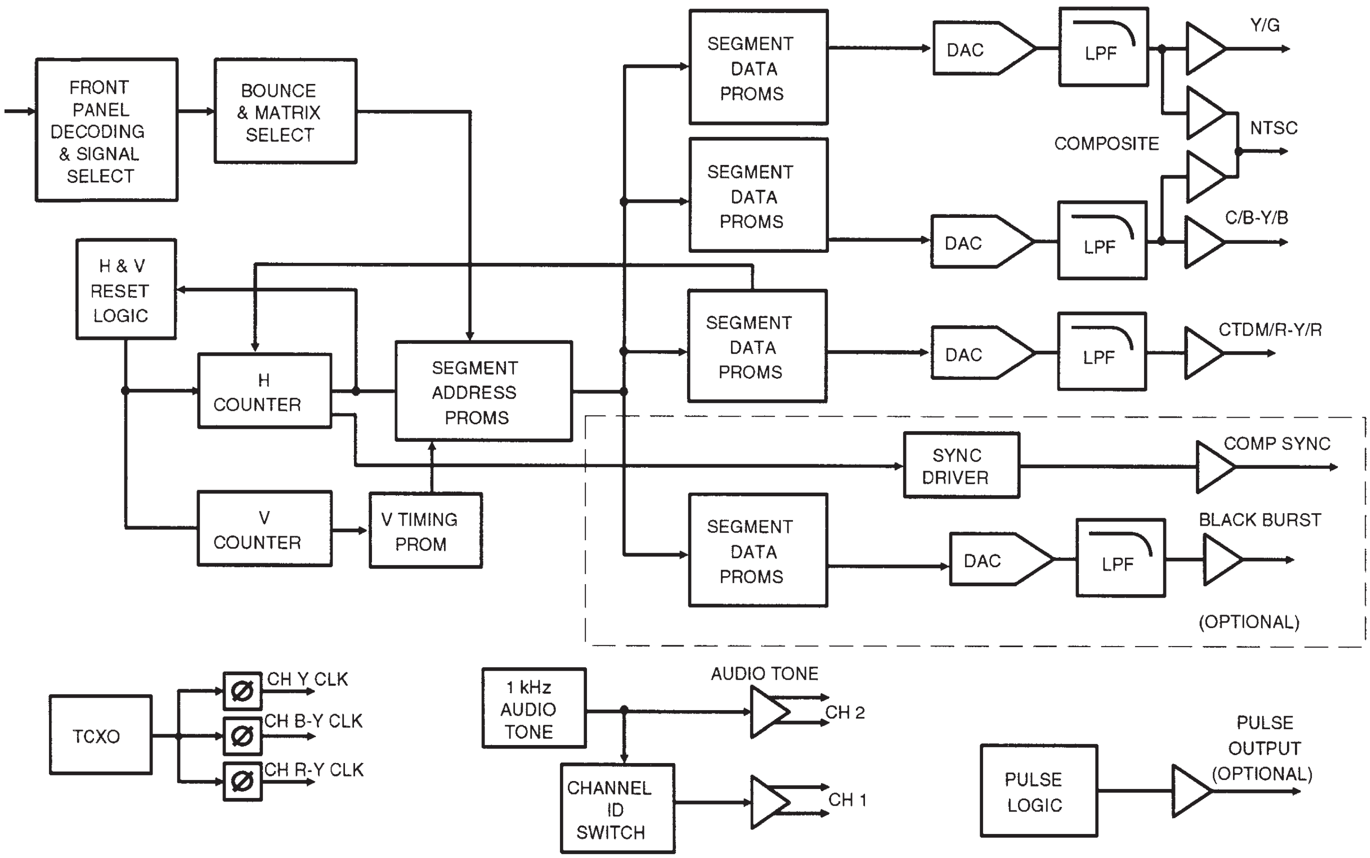
Figure 3–255: B–Y and R–Y channels – 100% bowtie

WARNING

The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all safety summaries before performing any service.

Block Diagram

Block Diagram



TSG130A Simplified block diagram

Performance Verification

Performance Check Procedures

This section consists of checklists and detailed procedures that can be used to check the performance of the TSG130A against specifications.

Table 5–1 is a list of equipment and corresponding performance requirements needed for the following performance check procedures.

Table 5–1: Equipment for performance check and adjustment procedure

Equipment	Required capabilities	Example equipment
NTSC video measurement set	Measures and displays field-rate and line-rate waveforms, differential phase and gain, and SC/H phase.	Tektronix 1780R Video Measurement Set.
Frequency counter	Accurate to within 2.5 Hz out of 5 MHz.	Tektronix DC 503A, plugs into a TM 503A Power Mainframe.
Distortion analyzer	Must test power output over 0 to 8 dBm and be capable of detecting THD of 0.01% or less.	Tektronix AA501A.
Audio amplifier	600 Ω impedance	
BNC coaxial cables (5)	75 Ω impedance.	Tektronix part number 012-0074-00. Note that it is imperative that all the cable lengths match.
End-line terminations (5)	75 Ω terminations equipped with a BNC connector.	Tektronix part number 011-0102-00.
Audio connector-to-triple banana cable	Must be configured to match TSG 130A audio output. Pin 1 shield; pin 2 +; pin 3 –	Example: ITT Pamona Electronics, Model 4953-J-36.
Test oscilloscope and 1x probe	This is needed only if Options 01/02, 02, 2J, 03, or 04 are installed. Any oscilloscope must have these minimum capabilities: 50 MHz bandwidth, 5 ns/div to 5 µs/div sweep speeds and triggering to 5 MHz.	Tektronix 2430A Oscilloscope, 1x probe P6101A.
S-video breakout cable	To convert S-video to separate Y and C signals.	Panasonic AG-C70 or Laird 103 Y/C
Pozidriv® screwdriver tips	For removing audio board.	General Tool 640-121 (small tip), 640-122 (medium tip), 624-440 (hex driver)

***NOTE**. It is very important for both performance checks and adjustment procedures that length and propagation delay of the coax cables are identical.*

Performance Check Checklist

This section provides a performance checklist for the signal generator.

Oscillator Frequency

1. Oscillator frequency 14.31818 MHz ±28 Hz

***NOTE**. After initial delivery or long storage, allow a two-hour warm up to re-age the crystal. Thereafter, a 30-minute warm up is sufficient.*

Composite Test Signal

2. Blanking level: 0 mVDC ±50 mVDC
3. Sync amplitude: 285.7 mV (40 IRE) ±2%
4. Burst amplitude: 285.7 mV (40 IRE) ±2%
5. 5-step staircase linearity: <1%
6. Luminance amplitude accuracy: ±1%
7. Chrominance accuracy: ±1%
8. Chrominance-to-luminance delay and gain: ≤12 ns ±1%
9. Line tilt: ±0.5%
10. Field tilt: ±0.5%
11. Ringing: K_{2T} factor <0.6%, ≤1% of peak
12. Pulse-to-bar ratio: 1:1 ±1%
13. Sine-squared pulse accuracy: HADs accurate within 25 ns
14. Line sync duration: 4.7 μs ±50 ns
15. Sync rise times: 140 ns ±20 ns
16. Luminance rise times: 250 ns ±25 ns
17. Horizontal sync duration, vertical serration duration, equalizing pulse duration: sync = 4.7 μs ±50 ns; vertical serration = 4.7 μs ±50 ns; equalizing pulse = 2.3 μs ±50 ns

18. Line blanking interval: 10.9 µs ±200 ns
19. Frequency response: flat to 4.2 MHz ±2%
20. Differential phase and gain: 0.3° & 0.3% maximum
21. SC/H phase: 0° ±5°

Y Channel (Luminance) Output

22. Blanking level: 0 mVDC ±50 mVDC
23. Sync amplitude: 285.7 mV ±2% (300.0 mV ±2% for MII 3-wire signals)
24. Line sync duration: 4.7 µs ±50 ns; 5.0 µs ±50 ns for 2-wire Betacam
25. 5-step staircase linearity: <1%
26. Line time distortion (line tilt): <0.5%
27. Field time distortion (field tilt): <0.5%
28. Ringing: K_{2T} factor <0.6%, ≤1% of peak
29. Pulse-to-bar ratio: 1:1 ±1%
30. Sine squared pulse accuracy: HADs accurate within 25 ns
31. Horizontal sync duration, vertical serration duration, equalizing pulse duration: sync = 4.7 µs ±50 ns; vertical serration = 4.7 µs ±50 ns; equalizing pulse = 2.3 µs ±50 ns

C Channel (Chrominance)

32. Chrominance response: ±1%
33. Chrominance amplitude: ±1%
34. Burst amplitude: 285.7 $mV_{p\text{-}p}$ (40 IRE) ±2%
35. Burst rise times: 400 ns ±40 ns
36. Chrominance rise times: 400 ns ±40 ns

B-Y Signals

37. B-Y blanking level: 0 mVDC ±50 mVDC
38. B-Y rise times: color bars 400 ns ±40 ns; other signal transitions 250 ns ±25 ns
39. B-Y sine squared pulse accuracy: HADs accurate within 25 ns

R-Y Signals

40. Blanking level: 0 mVDC ±50 mVDC
41. R-Y rise times: color bars 400 ns ±40 ns; other signal transitions 250 ns ±25 ns
42. R-Y sine squared pulse accuracy: HADs accurate within 25 ns

Green Channel

__NOTE__. Before using the GBR signal format, check that the green channel has sync enabled. If there is no sync on the green signal, move jumper J123 to the 2–3 position.

43. Amplitude accuracy: ±1%

44. Green frequency response: flat to 5.0 MHz ±1%; flat to 5.5 MHz ±2%

45. Sync amplitude: 300.0 mV ±2%

Blue Channel

46. Blue gain: ±1%

47. Blue frequency response: flat to 5.0 MHz ±1%; flat to 5.5 MHz ±2%

48. Blue staircase linearity: <1%

49. Line tilt: ±0.5%

50. Field tilt: ±0.5%

51. Pulse-to-bar ratio: 1:1 ±1%

Red Channel

52. Red frequency response: flat to 5.0 MHz ±1%; flat to 5.5 MHz ±2%

53. Staircase linearity: <1%

54. Red gain: ±1%

55. Line tilt: ±0.5%

56. Field tilt: ±0.5%

57. Pulse-to-bar ratio: 1:1 ±1%

Inter-Channel Timing and Amplitude

58. B-Y to Y timing: within 5 ns

59. R-Y to Y timing: within 5 ns

60. GBR amplitude matching: ±0.5%

S-Video Output

61. S-video frequency response: 4.2 MHz ±2%

Audio Outputs

62. Total harmonic distortion: ≤0.5% THD

Black Burst Output (Options 01/02, 02, 03, 2J)

63. Black burst amplitude: 7.5 IRE ±1 IRE; 0 IRE ±1 IRE (Option 2J)

64. Black burst blanking width: 10.9 ±2 μs

Composite Sync (Options 01/02, 02, 03)

65. Duration: horizontal sync = 4.7 μs ±50 ns; vertical serration = 4.7 μs ±50 ns; equalizing pulse = 2.3 μs ±50 ns

66. Amplitude: –4.0 V ±0.5 V

67. Rise and fall times: 140 ns ±20 ns

Color Flag Reference Pulse (Option 03)

68. Amplitude and position

Color Frame Square Wave (Option 04)

69. Amplitude and position

Performance Check Procedures

The order of these procedures has been chosen to minimize changes in equipment setup. Performance parameters may be checked in any order. However, because many adjustment steps are interactive, care must be taken when adjusting individual parameters to ensure that all others remain within specification.

Oscillator Frequency

Figure 5–1 shows the setup for this procedure.

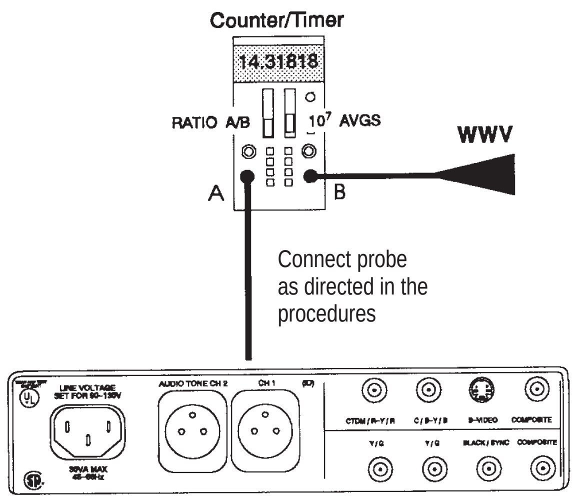


Figure 5–1: Setup to check crystal frequency

1. Oscillator Frequency: 14.31818 MHz ±28 Hz

***NOTE**. After initial delivery or long storage, allow a two-hour warm up to re-age the crystal. Thereafter, 30 minutes warm up is sufficient.*

- **a.** Connect the equipment as shown in Figure 5–1, attaching the probe to W151.
- **b.** Set the frequency counter to count using ratio A/B.
- **c.** CHECK that the measured oscillator frequency is 14.31818 MHz ±28 Hz at room temperature.

The following table lists the suggested Tektronix 1780R setup for the performance checks.

Table 5–2: Basic 1780 setup

Configure	
Coupling	DC
Vector Grat	INT
WFM Grat	INT
ABS Units	mV
Vector readout	ON
WFM readout	ON
Front panel	
Left display	VECT
Right display	WFM
WFM horizontal	ONE/LINE
REF	INT
Filter	FLAT
Waveform gain	OFF

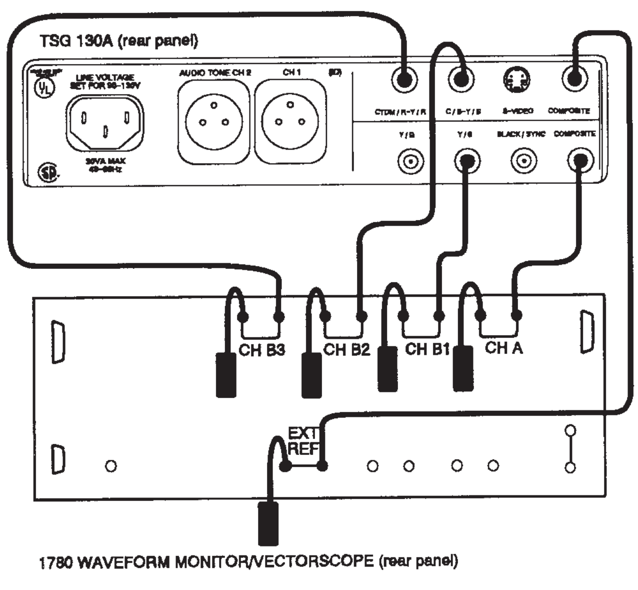


Figure 5–2: Basic performance check setup

***NOTE**. If the TSG130A being checked has an optional black burst signal, use that signal as the waveform monitor's EXT REF input.*

Composite Test Signal

2. Blanking level: 0 mVDC ±50 mVDC

a. Connect the equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the steps (5-step) signal in NTSC/YC format from the signal generator.

d. Confirm that any DC-restorer feature of the waveform monitor is off.

e. Switch the display from DC coupled to ground reference.

f. Use the vertical-position adjustment of the waveform monitor to set the ground line to a convenient reference graticule.

g. Return to DC coupling.

h. CHECK that the blanking level is on the reference graticule ±50 mV.

3. Sync amplitude: 285.7 mV (40 IRE) ±2%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the steps (5-step) signal in NTSC/YC format from the signal generator.

d. With the WFM + CAL function of the measurement set match the DC level of the lower waveform to the sync tip of the upper waveform.

e. CHECK that the sync amplitude is 285.7 mV ±5.7 mV (40 IRE ±0.8 IRE).

4. Burst amplitude: 285.7 mV (40 IRE) ±2%

a. Connect the test equipment as shown in Figure 5–2.

b. Select any signal from the signal generator in the NTSC/YC format.

c. Display CH A on the waveform monitor in WFM + CAL mode.

d. If necessary, adjust the measurement set to match the top of the lower burst to the bottom of the upper burst.

e. CHECK for a burst amplitude of 285.7 mV ±5.7 mV (40 IRE ±0.8 IRE).

5. Steps (5-step) staircase linearity <1%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. With the steps (5-step) signal selected in the NTSC/YC format, set the test equipment to view the signal through the differentiated step filter.

d. CHECK using the voltage cursors, that the difference between the highest and lowest spikes (differentiated steps) is <1%.

6. Luminance amplitude accuracy: ±1%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the 100% Field signal in NTSC/YC format from the signal generator.

d. Put the waveform monitor in WFM + CAL mode.

e. Set the test equipment to match the top of the lower waveform with the DC level of the upper waveform.

f. CHECK that the signal amplitude is 100 IRE ±1 IRE.

g. Note the value for use in step 8.

7. Chrominance accuracy: ±1%

a. Connect the test equipment as shown in Figure 5–2, keeping the waveform monitor in WFM + CAL.

b. Display CH A on the waveform monitor.

c. Select the CHROMA NOISE signal from the signal generator in NTSC/YC format.

d. Adjust the test equipment to match the top of the lower waveform with the blanking level of the upper.

e. CHECK that the signal amplitude is 100 IRE ±1 IRE.

f. Note the value for use in step 8.

8. Chrominance-to-luminance delay and gain: ≤12 ns ±1%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the Pulse & Bar signal in NTSC/YC format from the signal generator.

d. Set the waveform monitor to view the bottom of the 12.5T modulated pulse.

e. Use the Chroma/Luma measurement mode of the Tektronix 1780R to measure both C/Y delay and gain.

f. CHECK that the delay is <12 ns and the gain is <1%.

g. Compare the measured values for luminance amplitude (from part 6) and chrominance amplitude (from part 7).

h. CHECK that these numbers are equal within 1 IRE (1%).

i. Use whichever value is greater (from part f or part h) for the C/Y gain.

9. Line tilt: ±0.5%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the 100% Field signal in NTSC/YC format from the signal generator.

d. If necessary, normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at its midpoint.

e. Center the signal over a horizontal graticule.

f. CHECK that the line tilts no more than 0.5% (0.5 $IRE_{p\text{-}p}$) over its length. Ignore the first and last microsecond of the bar.

10. Field tilt: ±0.5%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the 100% Field signal in the NTSC/YC format from the signal generator.

d. Set the test equipment to view one field of the signal.

e. CHECK that the field bar tilts no more than 0.5% (0.5 $IRE_{p\text{-}p}$) over its length. Ignore the first and last 3 lines of the signal.

11. Ringing: K_{2T} factor <0.6% ≤1% of peak

a. Connect the test equipment as shown in Figure 5–2.

b. With the signal generator's Pulse & Bar in NTSC/YC format still selected, set the waveform monitor to display the 2T pulse.

c. Use the 1780R's K-factor measurement mode to measure the K Factor of the 2T pulse.

   d. CHECK that the K factor is <0.6%.

   e. CHECK using the voltage cursors or graticule, that the ringing is <1% (1 IRE_{p-p}).

12. Pulse-to-bar ratio: 1:1 ±1%

   a. Connect the test equipment as shown in Figure 5–2.

   b. Display CH A on the waveform monitor.

   c. Select the Pulse & Bar signal in NTSC/YC format from the signal generator.

   d. Set the waveform monitor to display the tip of the inverted pulse of the pulse and bar signal.

   e. CHECK that the inverted pulse tip is within 1% of blanking level, using the WFM + CAL signal.

13. Sine squared pulse accuracy: HADs accurate within 25 ns

   a. Connect the test equipment as shown in Figure 5–2.

   b. Display CH A on the waveform monitor in the line display mode.

   c. Set the waveform monitor to display the 2T pulse on the pulse and bar signal in NTSC/YC format.

   d. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

   e. Using the timing cursors, measure the time between the 50 IRE points.

   f. CHECK that the HAD of the 2T pulse is 250 ns ±25 ns.

14. Line sync duration: 4.7 μs ±50 ns

   a. Connect the test equipment as shown in Figure 5–2.

   b. Display CH A on the waveform monitor in the line display mode.

   c. Set the waveform monitor to display the sync on any signal generator test signal in NTSC/YC format.

   d. Use the variable gain control to normalize the sync to 100 IRE and set the top and bottom of the sync to 100 and 0 IRE respectively.

   e. Using the timing cursor, measure the time from the 50 IRE points of the sync.

   f. CHECK that the sync duration is 4.7 μs ±50 ns.

15. Sync rise times: 140 ns ±20 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Set the waveform monitor to display the sync on any signal generator test signal in NTSC/YC format.

d. Identify the 10% and 90% points of the sync transitions. This can be done with voltage cursors or graticule, and may be aided by using variable gain to normalize the sync to 100 IRE.

e. CHECK **-** that rise time between 10% and 90% are 140 ns ±20 ns, using the timing cursors.

16. Luminance rise times: 250 ns ±25 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Set the signal generator to output the 100% field signal in the NTSC/YC format.

c. Display CH A on the waveform monitor.

d. Set the waveform monitor to display the rise from 0 – 100 IRE.

e. Use the variable vertical gain to normalize the signal to 0 – 100 IRE and use the horizontal magnification to display the rise on the waveform monitor.

f. Use the timing cursors to measure the rise time from the 10 IRE graticule to the 90 IRE graticule.

g. CHECK that rise time is between 250 ns ±25 ns.

17. Horizontal sync duration, vertical serration duration, equalizing pulse duration: sync = 4.7 μs ±50 ns; vertical serration = 4.7 μs ±50 ns; equalizing pulse = 2.3 μs ±50 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select any signal from the signal generator in the NTSC/YC format.

d. Use the variable vertical gain to normalize the sync to 0 – 100 IRE.

e. CHECK that horizontal sync duration between 50% points is 4.7 μs ±50 ns.

f. Set the waveform monitor to display the serrations and equalizing pulses in the vertical interval.

g. CHECK that the half-amplitude duration of the vertical serrations is 4.7 μs ±50 ns.

h. CHECK that the half-amplitude duration of the equalizing pulses is 2.3 μs ±50 ns.

18. Line blanking interval: 10.9 μs ±200 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor in 2 line mode.

c. Select the 100% field signal in NTSC/YC format from the signal generator.

d. Set the waveform monitor to display horizontal blanking.

e. CHECK that the horizontal blanking interval is 10.9 μs ±200 ns between the 20 IRE points of the signal.

19. Frequency response: flat to 4.2 MHz ±2%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor.

c. Select the Multiburst signal in NTSC/YC format from the signal generator.

d. CHECK that the packets are flat and equal amplitude within 2%.

20. Differential phase and gain: 0.3° & 0.3% maximum

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH A on the waveform monitor using internal reference.

c. Select the mod ramp signal in NTSC/YC format from the signal generator.

d. Set the 1780R or separate vectorscope to measure differential phase. Use the double trace method, if possible.

e. CHECK for differential phase of ≤0.3°.

f. Set the test equipment to measure differential gain. Again, use a double trace, if possible.

g. CHECK that the differential gain of the modulated ramp is ≤0.3%.

21. SC/H phase: 0° ±5°

***NOTE**. Accurate SC/H measurements may be difficult without test equipment having modes intended for that purpose. The SC/H phase error in signal generator test signals is typically less than 1°.*

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH A on the waveform monitor using internal reference. (Internal reference is necessary for this measurement to measure the absolute SC/H phase of the signal instead of relative to the external reference.)
- **c.** Select any test signal in NTSC/YC format from the signal generator.
- **d.** Confirm that the measurement set is internally referenced and set it to display the SC/H phase of the signal.
- **e.** CHECK that the SC/H phase error is <5°.
- **f.** Return the waveform monitor to external reference.

Y Channel (Luminance)

22. Blanking level: 0 mVDC ±50 mVDC

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Select the Steps (5-Step) signal in NTSC/YC format from the signal generator.
- **d.** Confirm that any DC-restorer feature of the monitor is off.
- **e.** Switch the display from DC coupled to ground reference.
- **f.** Use the vertical position adjustment of the waveform monitor to set the ground line to a convenient reference graticule.
- **g.** Switch back to DC coupling.
- **h.** CHECK that the blanking level is on the reference graticule ±50 mV.

23. Sync amplitude: 285.7 mV ±2%; 300.0 mV ±2% for MII 3-wire signals

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Select any signal from the signal generator in the NTSC/YC format.

d. Using the WFM + CAL, match the signal level of the lower waveform to the sync tip of the upper waveform.

e. CHECK that the sync amplitude is 285.7 mV ±2%.

f. Select the 0% flat field from the signal generator in the Y/CTDM format.

g. Using the WFM + CAL, match the signal level of the lower waveform to the sync tip of the upper waveform.

h. CHECK that the sync amplitude is 285.7 mV ±2%.

i. Select the 0% flat field from the signal generator in the Y, B-Y, R-Y format.

j. Using the WFM + CAL, match the signal level of the lower waveform to the sync tip of the upper waveform.

k. CHECK that the sync amplitude is 285.7 mV ±2% (300.0 mV ±2% if an MII option is installed).

24. Line sync duration: 4.7 μs ±50 ns; 5.0 μs ±50 ns for 2-wire Betacam

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH B1 on the waveform monitor in the line display mode.

c. Set the waveform monitor to display the sync on any signal generator test signal in the NTSC/YC mode.

d. Use the variable gain control to normalize the sync to 100 IRE and set the top and bottom of the sync to 100 and 0 IRE respectively.

e. Using the timing cursor, measure the time from the 50 IRE points of the sync.

f. CHECK that the sync duration is 4.7 μs ±50 ns.

***NOTE**. Only do the rest of this procedure if you are testing a standard instrument or if one of the Betacam options is installed.*

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g. Set the waveform monitor to display the sync on any signal generator test signal in the Y/CTDM mode using internal reference.

h. Use the variable gain control to normalize the sync to 100 IRE and set the top and bottom of the sync to 100 and 0 IRE respectively.

i. Using the timing cursor, measure the time from the 50 IRE points of the sync.

j. CHECK that the sync duration is 5.0 μs ±50 ns.

25. Steps (5-step) staircase linearity: <1%

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Select the Steps (5-Step) signal in NTSC/YC format. Set the test equipment to view the Y output through the Differentiated Step filter.
- **d.** CHECK using the voltage cursors, that the difference between the highest and lowest spikes (differentiated steps) is no greater than 1%.

26. Line time distortion (line tilt): <0.5%

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Select the 100% Field signal from the signal generator in NTSC/YC format.
- **d.** Normalize the signal gain so that the blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at the midpoint of the line tilt.
- **e.** Center the bar horizontally over a graticule.
- **f.** CHECK that the signal tilts no more than 0.5% (0.5 IRE) over its length. Ignore the first and last microsecond of the signal.

27. Field time distortion (field tilt): <0.5%

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Select the 100% field signal in NTSC/YC format from the signal generator.
- **d.** Normalize the signal gain so that the blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at the midpoint of the line tilt.
- **e.** Set the test equipment to view one field of the signal.
- **f.** CHECK that the signal tilts no more than 0.5% over its length. Ignore the first and last 0.2 milliseconds (about 3 lines) of the bar.

28. Ringing: K_{2T} factor <0.6% ≤1% of peak

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.

- **c.** Select the pulse & bar signal in NTSC/YC format from the signal generator.
- **d.** Use the K factor measurement mode of the 1780R to measure the K factor of the 2T pulse.
- **e.** CHECK that the K_{2T} factor is <0.6%.
- **f.** Normalize the signal gain so that the blanking level of the waveform is on the baseline and the top of the 2T pulse is at 100 IRE.
- **g.** Set the equipment to display the bottom of the 2T pulse at line rate.
- **h.** CHECK with voltage cursors or graticule that ringing is <1% (1 IRE peak).

29. Pulse-to-bar ratio: 1:1 ±1%

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor.
- **c.** Set the waveform monitor to display the tip of the inverted pulse of the pulse & bar with signal in NTSC/YC format.
- **d.** CHECK that the inverted pulse tip is within 1% of blanking level, using the WFM + CAL signal.

30. Sine squared pulse accuracy: HADs accurate within 25 ns

- **a.** Connect the test equipment as shown in Figure 5–2.
- **b.** Display CH B1 on the waveform monitor in the line display mode using internal reference.
- **c.** Set the waveform monitor to display the 2T pulse on the T Pulses signal in Y, B-Y, R-Y format.
- **d.** Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.
- **e.** Using the timing cursors, measure the time between the 50 IRE points.
- **f.** CHECK that the HAD of the 2T pulse is 250 ns ±25 ns.
- **g.** Set the waveform monitor to display the 3T pulse on the T pulses signal in Y, B-Y, R-Y format.
- **h.** Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

i. Using the timing cursors, measure the time between the 50 IRE points.

j. CHECK that the HAD of the 3T pulse is 375 ns ±25 ns.

k. Set the waveform monitor to display the 5T pulse on the T pulses signal in Y, B-Y, R-Y format.

l. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

m. Using the timing cursors, measure the time between the 50 IRE points.

n. CHECK that the HAD of the 5T pulse is 625 ns ±25 ns.

31. Horizontal sync duration, vertical serration duration, equalizing pulse duration: sync = 4.7 μs ±50 ns; vertical serration = 4.7 μs ±50 ns; equalizing pulse = 2.3 μs ±50 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Select any signal in the NTSC/YC format.

c. Display CH B1 on the waveform monitor.

d. CHECK that horizontal sync duration between 50% points is 4.7 μs ±50 ns.

e. Set the waveform monitor to display the serrations and equalizing pulses in the vertical interval.

f. CHECK that the half-amplitude duration of the vertical serrations is 4.7 μs ±50 ns.

g. CHECK that the half-amplitude duration of the equalizing pulses is 2.3 μs ±50 ns.

C Channel (Chrominance)

32. Chrominance response: ±1%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH B2 on the waveform monitor using external reference.

c. Select the chroma response signal from the signal generator in NTSC/YC format.

d. CHECK that the amplitude of the chrominance is flat, within 1%, using the voltage cursors.

33. Chrominance amplitude: ±1%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH B2 on the waveform monitor using external reference.

c. Select the chroma noise signal in NTSC/YC format from the signal generator.

d. Using the WFM + CAL, adjust the waveform to match the top of the lower waveform with the bottom of the upper.

e. CHECK that the chrominance amplitude is 100 IRE_{p-p} ±1 IRE (1%)

34. Burst amplitude: 285.7 mV_{p-p} (40 IRE) ±2%

a. Connect the test equipment as shown in Figure 5–2.

b. Display CH B2 on the waveform monitor using external reference.

c. Select any test signal in the NTSC/YC format.

d. Use the WFM + CAL feature to match the top of the lower burst with the bottom of the upper.

e. CHECK that burst amplitude is 285.7 mVp-p ±2% (40 IRE ±0.8 IRE).

35. Burst rise times: 400 ns ±40 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Set the signal generator to output the chroma response signal in the NTSC/YC format.

c. Display CH B2 on the waveform monitor using external reference.

d. Set the waveform monitor to display the burst on the B2 channel.

e. Use the variable vertical gain to normalize half the burst to 100 IRE and use the horizontal magnification to display the rise on the waveform monitor.

f. Use the timing cursors to measure the rise time of the burst envelope from the 10 IRE graticule to the 90 IRE graticule.

g. CHECK that rise time is 400 ns ±40 ns.

36. Chrominance rise times: 400 ns ±40 ns

a. Connect the test equipment as shown in Figure 5–2.

b. Set the signal generator to output the chroma response signal in the NTSC/YC format.

c. Display CH B2 on the waveform monitor using external reference.

d. Set the waveform monitor to display the rise on the B2 channel.

e. Use the variable vertical gain to normalize the rise to 100 IRE and use the horizontal magnification to display the rise on the waveform monitor.

f. Use the timing cursors to measure the rise time of the chrominance envelope from the 10 IRE graticule to the 90 IRE graticule.

g. CHECK that rise time is 400 ns ±40 ns.

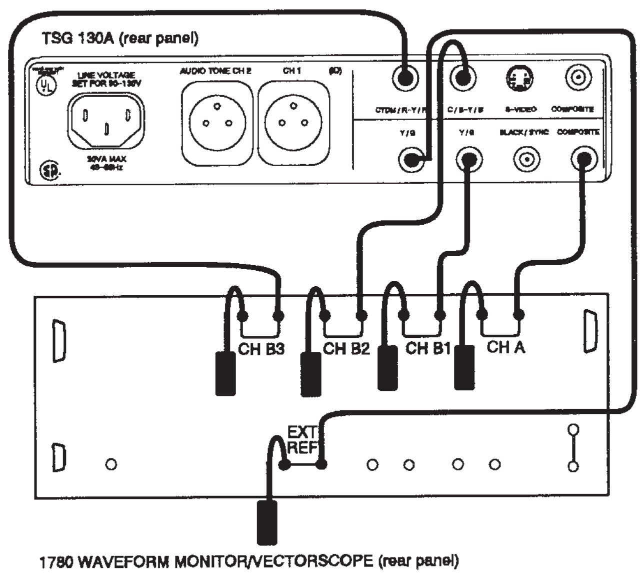


Figure 5–3: Setup for remaining standard performance checks (EXT REF cable moved to Y/G output)

NOTE*. If the signal generator under check has an optional black burst signal installed, use that signal as the waveform monitor EXT REF input.*

B-Y Signals

37. B-Y blanking level: 0 mVDC ±50 mVDC

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor using external reference.

c. Select any signal from the signal generator in Y, B-Y, R-Y format.

d. Switch the display from DC coupled to ground reference.

e. Use the vertical position adjustment of the waveform monitor to set the ground line to a convenient reference graticule.

f. Return to DC coupling.

g. CHECK that the blanking level is on the reference graticule ±50 mV.

38. B-Y rise times: color bars 400 ns ±40 ns; other signal transitions 250 ns ±25 ns

a. Connect the equipment as shown in Figure 5–3.

b. Set the signal generator to output 100% Color Bars in the Y, B-Y, R-Y format.

c. Display CH B2 on the waveform monitor using external reference.

d. Turn on Time Cursors and set for ‘Separate’ on the touch screen. Dial in 400 ns and touch ‘Track.’

e. Use the Waveform Variable Gain and Vert.Pos. controls to normalize the first falling edge to 50 IRE amplitude with the baseline at 50 IRE.

f. Move the time cursors to 90% (45 IRE) and 10% (5 IRE).

g. CHECK that the fall time is 400 ns ±40 ns. Touch ‘Separate’ and dial timing cursor if necessary.

h. With the timing cursors set to track 400 ns, move the cursors to other rising and falling edges and observe 10% and 90% points.

i. Set the signal generator to output 5 Step and set the timing cursor to track 250 ns.

j. Normalize the first falling edge to 50 IRE as before.

k. CHECK that tracking cursors fall at 45 IRE and 5 IRE and at 10% and 90% points when moved to other edges.

39. B-Y sine squared pulse accuracy: HADs accurate within 25 ns

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor in the line display mode using external reference.

c. Set the waveform monitor to display the 4T pulse on the T pulses signal in Y, B-Y, R-Y format.

d. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

e. Using the timing cursors, measure the time between the 50 IRE points.

f. CHECK that the HAD of the 4T pulse is 500 ns ±25 ns.

g. Set the waveform monitor to display the 7T pulse on the T pulses signal in Y, B-Y, R-Y format.

h. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

i. Using the timing cursors, measure the time between the 50 IRE points.

j. CHECK that the HAD of the 7T pulse is 875 ns ±25 ns.

R-Y Signals

40. Blanking level: 0 mVDC ±50 mVDC

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor using external reference.

c. Select any signal from the signal generator in the Y, B-Y, R-Y format.

d. Switch the display from DC coupled to ground reference.

e. Use the vertical position adjustment of the waveform monitor to set the ground line to a convenient reference graticule.

f. Return to DC coupling.

g. CHECK that the blanking level is on the reference graticule ±50 mV.

41. R-Y rise times: color bars 400 ns ±40 ns; other signal transitions 250 ns ±25 ns

a. Connect the equipment as shown in Figure 5–3.

b. Set the signal generator to output 100% Color Bars in the Y, B-Y, R-Y format.

c. Display CH B3 on the waveform monitor using external reference.

d. Turn on Time Cursors and set for ‘Separate’ on the touch screen. Dial in 400 ns and touch Track.

e. Use the Waveform Variable Gain and Vert.Pos. controls to normalize the first falling edge to 50 IRE amplitude with the baseline at 50 IRE.

f. Move the time cursors to 90% (45 IRE) and 10% (5 IRE).

g. CHECK that the fall time is 400 ns ±40 ns. Touch ‘Separate’ and dial timing cursor if necessary to determine the fall time of the edge. Reset the time cusrors to 400 ns.

h. With the timing cursors set to track 400 ns, move the cursors to other rising and falling edges and observe 10% and 90% points.

i. Set the signal generator to output 5 Step and set the timing cursor to track 250 ns.

j. Normalize the first falling edge to 50 IRE as before.

k. CHECK that tracking cursors fall at 45 IRE and 5 IRE and at 10% and 90% points when moved to other edges.

42. R-Y sine squared pulse accuracy: HADs accurate within 25 ns

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor in the line display mode using external reference.

c. Set the waveform monitor to display the 4T pulse on the T pulses signal in Y, B-Y, R-Y format.

d. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

e. Using the timing cursors, measure the time between the 50 IRE points.

f. CHECK that the HAD of the 4T pulse is 500 ns ±25 ns.

g. Set the waveform monitor to display the 7T pulse on the T pulses signal in Y, B-Y, R-Y format.

h. Use the variable gain control to normalize the pulse to 100 IRE and use the horizontal magnification to make the pulse fill the waveform monitor display.

i. Using the timing cursors, measure the time between the 50 IRE points.

j. CHECK that the HAD of the 7T pulse is 875 ns ±25 ns.

Green Channel

***NOTE**. Before using the GBR signal format, check that the green channel has sync enabled. If there is no sync on the green signal, move jumper J123 to the 2-3 position.*

43. Amplitude accuracy: ±1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1 on the waveform monitor.

c. Select the 100% bars signal in GBR format from the signal generator.

d. With the WFM + CAL function of the measurement set match the top of the lower waveform with the blanking level of the upper waveform.

e. CHECK that the amplitude is 700 mV ±7 mV (1%).

44. Green frequency response: flat to 5.0 MHz ±1%; flat to 5.5 MHz ±2%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1 on the waveform monitor.

c. Select the Sweep signal from the signal generator in GBR format.

d. CHECK using the WFM + CAL function, that the signal amplitude is flat within 1% to 5.0 MHz and flat within 2% to 5.5 MHz.

45. Sync amplitude: 300.0 mV ±2%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1 on the waveform monitor.

c. Select any signal from the signal generator in the GBR format.

d. Using the WFM + CAL, match the signal level of the lower waveform to the sync tip of the upper waveform.

e. CHECK that the sync amplitude is 300.0 mV ±2%.

Blue Channel

46. Blue gain: ±1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor using external reference.

c. Select GBR format and the blue field test signal from the signal generator.

d. Use the WFM + CAL feature to match the top of the lower waveform with the bottom of the upper.

e. CHECK that signal amplitude is 700 mV_{p-p} ±7 mV (1%).

47. Blue frequency response: flat to 5.0 MHz ±1%; flat to 5.5 MHz ±2%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor using external reference.

c. Select GBR format and the sweep test signal from the signal generator.

d. Use the WFM + CAL feature to match the top of the lower waveform with the bottom of the upper.

e. CHECK that the sweep portion of the signal is flat within 1% out to 5.0 MHz and flat to within 2% out to 5.5 MHz.

48. Blue staircase linearity: <1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor using external reference.

c. Select GBR format and the 10-step test signal from the signal generator.

d. Set the test equipment to view the signal through a differentiated step filter.

e. CHECK using the voltage cursors, that the upward spikes (differentiated steps) are equal within 1%.

49. Line tilt: ±0.5%

a. Connect the equipment as shown in Figure 5–3.

b. Display channel B2 on the waveform monitor using external reference.

c. Select the blue field signal from the signal generator in the GBR format.

d. Normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at its midpoint.

e. Center the signal over a horizontal graticule.

f. CHECK that the line tilts no more than 0.5% (0.5 IRE) over its length. Ignore the first and last microsecond of the bar.

50. Field tilt: ±0.5%

a. Connect the equipment as shown in Figure 5–3.

b. Display channel B2 on the waveform monitor using external reference.

c. Select the Blue Field signal from the signal generator in GBR format.

d. Normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at its midpoint.

e. Set the test equipment to view one field of the signal.

f. CHECK that the field bar tilts no more than 0.5% over its length. Ignore the first and last 3 lines of the signal.

51. Pulse-to-bar ratio: 1:1 ±1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B2 on the waveform monitor using external reference.

c. Set the signal generator to output the pulse & bar signal in the GBR format.

d. Set the waveform monitor to display the tip of the inverted pulse of the pulse & bar signal.

e. CHECK that the inverted pulse tip is within 1% of the 0 IRE reference graticule, using the WFM + CAL signal.

Red Channel

52. Red frequency response: flat to 5.0 MHz ±1%
Flat to 5.5 MHz ±2%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor using external reference.

c. Select GBR format and the Sweep test signal from the signal generator.

d. Use the WFM + CAL feature to match the top of the lower waveform with the bottom of the upper.

e. CHECK that the sweep portion of the signal is flat within 1% out to 5.0 MHz and flat within 2% out to 5.5 MHz.

53. Staircase linearity: <1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor using external reference.

c. Select GBR format and the 10-Step test signal from the signal generator.

d. Set the test equipment to view the signal through a differentiated step filter.

e. CHECK that the upward spikes (differentiated steps) are equal within 1%.

54. Red gain: ±1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor using external reference.

c. Select GBR format and red field test signal from the signal generator.

d. Use the WFM + CAL to align to top of the lower waveform with the blanking level of the upper.

e. CHECK that signal amplitude is 700 mV ±7 mV (1%).

55. Line tilt: ±0.5%

a. Connect the equipment as shown in Figure 5–3.

b. Display channel B3 on the waveform monitor using external reference.

c. Select the red field signal from the signal generator in GBR format.

d. Normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at its midpoint.

e. Center the signal over a horizontal graticule.

f. CHECK that the line tilts no more than 0.5% over its length. Ignore the first and last microsecond of the bar.

56. Field tilt: ±0.5%

a. Connect the equipment as shown in Figure 5–3.

b. Display channel B3 on the waveform monitor using external reference.

c. Select the red field signal from the signal generator in GBR format.

d. Normalize the signal gain so that blanking level of the waveform is on the baseline and the top of the signal passes through 100 IRE at its midpoint.

e. Set the test equipment to view one field of the signal.

f. CHECK that the field bar tilts no more than 0.5% over its length. Ignore the first and last 3 lines of the signal.

57. Pulse-to-bar ratio: 1:1 ±1%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B3 on the waveform monitor in external reference.

c. Set the signal generator to output the pulse & bar signal in the GBR format.

d. Set the waveform monitor to display the tip of the inverted pulse of the pulse & bar signal.

e. CHECK that the inverted pulse tip is within 1% of blanking level, using the WFM + CAL signal.

Inter-Channel Timing and Amplitude

58. B-Y to Y Timing: within 5 ns

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1-B2 on the waveform monitor using external reference.

c. Select Y, B-Y, R-Y format and the Bowtie test signal from the signal generator.

d. Use 5X waveform gain to accentuate the bowtie.

e. CHECK that the crossover point of the bowtie falls within the 5 ns markers (see Figure 5–4.

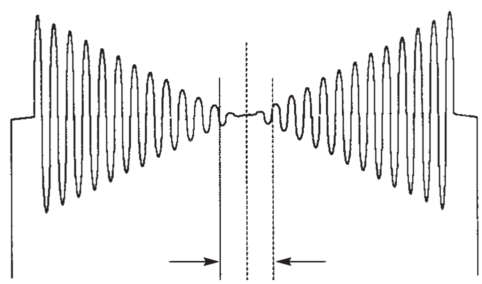


Figure 5–4: Bowtie crossover

59. R-Y to Y timing: within 5 ns

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1-B3 on the waveform monitor using external reference.

c. Select Y, B-Y, R-Y format and the bowtie test signal from the signal generator.

d. Use 5X waveform gain to accentuate the bowtie.

e. CHECK that the crossover point of the bowtie falls between the 5 ns markers (see Figure 5–4).

60. GBR amplitude matching: ±0.5%

a. Connect the equipment as shown in Figure 5–3.

b. Display CH B1, B2, and B3 on the waveform monitor using external reference in overlay mode.

c. Select GBR format and the 100% bars test signal from the signal generator.

d. Use the channel offset to set the bottom of the waveforms to the 0 IRE graticule.

e. Use the X5 gain to display any differences in the amplitude at the top of the signals.

f. CHECK that the amplitude of the signals are equal within 0.5%.

S-video Output

61. S-video frequency response: 4.2 MHz ±2%

a. Connect the test equipment as shown in Figure 5–5.

b. Display CH A on the waveform monitor using EXT REF.

c. Select line sweep from the signal generator in the NTSC/Y-C mode.

d. CHECK that the signal is flat within 2% to 4.2 MHz.

e. Display CH B1 on the waveform monitor using EXT REF.

f. Select the chroma response signal from the signal generator in the NTSC/Y-C format.

g. CHECK that the signal is flat within 2% to 4.2 MHz.

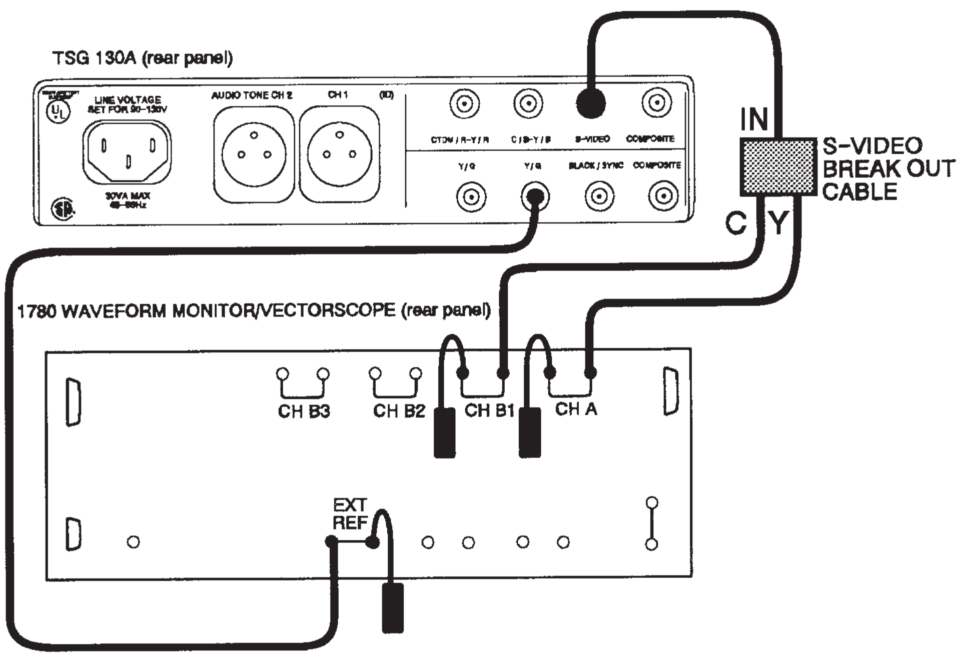


Figure 5–5: Setup to check S-video output

Audio Output

62. Total harmonic distortion: TDH ≤0.5%

a. Disable the CH 1 ID click by moving jumper J12 to pins 2 and 3.

b. Connect the equipment as shown in Figure 5–6, placing a 600 resistor across the analyzer's + and – terminals (to represent the system load).

c. Set the distortion analyzer to measure THD.

d. CHECK that the THD on CH 1 is ≤0.5%.

e. Return jumper J12 to pins 1 and 2.

f. Move the cable at the signal generator from audio channel 1 to audio channel 2.

g. CHECK that the THD on channel 2 is ≤0.5%.

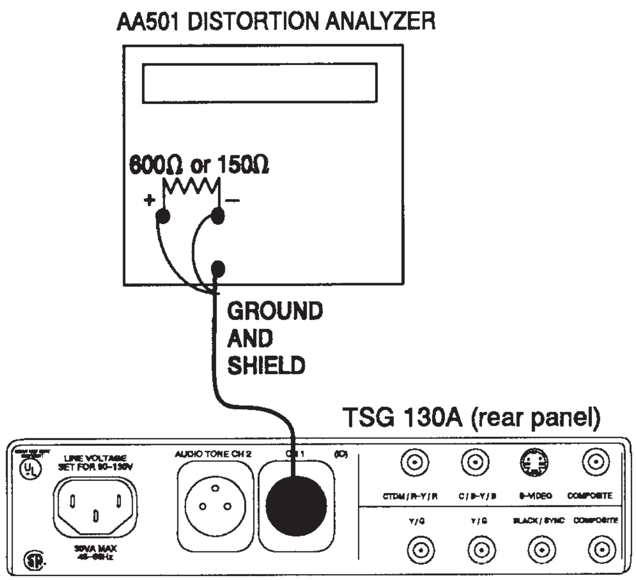


Figure 5–6: Setup to measure total harmonic distortion

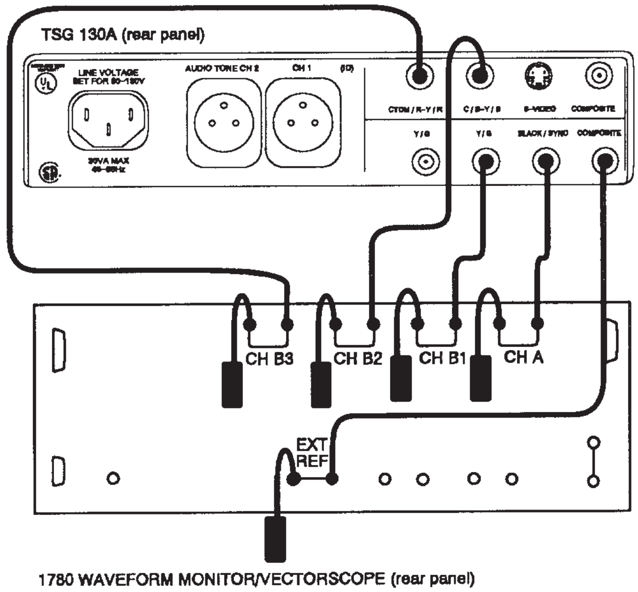


Figure 5–7: Setup to check black burst output

Black Burst Output (Option 01/02, 02, 03, 2J)

63. Black burst amplitude: 7.5 IRE ±IRE; 0 IRE ±1 IRE (Option 2J)

- **a.** Connect the equipment as shown in Figure 5–7.
- **b.** Display CH A in the WFM + CAL mode.
- **c.** CHECK that the amplitude of the signal is 7.5 IRE ±1 IRE (0 IRE ±1 IRE Option 2J).

64. Black burst blanking width: 10.9 ±0.2 μs

- **a.** Connect the equipment as shown in Figure 5–7.
- **b.** Display CH A on the waveform monitor.
- **c.** Use the voltage cursor to measure the time between the 4 IRE point on the front porch and the 4 IRE point on the back porch.
- **d.** CHECK that the blanking width is 10.9 ±0.2 μs.

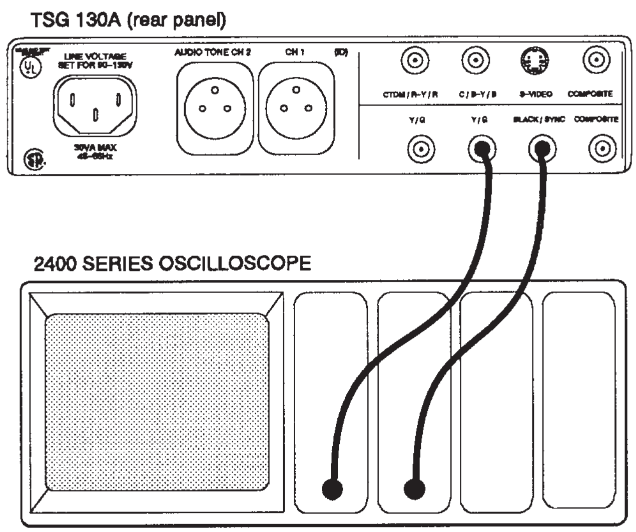


Figure 5–8: Setup to check Option pulse outputs

Composite Sync (Options 01/02, 02, 03)

65. Duration: horizontal sync = 4.7 μs ±50 ns; vertical serration = 4.7 μs ±50 ns; equalizing pulse = 2.3 μs ±50 ns

- **a.** Connect the equipment as shown in Figure 5–8.
- **b.** Select the 0% flat field from the signal generator in NTSC/YC mode.
- **c.** Display the comp sync signal on the scope.
- **d.** Display one of the sync pulses so that its width covers the entire horizontal display.
- **e.** Use the variable vertical gain to normalize the pulse to 6 or 8 divisions.
- **f.** Use the horizontal position control to place the midpoint of the sync on the 0 graticule.
- **g.** CHECK that the time between the 50% points of the horizontal sync is 4.7 μs ±50 ns.
- **h.** CHECK that the time between the 50% points of the vertical serration is 4.7 μs ±50 ns.
- **i.** CHECK that the time between the 50% points of the equalizing pulse is 2.3 μs ±50 ns.

66. Amplitude: –4.0 V ±0.5 V

- **a.** Connect the equipment as shown in Figure 5–8.

b. Connect the BLACK/SYNC output to one input of the oscilloscope and Y to the other.

c. Select the 0% flat field from the signal generator in NTSC/YC mode.

d. CHECK that the amplitude of the comp sync is –4 V within 500 mV.

67. Rise and fall times: 140 ns ±20 ns

a. Connect the equipment as shown in Figure 5–8.

b. Display the comp sync on the oscilloscope.

c. Use the variable vertical gain to normalize the sync to 10 divisions high.

d. Expand the horizontal display as much as possible, still having the entire falling edge of the sync displayed.

e. Measure the time between the the middle 8 divisions.

f. CHECK that the fall time is 140 ns ±20 ns.

g. Repeat for the rising edge.

Color Flag Reference Pulse (Option 03)

68. Amplitude & position

a. Connect the signal generator black/sync output to one of the oscilloscope inputs, using a 75   coax and a 75   feed-through terminator. Set this input to 200 mV/div.

b. Connect the left Y/G output to a second oscilloscope input. Set this input to 2 V/div.

c. Set the oscilloscope to trigger from the black/sync input, at a 10 ms sweep rate, displaying both inputs.

d. CHECK that there is a negative-going pulse of approximately 5 V occurring on the Y/G output once every four fields, just before the F1L10 pulse on the black burst signal from the black/sync output.

e. Expand the oscilloscope horizontal to display this pulse at 100 μs/div.

f. CHECK that the color frame reference pulse is approximately 200 μs in duration, and aligns with the vertical sync pulse interval of the black burst signal.

Color Frame Square Wave (Option 04)

69. Amplitude & position

a. Connect the black/sync output to one input of the oscilloscope and composite to the other.

b. Select the 0% flat field from the signal generator in NTSC/YC mode.

c. CHECK that the amplitude of the color frame square wave is –5 V within 200 mV.

d. CHECK that the timing of the color frame square wave is low for fields 1 and 2 and high for fields 3 and 4. The transition should occur on line 11.

Adjustment Procedures

Adjustment Procedures

Table 6–1 is a checklist for the following adjustment procedures.

Table 6–1: Adjustment procedures list

No.	Description	Notes
1	Oscillator frequency – Y1	
2	Audio output amplitude – R123, R122	
3	Audio ID click frequency – R126	
4	Y/G channel DC level and gain – R82, R79	
5	Y/G channel sin(x)/x compensation – C69	
6	Y/G channel frequency response and 2T ringing – L14, L15, L16, L17, L18	These parts are factory set. Do not adjust unless these parts are out of spec.
7	C/B-Y/B channel DC level and gain – R63, R60	
8	C/B-Y/B channel sin(x)/x compensation – C47	
9	C/B-Y/B channel frequency response and ringing – L8, L9, L10, L11, L12	These parts are factory set. Do not adjust unless these parts are out of spec.
10	CTDM/R-Y/R channel DC level and gain – R101, R98	
11	CTDM/R-Y/R channel sin(x)/x compensation – C99	
12	CTDM/R-Y/R channel frequency response and 2T ringing – L20, L21, L22, L23, L24	These parts are factory set. Do not adjust unless these parts are out of spec.
13	Interchannel gain matching – R79, R60, R98	
14	Composite blanking level and gain – R20, R18	
15	Composite chrominance gain – R23	
16	Composite sin(x)/x compensation and chroma response – C19, C21	
17	Inter-channel timing – C30, C32	These steps are interactive. Repeat them in sequence until the best possible results are obtained. If satisfactory results cannot be achieved, repeat steps 4 – 16 before returning to this sequence.
18	Chrominance-to-luminance delay – C30	
19	SC/H phase – C30	
20	Channel 1 to channel 2 timing (re-check)	
21	Black burst DC level and gain – R231, R226	The parts in these steps are loaded only in Options 01/02, 02, 03, and 2J. The parts in step 23 are factory set. Do not adjust unless these parts are out of spec.
22	Black burst channel sin(x)/x compensation – C278	
23	Black burst channel interchannel timing – L31, L32, L34, L35, L36	
24	Comp sync DC level and gain – R231, R226	The parts in these steps are loaded only in Option 04. The parts in step 26 are factory set. Do not adjust unless these parts are out of spec.
25	Comp sync channel sin(x)/x compensation – C278	
26	Comp sync interchannel timing – L31, L32, L34, L35, L36	

Adjustment Procedures

1. Oscillator frequency – Y1

a. Connect the equipment as shown in Figure 6–1, connecting the probe to W151.

b. Set the DC503A to count a frequency referenced to channel B (ratio A/B).

c. Remove the round plastic cap from the top of the oscillator (Y1).

d. Fine-adjust the oscillator frequency to bring $4F_{sc}$ to 14.31818 MHz ±28 Hz.

e. Reinstall the plastic cap.

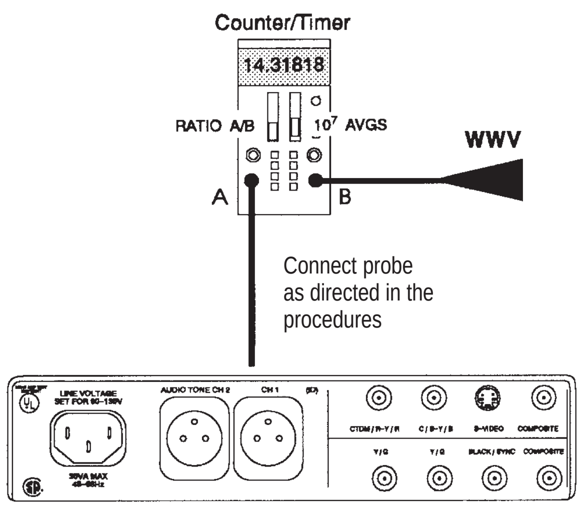


Figure 6–1: Setup to adjust oscillator frequency

2. Audio output amplitude – R123, R122

a. Connect the equipment as shown in Figure 6–2 with the following distortion analyzer settings:

Table 6–2: Distortion analyzer settings

Function	Setting
Input level range	Auto range
dBm switch	In

Table 6–2: Distortion analyzer settings (Cont.)

Function	Setting
Level switch	In
All filter switches	Out

b. Disable the channel 1 ID click by moving jumper J12 to pins 2 and 3.

c. Adjust R123 to obtain the desired output level for audio 1 (factory setting is +8 dBm).

d. Return jumper J12 to the 1–2 position.

e. Move the TSG130A cable from audio channel 1 to audio channel 2.

f. Adjust R122 to obtain the desired output level for audio 2 (factory setting is +8 dBm).

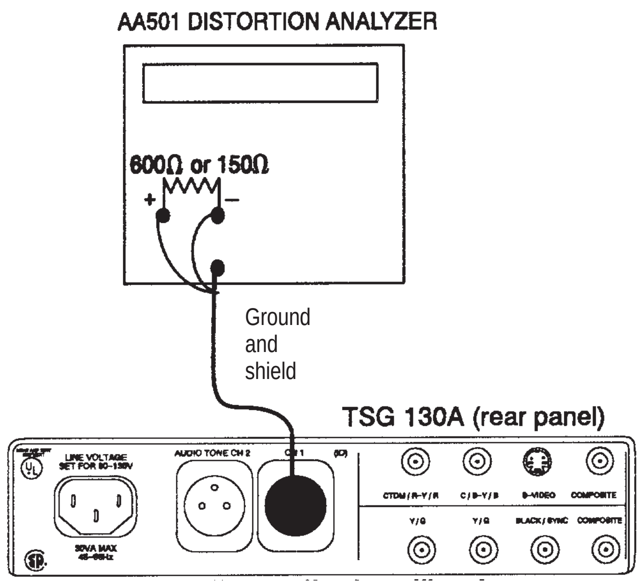


Figure 6–2: Audio amplitude calibration setup

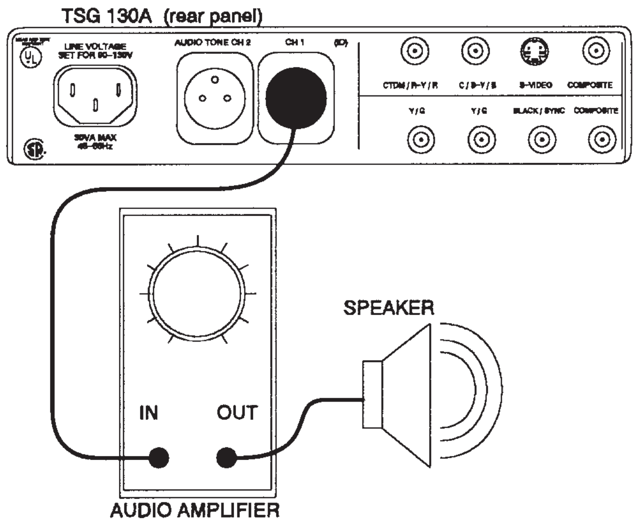


Figure 6–3: Audio ID click frequency adjustment setup

3. Audio ID click frequency – R126

a. Connect the equipment as shown in Figure 6–3.

b. Adjust R126 for the desired interval between ID clicks. The range of adjustment is about 0.2 – 4 seconds.

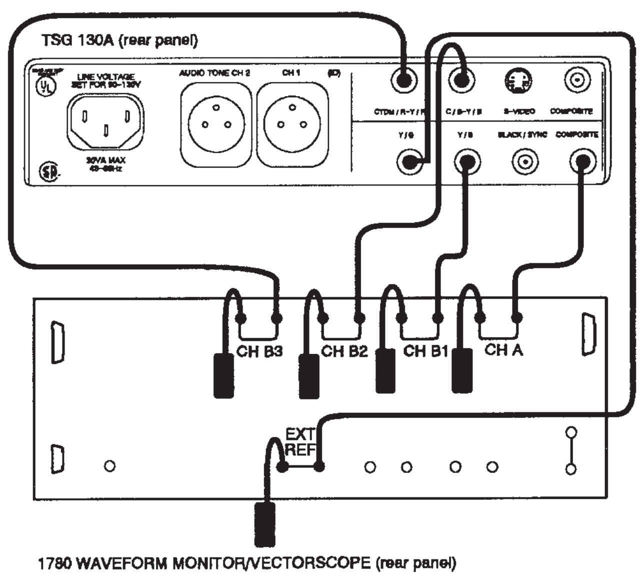


Figure 6–4: Basic setup for calibration procedures

Table 6–3: Initial 1780 setup

Configure	Front panel
Coupling	DC
Left display	Vect
Vector grat	Int
Right display	WFM
WFM grat	Int
Ref	Ext
Abs units	IRE
Filter	Flat
Vector readout	On
WFM horizontal	One/line
WFM readout	On
Waveform gain	X5

***NOTE**. If the TSG130A under check has the optional black burst signal installed, use that signal as the waveform monitor Ext Ref input.*

4. Y/G channel DC level and gain – R82, R79

a. Begin with the 1780R reference setup shown in Table 6–3 and Figure 6–4 and select channel B1 as the input.

b. Select the 0% flat field signal in NTSC/YC format from the TSG130A.

c. Set the 1780R to GND coupling and center the trace on a reference graticule.

d. Switch to DC coupled. Adjust R82 for a dc level of 0 V (set the blanking level to the reference graticule).

e. Select the 100% field signal in NTSC/YC format from the TSG130A.

f. Select WFM + CAL, set CAL for 100 IRE, and adjust R79 to match the top of the lower waveform with the blanking level of the upper.

g. Repeat these procedures as necessary to get satisfactory results.

5. Y/G channel (sin(x))/x compensation – C69

a. Begin with the reference setup of the measurement set and select channel B1 as the input.

b. Select the sweep (one of the diagnostic signals) from the TSG130A in NTSC/YC format.

c. Choose WFM + CAL at the 1780R and match the top of the lower sweep with the bottom of the upper.

d. Adjust C69 for as flat a frequency response as possible from the beginning of the sweep out to 5.0 MHz within 1% and to 5.5 MHz within 2%.

6. Y/G channel frequency response and 2T ringing L14, L15, L16, L17, & L18

NOTE*. The parts in this step are factory set. Do not adjust these parts unless they are out of spec.*

---

a. Begin with the 1780R reference setup and select channel B1 as the input and external reference.

b. Select the sweep from the TSG130A in NTSC/YC format.

c. Adjust L14, L15, L16, L17, and L18 to make the frequency response as flat as possible. Use WFM + CAL to confirm that the full amplitude sweep is 700 ±14 $mV_{p\text{-}p}$, for the duration of the sweep.

d. Select the pulse & bar signal from the TSG130A.

e. Display the bottom of the 2T pulse, using horizontal magnification, to view the ringing.

f. Adjust L14 and L15 for symmetrical 2T ringing. Use the 1780R's voltage cursors to confirm that ringing (overshoot) is <7.0 mV peak.

g. Repeat steps b – g for best results.

7. C/B-Y/B Channel DC level and gain R63 & R60

a. Begin with the 1780R reference setup and display channel B2 using external reference.

b. Select the 100% bars signal in Y, B-Y, R-Y format from the TSG130A.

c. Set the 1780R to GND coupling and center the trace on a reference graticule.

d. Switch to DC coupled and adjust R63 for a blanking level of 0 V (set the blanking level to the reference graticule).

e. Select the blue field signal in GBR format from the TSG130A.

f. Select WFM + CAL at the right display section of the 1780R, set CAL for 700 mV, and adjust R60 to match the top of the lower waveform with the blanking level of the upper.

g. Repeat these steps as necessary to produce satisfactory results.

8. C/B-Y/B channel (sin(x))/x compensation – C47

a. Begin with the reference setup and select channel B2 as the input using external reference.

b. Select the sweep in the GBR format from the TSG130A.

c. Choose WFM + CAL at the 1780R and match the top of the lower sweep with the bottom of the upper; use the dual trace to aid adjustment.

d. Adjust C47 for as flat a frequency response as possible from the beginning of the sweep within 1% out to 5.0 MHz and within 2% out to 5.5 MHz.

9. C/B-Y/B channel frequency response and ringing L8, L9, L10, L11, & L12

***NOTE**. The parts in this step are factory set. Do not adjust these parts unless they are out of spec.*

a. Begin with the reference setup and select channel B2 using external reference.

b. Select the sweep in GBR format from the TSG130A.

c. Adjust L8, L9, L10, L11, and L12 to make the frequency response as flat as possible. Use WFM + CAL to confirm that the Sweep is 700 ±14 mV_{p-p} for the duration of the sweep.

d. Select the T Pulses in GBR format from the TSG130A.

e. Display the bottom of the 4T Pulse, using horizontal magnification, to view the ringing.

f. Adjust L8 and L9 for symmetrical 4T ringing. Use the 1780R's voltage cursors to confirm that ringing (overshoot) is <7 mV peak.

g. Repeat these steps for the best results.

10. CTDM/R-Y/R channel DC level and gain – R101 & R98

a. Begin with the 1780R reference setup and select channel B3 as the input using external reference.

b. Select the 100% bars signal in GBR format from the TSG130A.

c. Set the 1780R to GND coupling and center the trace on a reference graticule.

d. Switch to DC coupling and adjust R101 for a blanking level of 0 V by setting the blanking level to the reference graticule.

e. Select the red field signal in GBR format from the TSG130A.

f. Select WFM + CAL at the right display section of the 1780R, set CAL for 700 mV, and adjust R98 to match the top of the lower waveform with the blanking level of the upper.

g. Repeat these steps as necessary for best results.

11. CTDM/R-Y/R channel (sin(x))/x compensation – C99

a. Begin with the reference setup and select channel B3 as the input using external reference.

b. Select the sweep in the GBR format from the TSG130A.

c. Choose WFM + CAL at the 1780R and match the top of the lower sweep with the bottom of the upper; use the dual trace to aid adjustment.

d. Adjust C99 for as flat a frequency response as possible from the beginning of the sweep out to 5.0 MHz (within 1%) and to 5.5 MHz (within 2%).

12. CTDM/R-Y/R channel frequency response and 2T ringing L20, L21, L22, L23, L24

NOTE. *The parts in this step are factory set. Do not adjust these parts unless they are out of spec.*

a. Begin with the reference setup and select channel B3 as the input using external reference.

b. Select the sweep in GBR format from the TSG130A.

c. Also adjust L20, L21, L22, L23, and L24 to make the frequency response as flat as possible. Use WFM + CAL to confirm that the Sweep is 700 ±14 $mV_{p\text{-}p}$ for the duration of the sweep.

d. Select the T pulses in GBR format from the TSG130A.

e. Display the bottom of the 2T pulse, using horizontal magnification, to view the ringing.

f. Adjust L20 and L21 for symmetrical 2T ringing. Use the 1780R’s voltage cursors to confirm that ringing (overshoot) is <7 mV peak.

g. Repeat these steps for best results.

13. Interchannel gain matching – R79, R60, R98

a. Begin with the reference setup of the measurement set and select B1, B2, B3 in overlay mode.

b. Select the 100% bars signal in GBR format.

c. Use the variable offset control to place the bottom of all of the waveforms on a convenient graticule.

d. Set the vertical gain to X5 and display the top of the waveform.

e. CHECK to see if all of the amplitudes are within 0.5% of each other.

f. Adjust, if necessary, R79 for green, R60 for blue, and R98 for red to bring the amplitudes into spec.

g. If any of the amplitudes needed to be adjusted, repeat steps 4 – 12 until these adjustments are no longer necessary.

14. Composite blanking level and gain – R20, R18

a. Begin with the reference setup and select channel A as the input.

b. Select the steps (5-step) signal in NTSC/YC format from the TSG130A.

c. Set the 1780R to GND coupling and center the trace on a reference graticule.

d. Switch to DC coupling and adjust R20 for a blanking level of 0 V by setting the blanking level to the reference graticule.

e. Select WFM + CAL at the right display section of the 1780R, set CAL for 100 IRE, and adjust R18 to match the top of the lower waveform with the blanking level of the upper.

f. Repeat these steps as necessary for best results.

15. Composite chrominance gain – R23

a. Begin with the reference setup and select CH A as the input.

b. Select the chroma noise signal from the TSG130A in NTSC/YC format.

c. Select WFM + CAL at the right display section of the 1780R, set CAL for 100 IRE.

d. Adjust R23 to match the bottom of the chrominance portion of the signal to blanking.

16. Composite (sin(x))/x compensation and chroma response – C19, C21

a. Begin with the reference setup and select channel A as the input.

b. Select the sweep in NTSC/YC format from the TSG130A.

c. Choose WFM + CAL at the 1780R and match the top of the lower sweep with the bottom of the upper; use the dual trace to aid adjustment.

d. Adjust C19 for as flat a frequency response as possible from the beginning of the sweep out to 4.2 MHz (within 2%).

e. Select the chroma response signal from the TSG130A.

f. Again, use WFM + CAL to create a dual trace to aid adjustment.

g. Set the WFM + CAL to 40 IRE.

h. Adjust C21 to match the top of the burst of the lower waveform to the bottom of the burst of the upper waveform.

***NOTE**. Steps 17 – 20 are interactive. Repeat them in sequence until the best possible results are obtained. If satisfactory results cannot be achieved, repeat steps 4 – 16 before returning to this sequence.*

---

17. Inter-channel timing – C30, C32

a. Begin with the reference setup of the measurement set and select B1-B2 as the input.

b. Select the bowtie signal in GBR format from the TSG130A.

c. Adjust C30 to place the crossover point of the bowtie on the center (highest amplitude) marker.

d. Select B1-B3 as the input.

e. Adjust C32 to center the crossover point (see Figure 6–5).

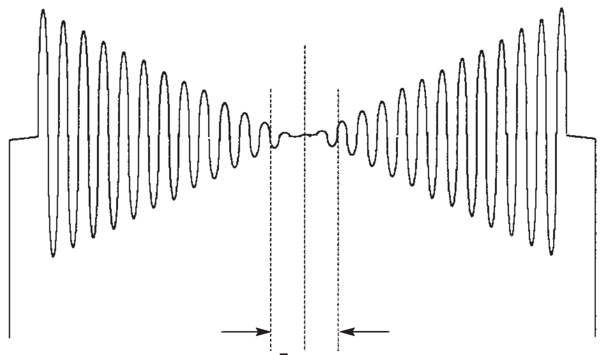


Figure 6–5: Bowtie crossing

18. Chrominance-to-luminance delay

a. Begin with the reference setup and select channel A as the input.

b. Select the pulse & bar signal in NTSC/YC format from the TSG130A.

c. Display the bottom of the 12.5T modulated pulse, using horizontal magnification to view the sine wave distortion.

d. Use the 1780R's C-Y measurement feature to measure the chrominance-to-luminance delay. If necessary, adjust C30 for a delay of <5 ns.

19. SC/H phase

a. With channel A as the input, change the 1780R REF setting to INT, and the LEFT DISPLAY to SC/H.

b. If necessary, adjust C30 for an SC/H phase difference of <5°.

20. Channel 1 to channel 2 timing (recheck)

a. Change the 1780R input to B1-B2.

b. Select the bowtie signal from the TSG130A.

c. If necessary, adjust C30 to bring the crossover point of the bowtie between the +5 and –5 ns markers (see Figure 6–5).

NOTE*. Once adjustment has been completed, return jumper J2 to pins 1 and 2 before reinstalling the cover and placing the TSG130A in service.*

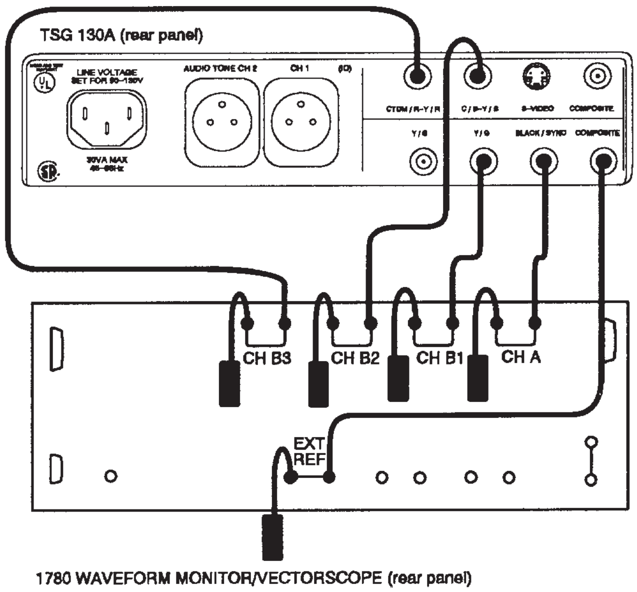


Figure 6–6: Setup to calibrate black burst output

NOTE*. The following parts adjusted in steps 21 – 23 appear only in Options: 01/02, 03, and 3J.*

---

21. Black burst DC level and gain – R231, R226

- **a.** Begin with the 1780R setup shown in Figure 6–6 and select channel A as the input.
- **b.** Set the 1780R to GND coupling and center the trace on a reference graticule.
- **c.** Switch to DC coupled and adjust R231 so that the blanking level of the signal is on the reference graticule.
- **d.** Select WFM + CAL at the right display section of the 1780R, set CAL for 7.5 IRE, and adjust R226 to match the top of the lower waveform with the 0 level of the upper.
- **e.** Repeat these procedures as necessary to get satisfactory results.

22. Black burst channel (sin(x))/x compensation – C278

- **a.** Begin with the reference setup and select channel A as the input.
- **b.** Select any signal in the NTSC/YC format from the TSG130A.
- **c.** Choose WFM + CAL at the 1780R and set it to 40 IRE.

d. Adjust C69 to match the burst amplitude to the WFM + CAL signal.

23. Black burst inter-channel timing – L31, L32, L34, L35, L36

***NOTE**. The parts in this step are factory set. Do not adjust these parts unless they are out of spec.*

---

a. Begin with the 1780R reference setup and select channel A as the input using external reference.

b. Select the 0% flat field in NTSC/YC format from the TSG130A.

c. Put the vectorscope in SCH mode.

d. CHECK that the phase difference (SCH) between the black burst and the composite signal is <3°.

e. If it is <3° then the adjustments are finished. If not, continue with step f.

f. Adjust L14, L15, L16, L17, and L18 to make the phase difference (SCH) <3°.

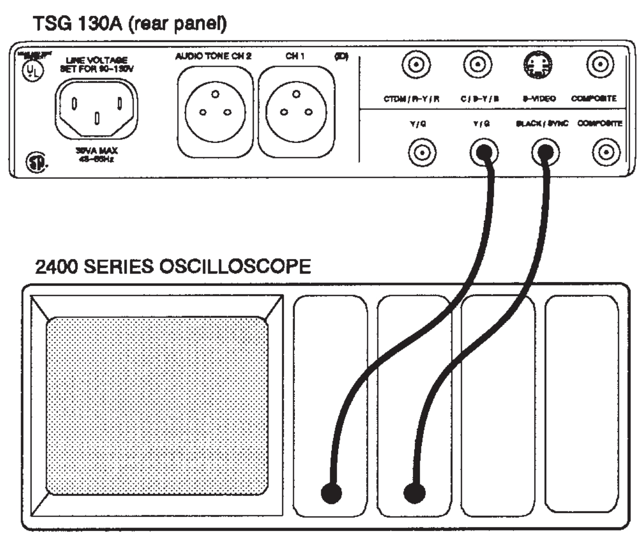


Figure 6–7: Setup to adjust comp sync signal

***NOTE**. The following parts adjusted in steps 24 – 26 are used only in Option 04.*

---

24. Comp sync DC level and gain – R231, R226

- **a.** Begin with the oscilloscope setup shown in Figure 6–7 and select comp sync as the input.
- **b.** Set the oscilloscope to GND coupling and center the trace on a reference graticule.
- **c.** Switch to DC coupled and adjust R231 so that the comp sync blanking level is on the reference graticule.
- **d.** Adjust R226 for a sync tip level of –5 V.
- **e.** Repeat these procedures as necessary to get satisfactory results.

25. Comp sync channel (sin(x))/x compensation – C278

- **a.** Begin with the reference setup and select comp sync as the input.
- **b.** Adjust C69 so that the burst amplitude is 285.7 mV.

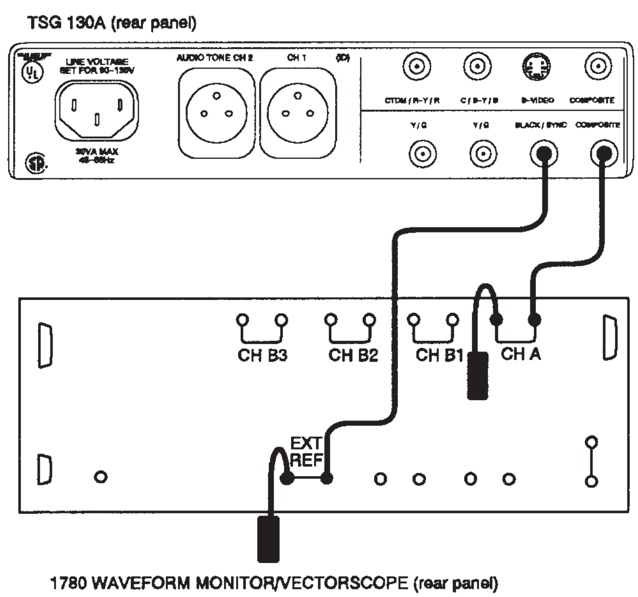


Figure 6–8: Comp sync inter-channel timing setup

NOTE*. The parts in this step are factory set. Do not adjust these parts unless they are out of spec.*

---

26. Comp sync interchannel timing L31, L32, L34, L35, L36

a. Set the equipment up as shown in Figure 6–8 and select channel A as the input using external reference.

b. Select the 0% flat field in NTSC/YC format from the TSG130A.

c. Put the vectorscope in SCH mode.

d. CHECK that the phase difference (SCH) between the 0% flat field and comp sync is <3°.

e. If it is <3°, adjustments are finished. If not, go to step f.

f. Adjust L14, L15, L16, L17, and L18 to make the phase difference (SCH) <3°.

Maintenance

Maintenance

This section describes configuring the power supply for 220 VAC operation, removing and replacing the audio board for maintenance of the circuits below it, accessing the diagnostic signal set, and setting the internal jumpers for customized uses.

WARNING. *Dangerous voltages are present in the power supply. To ensure safety, only qualified service personnel should perform the following procedures.*

Selecting the Power Supply Mains Voltage

The TSG130A is shipped from the factory configured for 110 VAC, 60 Hz operation. To configure the TSG130A for 220 VAC operation, follow this procedure.

WARNING. *Dangerous voltages are present in the power supply. Remove the power cord from the electrical mains supply before attempting this procedure. Failure to remove the power cord can result in life-threatening electrical shock.*

1. Remove the TSG130A power cord from the electrical mains supply.
2. Remove the instrument access cover.
3. Locate J122 near the AC line filter and power receptacle at the right rear of the main board.
4. For 110 VAC operation (the factory setting), the jumper should be in the 1–2–3–4 position.
5. For 220 VAC operation, the jumper should be in the 2–3–4–5 position.
6. Reinstall the instrument access cover.
7. CHECK that the fuse is the proper value. For 220 VAC operation, fuse F1 should be 0.2 Amp med blow. For 110 VAC operation the fuse should be 0.4 Amp med blow.

Removing and Replacing the Audio Board

To remove the audio board:

1. Make sure that all connections, especially the power supply are removed from the instrument.
2. Remove the top cover. (There are 8 Pozidriv<190> screws holding the top cover to the instrument.)
3. Using Figure 7–1 as a guide, remove one screw from the audio board and four screws from the rear panel audio tone connectors (five screws).

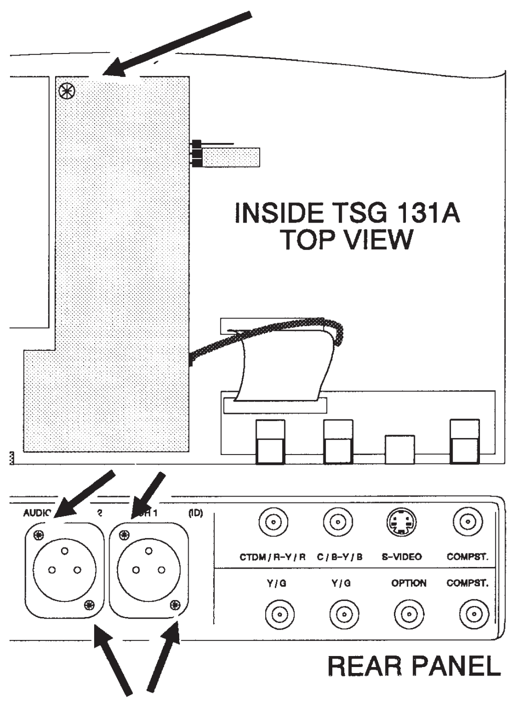


Figure 7–1: Remove 5 screws with Pozidriv screwdriver to remove audio board

4. Pull the two audio connectors straight out from the rear panel.
5. Gently, slide the audio board toward the front of the instrument until the part of the audio connectors that are soldered to the board clear the rear-panel holes.
6. Lift the board and flip it at the same time (J128, attached to the board toward the front of the instrument, forces it to flip over revealing the component side of the board).
7. The adjustments for the black burst and comp sync can now be made.

To reassemble the audio board:

1. Flip the audio board back over to face the components down.
2. Slide the audio connectors that are soldered on the board back through the rear-panel holes.
3. Slide the external audio connectors back through the rear-panel holes. The text on the audio connectors should be upside down.
4. Replace the single screw on the board.
5. Replace the four audio connector screws.
6. Replace the top cover.

Special Diagnostic Signal Set

The TSG130A has a special set of diagnostic signals that can be accessed from the front panel. These are listed in Table 7–1.

Table 7–1: Available diagnostic signals

Button	Signal name	Description
Red field	GBR matrix	100% color bars, 100% multiburst, Bowtie, Bowtie markers, 12.5T pulse and bar, 10 step
Blue field	Component matrix	100% multiburst, NTC7, chroma frequency response
Green field	GBR field square wave	Alternates black and white between fields

The diagnostic signals are designed for use with the VM700A. The signal matrixs, positions, and levels are all located where the VM700A expects them. Therefore, it takes no special programming to use the TSG130A as the reference signal source for the VM700A to test other equipment.

The diagnostic signals replace the signals in the second row of the front panel (red field, blue field, green field) when J2 is in the 2–3 position. No other signals are changed and the TSG130A can be left in this mode if the diagnostic signals are more useful than the standard signal set in a particular application.

When the user wants the standard signal set, return J2 to the 1–2 position.

Setting the Internal Jumpers

Table 7–2 lists the available jumper functions that enable you to set the instrument for individual preferences.

Table 7–2: TSG130A jumper list

Jumper		Position	Function
Diagnostic signals	J2	1–2	Enables standard front panel operation.
		2–3	Allows selection of diagnostic test signals.
Black burst F1L10 reference	J108	1–2	Enables white flag on field 1 line 7
		2–3	Disables white flag on field 1 line 7
GBR sync on green	J123	1–2	Disables sync on G output
		2–3	Enables sync on G output
Black burst or comp sync	J112	Installed	Black burst from black/sync output
	J124	Installed	Composite sync from black/sync output
Y/G channel test signal disable	J7	1–2	Normal
		2–3	Y channel output disable
C/B-Y/B channel test signal disable	J6	1–2	Normal
		2–3	C channel disable
R-Y/R channel test signal disable	J8	1–2	Normal
		2–3	R-Y channel disable
Black burst disable	J111	1–2	Black burst output enabled
		2–3	Black burst output disabled
Audio click	J12	1–2	Audio click enabled
		2–3	Audio click disabled
–5 V supply disable	J30	1–2 (installed)	Service use only
+5 V supply disable	J31	1–2 (installed)	Service use only
Power supply voltage configuration	J122	1–2–3–4	Power supply configured for 110 V operation (standard)
		2–3–4–5	Power supply configured for 220 V operation

Replaceable Electrical Parts

Replaceable Electrical Parts

This section contains a list of the electrical components for the TSG130A. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

Using the Replaceable Electrical Parts List

The tabular information in the Replaceable Electrical Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replacement parts. The following table describes each column of the electrical parts list.

Parts list column descriptions

Column	Column name	Description
1	Component number	The component number appears on diagrams and circuit board illustrations, located in the diagrams section. Assembly numbers are clearly marked on each diagram and circuit board illustration in the *Diagrams* section, and on the mechanical exploded views in the *Replaceable Mechanical Parts* list section. The component number is obtained by adding the assembly number prefix to the circuit number (see Component Number illustration following this table). The electrical parts list is arranged by assemblies in numerical sequence (A1, with its subassemblies and parts, precedes A2, with its subassemblies and parts). Chassis-mounted parts have no assembly number prefix, and they are located at the end of the electrical parts list.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.
5	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
6	Mfr. code	This indicates the code number of the actual manufacturer of the part.
7	Mfr. part number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations

Abbreviations conform to American National Standard ANSI Y1.1–1972.

Component Number

$$\text{A23A2R1234} \quad \underbrace{\text{A23} \quad \text{A2} \quad \text{R1234}}_{\text{Component number}}$$

A23 ← Assembly number

A2 ← Subassembly number (optional)

R1234 ← Circuit number

Read: Resistor 1234 (of Subassembly 2) of Assembly 23

List of Assemblies

A list of assemblies is located at the beginning of the electrical parts list. The assemblies are listed in numerical order. When a part's complete component number is known, this list will identify the assembly in which the part is located.

Chassis Parts

Chassis-mounted parts and cable assemblies are located at the end of the Replaceable Electrical Parts List.

Mfr. Code to Manufacturer Cross Index

The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
04222	AVX/KYOCERA DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008–4229
07416	TRW INC TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
09023	CORNELL–DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO	2652 DALRYMPLE ST	SANFORD NC 27330
09922	BURNDY CORP	1 RICHARDS AVE	NORWALK CT 06856
19701	PHILIPS COMPONENTS DISCRETE PROD-UCTS DIV RESISTIVE PRODUCTS FACILITY AIRPORT ROAD	PO BOX 760	MINERAL WELLS TX 76067–0760
22229	SOLITRON DEVICES INC SEMICONDUCTOR GROUP SAN DIEGO OPERS	8808 BALBOA AVE	SAN DIEGO CA 92123
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT ELECTRONICS DEPT	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070–3007
24165	SPRAGUE ELECTRIC CO	267 LOWELL ROAD	HUDSON NH 03051
26364	COMPONENTS CORP	6 KINSEY PLACE	DENVILLE NJ 07834–2611
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051–0606
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507–2114
54473	MATSUSHITA ELECTRIC CORP OF AMERICA	ONR PANASONIC WAY PO BOX 1501	SECAUCUS NJ 07094–2917
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195–4526
57668	ROHM CORPORATION	15375 BARRANCA PARKWAY SUITE B207	IRVINE CA 92718
58361	QUALITY TECHNOLOGIES CORP		
59660	TUSONIX INC	7741 N BUSINESS PARK DR PO BOX 37144	TUCSON AZ 85740–7144
61964	OMRON ELECTRONICS INC	1 EAST COMMERCE	SCHAUMBURG IL 60173
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75042	IRC ELECTRONIC COMPONENTS PHILADELPHIA DIV TRW FIXED RESISTORS	401 N BROAD ST	PHILADELPHIA PA 19108–1001
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
76493	BELL INDUSTRIES INC JW MILLER DIV	19070 REYES AVE PO BOX 5825	COMPTON CA 90224–5825
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001

Manufacturers cross index (Cont.)

Mfr. code	Manufacturer	Address	City, state, zip code
82389	SWITCHCRAFT INC SUB OF RAYTHEON CO	5555 N ELSTRON AVE	CHICAGO IL 60630–1314
8X345	NORTHWEST SPRING MFG CO	5858 SW WILLOW LANE	LAKE OSWEGO, OR 97035
91506	AUGAT INC	33 PERRY AVE PO BOX 779	ATTLEBORO MA 02703–2417
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601–3632
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108–5181
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
S4307	SCHAFFNER ELECTRONIK AG		LUTERBACH SWITZERLAND
TK1345	ZMAN & ASSOCIATES		
TK1450	TOKYO COSMOS ELECTRIC CO LTD	2–268 SOBUDAI ZAWA	KANAGAWA 228 JAPAN
TK2058	TDK CORPORATION OF AMERICA	1600 FEEHANVILLE DRIVE	MOUNT PROSPECT, IL 60056

Replaceable electrical parts list

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A1	671–2651–01		B031342	CIRCUIT BD ASSY:FRONT PANEL	80009	671–2651–01
A1	671–2651–02	B031343		CIRCUIT BD ASSY:FRONT PANEL	80009	671–2651–02
A1	671–2761–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 01&02 ONLY)	80009	671–2711–01
A1	671–2761–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 01&02 ONLY)	80009	671–2711–02
A1	671–2710–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 2J ONLY)	80009	671–2710–01
A1	671–2710–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 2J ONLY)	80009	671–2710–02
A1	671–2709–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 03 ONLY)	80009	671–2709–01
A1	671–2709–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 03 ONLY)	80009	671–2709–02
A1	671–2711–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 04 ONLY)	80009	671–2711–01
A1	671–2711–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 04 ONLY)	80009	671–2711–02
A2	671–2713–01		B020906	CIRCUIT BD ASSY:MAIN(STANDARD ONLY)	80009	671–2713–01
A2	671–2713–02	B020907		CIRCUIT BD ASSY:MAIN(STANDARD ONLY)	80009	671–2713–01
A2	671–2714–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 01 ONLY)	80009	671–2714–01
A2	671–2714–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 01 ONLY)	80009	671–2714–01
A2	671–2715–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 01 & 02 ONLY)	80009	671–2715–01
A2	671–2715–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 01 & 02 ONLY)	80009	671–2715–01
A2	671–2650–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 02 ONLY)	80009	671–2650–01
A2	671–2650–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 02 ONLY)	80009	671–2650–01
A2	671–2717–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 2J ONLY)	80009	671–2717–01
A2	671–2717–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 2J ONLY)	80009	671–2717–01
A2	671–2716–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–01
A2	671–2716–01	B020907	B021035	CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–01
A2	671–2716–03	B021036		CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–03
A2	671–2718–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–01
A2	671–2718–02	B020907	B021035	CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–01
A2	671–2718–03	B021036		CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–03
A3	671–2183–01			CIRCUIT BD ASSY:TOP BNC	80009	671–2183–01
A4	671–2184–01			CIRCUIT BD ASSY:BOTTOM BNC	80009	671–2184–01
A5	671–2790–01		B020999	CIRCUIT BD ASSY:AUDIO	80009	671–2790–01
A5	671–2790–02	B030000		CIRCUIT BD ASSY:AUDIO	80009	671–2790–02
A1	671–2651–01		B031342	CIRCUIT BD ASSY:FRONT PANEL	80009	671–2651–01
A1	671–2651–02	B031343		CIRCUIT BD ASSY:FRONT PANEL	80009	671–2651–02
A1	671–2761–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 01&02 ONLY)	80009	671–2711–01
A1	671–2761–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 01&02 ONLY)	80009	671–2711–02
A1	671–2710–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 2J ONLY)	80009	671–2710–01
A1	671–2710–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 2J ONLY)	80009	671–2710–02
A1	671–2709–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 03 ONLY)	80009	671–2709–01
A1	671–2709–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 03 ONLY)	80009	671–2709–02

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A1	671–2711–01		B031342	CIRCUIT BD ASSY:FRONT PANEL(OPTION 04 ONLY)	80009	671–2711–01
A1	671–2711–02	B031343		CIRCUIT BD ASSY:FRONT PANEL(OPTION 04 ONLY)	80009	671–2711–02
A1C201	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C202	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C250	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C251	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C252	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1C253	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A1DS211	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS214	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS215	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS218	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS219	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS220	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1DS221	150–1029–00			LT EMITTING DIO:GRN,565NM,35MA	58361	Q6480/MV5274C
				MOUNTING PARTS		
	352–1012–00			HOLDER,LED:BLK,ABS	80009	352–1012–00
				END MOUNTING PARTS		
A1J201	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 16)		

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A1R201	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A1R204	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A1R207	322–3143–00			RES,FXD,FILM:301 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 301E
A1S201	260–2673–00			Switch, push, no LED		
				ATTACHED PARTS		
	366–0683–00			PUSH BTN:SW CAP	80009	366–0683–00
				END ATTACHED PARTS		
A1S202	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S203	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S204	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S205	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S206	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S207	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S208	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00
				END ATTACHED PARTS		
A1S209	260–2675–00			Switch, push, gr LED		
				ATTACHED PARTS		
	366–0682–00			PUSH BTN:LIGHTED CAP,INSERT ASSY	80009	366–0682–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
				END ATTACHED PARTS		
A1U204	156–1215–01			IC,DGTL:CMOS,MUX/ENCODER;20–KEY ENCODER;74C923,DIP18.3,TUBE,SCRN	27014	MM74C923JA+
A1U207	160–9064–00	671–2651–01		IC,DGTL:CMOS,PROM;2048 X 8,RGTR,7C245–35,PRGM,DIP24	80009	160–9064–00
A1U207	160–9206–00	671–2710–01		MICROCKT,DGTL:CMOS,2048 X 8,RGTR PRON,PRGM,7C245–35,DIP24	80009	160–9206–00
A1U207	160–9204–00	671–2709–01		MICROCKT,DGTL:CMOS,2048 X 8,RGTR PROM,PRGM,7C245–35,DIP24	80009	160–9204–00
A1U207	160–9202–00	671–2711–01		MICROCKT,DGTL:CMOS,2048 X 8,RGTR,PROM,PRGM,7C245–35,DIP24	80009	160–9202–00
				MOUNTING PARTS		
	136–0925–00			SKT,DIP:	91506	224–AG30D
				END MOUNTING PARTS		
A1U209	160–9065–00	671–2651–01		IC,DGTL:CMOS,PLD;EEPLD,16V8,25NS,90MA,PRGM;16V8–25,DIP20.3	80009	160–9065–00
A1U209	160–9207–00	671–2710–01		IC,DGTL:CMOS,PLD;EEPLD,16V8,25NS,90MA,PRGM;16V8–25,DIP20.3	80009	160–9207–00
A1U209	160–9205–00	671–2709–01		IC,DGTL:CMOS,PLD;EEPLD,16V8,25NS,90MA,PRGM;16V8–25,DIP20.3	80009	160–9205–00
A1U209	160–9203–00	671–2711–01		IC,DGTL:CMOS,PLD;EEPLD,16V8,25NS,90MA;PRGM,16V8–25,DIP20.3,TUBE	80009	160–9203–00
				MOUNTING PARTS		
	136–0752–00			SKT,PL–IN ELEK:MICROCIRCUIT,20 DIP	09922	DILB20P–108
				END MOUNTING PARTS		
A1U210	160–9066–00			IC,DGTL:CMOS,PLD;OPT,DUAL CLOCK,16 MACROCELL,35NS,PRGM,EP610,DIP24.3	80009	160–9066–00
				MOUNTING PARTS		
	136–0925–00			SKT,DIP:	91506	224–AG30D
				END MOUNTING PARTS		
A2	671–2713–01		B020906	CIRCUIT BD ASSY:MAIN(STANDARD ONLY)	80009	671–2713–01
A2	671–2713–02	B020907		CIRCUIT BD ASSY:MAIN(STANDARD ONLY)	80009	671–2713–01
A2	671–2714–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 01 ONLY)	80009	671–2714–01
A2	671–2714–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 01 ONLY)	80009	671–2714–01
A2	671–2715–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 01 & 02 ONLY)	80009	671–2715–01
A2	671–2715–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 01 & 02 ONLY)	80009	671–2715–01
A2	671–2650–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 02 ONLY)	80009	671–2650–01
A2	671–2650–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 02 ONLY)	80009	671–2650–01
A2	671–2717–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 2J ONLY)	80009	671–2717–01
A2	671–2717–02	B020907		CIRCUIT BD ASSY:MAIN(OPTION 2J ONLY)	80009	671–2717–01
A2	671–2716–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–01
A2	671–2716–01	B020907	B021035	CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–01

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2	671–2716–03	B021036		CIRCUIT BD ASSY:MAIN(OPTION 03 ONLY)	80009	671–2716–03
A2	671–2718–01		B020906	CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–01
A2	671–2718–02	B020907	B021035	CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–01
A2	671–2718–03	B021036		CIRCUIT BD ASSY:MAIN(OPTION 04 ONLY)	80009	671–2718–03
A2				CIRCUIT BD ASSY:MAIN		
				ATTACHED PARTS		
	337–2157–00			SHIELD,ELEC:PULSER,SAMPLER	80009	337–2157–00
	337–3760–00			SHIELD,ELEC:TIN PLATED BRS	80009	337–3760–00
				END ATTACHED PARTS		
A2C1	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C2	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C9	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C10	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C13	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C15	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C18	281–0797–00			CAP,FXD,CER:MLC;15PF,10%,100V,SAF ,0.100 X 0.170;AX	80009	281–0797–00
A2C19	281–0153–00			CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C20	283–0159–02			CAP,FXD,CER DI:18PF,5%,50V	54583	FK16COG1H180J–T
A2C21	281–0153–00			CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C22	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C23	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C30	281–0123–00			CAP,VAR,CER DI:5–25PF,100V	59660	518–000A5–25
A2C31	283–0663–00			CAP,FXD,MICA DI:16.8PF,+/0.5PF,500V	80009	283–0663–00
A2C32	281–0123–00			CAP,VAR,CER DI:5–25PF,100V	59660	518–000A5–25
A2C33	283–0663–00			CAP,FXD,MICA DI:16.8PF,+/0.5PF,500V	80009	283–0663–00
A2C37	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C38	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C39	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C40	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C41	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C42	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C43	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C46	281–0898–00			CAP,FXD,CER DI:7.5PF,+/–0.5PF,500V	04222	MA107A7R5DAA
A2C47	281–0153–00			CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C48	283–0788–01			CAP,FXD,MICA DI:267PF,1%,500V,T&A	09023	CDA15FD(267)F03
A2C49	283–0596–00			CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C50	283–0688–01			CAP,FXD,MICA DI:464PF,1%,500V,T&A	09023	CDA15FD(464)F03
A2C51	283–0638–01			CAP,FXD,MICA DI:130PF,1%,500V	80009	283–0638–01

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2C52	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A2C53	283–0666–00			CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C54	283–0644–01			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–01
A2C55	283–0625–01			CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C56	283–0631–01			CAP,FXD,MICA DI:95PF,1%,500V	80009	283–0631–01
A2C57	283–0784–01			CAP,FXD,MICA DI:40PF,2%,500V,T&A	09023	CDA15ED400G03
A2C59	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C60	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C61	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C62	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C63	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C64	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C65	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C68	281–0898–00			CAP,FXD,CER DI:7.5PF,+/–0.5PF,500V	04222	MA107A7R5DAA
A2C69	281–0153–00			CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C70	283–0788–01			CAP,FXD,MICA DI:267PF,1%,500V,T&A	09023	CDA15FD(267)F03
A2C71	283–0596–00			CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C72	283–0688–01			CAP,FXD,MICA DI:464PF,1%,500V,T&A	09023	CDA15FD(464)F03
A2C73	283–0638–01			CAP,FXD,MICA DI:130PF,1%,500V	80009	283–0638–01
A2C74	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A2C75	283–0666–00			CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C76	283–0644–01			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–01
A2C77	283–0625–01			CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C78	283–0631–01			CAP,FXD,MICA DI:95PF,1%,500V	80009	283–0631–01
A2C79	283–0784–01			CAP,FXD,MICA DI:40PF,2%,500V,T&A	09023	CDA15ED400G03
A2C82	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C87	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C88	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C89	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C90	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C91	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C92	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C93	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C94	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C95	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C96	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C98	281–0898–00			CAP,FXD,CER DI:7.5PF,+/–0.5PF,500V	04222	MA107A7R5DAA
A2C99	281–0153–00			CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2C100	283–0788–01			CAP,FXD,MICA DI:267PF,1%,500V,T&A	09023	CDA15FD(267)F03
A2C101	283–0596–00			CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C102	283–0688–01			CAP,FXD,MICA DI:464PF,1%,500V,T&A	09023	CDA15FD(464)F03
A2C103	283–0638–01			CAP,FXD,MICA DI:130PF,1%,500V	80009	283–0638–01
A2C104	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A2C105	283–0666–00			CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C106	283–0644–01			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–01
A2C107	283–0625–01			CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C108	283–0631–01			CAP,FXD,MICA DI:95PF,1%,500V	80009	283–0631–01
A2C109	283–0784–01			CAP,FXD,MICA DI:40PF,2%,500V,T&A	09023	CDA15ED400G03
A2C115	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C117	281–0788–00			CAP,FXD,CER:MLC;470PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA102C471KAA
A2C122	281–0788–00			CAP,FXD,CER:MLC;470PF,10%,100V,0.100 X 0.170;AXIAL,MI	04222	SA102C471KAA
A2C141	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C142	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C151	290–1301–00			CAP,FXD,ALUM:;2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A2C152	290–1301–00			CAP,FXD,ALUM:;2700UF,20%,10V,12.5 X 30MM(0.492 X 1.180);RDL,LOWIMP,1.95A RIPPLE,BULK	80009	290–1301–00
A2C153	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C154	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C155	283–0238–01			CAP,FXD,CER DI:0.01UF,10%,5OWVDC,X7R,T&A	04222	SR295C103KAAAP1
A2C160	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C161	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C162	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C163	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C164	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C165	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C166	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C167	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C168	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C169	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C170	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C172	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C173	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C174	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C175	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C176	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C178	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2C186	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C187	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C188	290–0943–02			CAP,FXD,ELCTLT:47UF,20%,25V	55680	UVX1E470MDA1TD
A2C189	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C190	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C191	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C192	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C193	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C194	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C195	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C196	290–0845–00			CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C236	283–0359–00	671–2716–03 671–2718–03		CAP,VXD,CER DI:1000PF,10%,200V(OPT 03, OPT 04 ONLY)	80009	283–0359–00
A2C254	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C255	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C256	290–0845–00			CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C257	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C258	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C263	283–0637–00			CAP,FXD,MICA DI:20PF,2.5%,500V	80009	283–0637–00
A2C264	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C265	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C266	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C267	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C268	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C269	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C270	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A2C271	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C272	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C273	283–0220–00			CAP,FXD,CER:MLC;0.01UF,20%,50V,X7R,0.20 X 0.20;RDL	04222	SR205C103MAA
A2C274	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C275	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C276	290–0973–00			CAP,FXD,ELCTLT:100UF,20%,25VDC	24165	513D107M025BB4D
A2C277	281–0898–00			CAP,FXD,CER DI:7.5PF,+/–0.5PF,500V	04222	MA107A7R5DAA
A2C278	281–0153–00	671–2715–01		CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C278	281–0153–00	671–2650–01		CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C278	281–0153–00	671–2717–01		CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C278	281–0153–00	671–2716–01		CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C278	281–0153–00	671–2718–01		CAP,VAR,AIR DI:1.7–10PF,250V	80009	281–0153–00
A2C279	283–0666–00	671–2715–01		CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2C279	283–0666–00	671–2650–01		CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C279	283–0666–00	671–2717–01		CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C279	283–0666–00	671–2716–01		CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C279	283–0666–00	671–2718–01		CAP,FXD,MICA DI:890PF,2%,100V	80009	283–0666–00
A2C280	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A2C281	283–0638–01			CAP,FXD,MICA DI:130PF,1%,500V	80009	283–0638–01
A2C282	283–0688–01			CAP,FXD,MICA DI:464PF,1%,500V,T&A	09023	CDA15FD(464)F03
A2C283	283–0644–01			CAP,FXD,MICA DI:150PF,1%,500V	80009	283–0644–01
A2C284	283–0625–01	671–2715–01		CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C284	283–0625–01	671–2650–01		CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C284	283–0625–01	671–2717–01		CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C284	283–0625–01	671–2716–01		CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C284	283–0625–01	671–2718–01		CAP,FXD,MICA DI:220PF,1%,500V	09023	CDA10FD221F03
A2C285	283–0631–01			CAP,FXD,MICA DI:95PF,1%,500V	80009	283–0631–01
A2C286	283–0784–01			CAP,FXD,MICA DI:40PF,2%,500V,T&A	09023	CDA15ED400G03
A2C287	283–0596–00	671–2715–01		CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C287	283–0596–00	671–2650–01		CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C287	283–0596–00	671–2717–01		CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C287	283–0596–00	671–2716–01		CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C287	283–0596–00	671–2718–01		CAP,FXD,MICA DI:528PF,1%,300V	80009	283–0596–00
A2C288	283–0788–01			CAP,FXD,MICA DI:267PF,1%,500V,T&A	09023	CDA15FD(267)F03
A2C289	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C290	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C291	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A2C300	290–1290–00			CAP,FXD,ALUM:2200UF,20%,25V,16 X 31.5MM;RDL,LOW IMPED,105 DEG,BULK	80009	290–1290–00
A2C301	283–0639–01			CAP,FXD,MICA DI:56PF,1%,500V,T&A	09023	CDA15ED560F03
A2C303	283–0692–00			CAP,FXD,MICA DI:670PF,1%,300V	80009	283–0692–00
A2C305	283–0796–01			CAP,FXD,MICA DI:100PF,5%,500V,TAPE & AMMO	09023	CDA10FD101J03
A2C306	290–0845–00	671–2713–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2714–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2715–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2650–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2717–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2716–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2C306	290–0845–00	671–2718–01		CAP,FXD,ELCTLT:330UF,+50–10%,25V	54473	ECE–A25V330L
A2CR4	152–0601–01			SEMICOND DVC,DI:RECTIFIER,SI,150V,1A,35NS	04713	MUR115RL
A2CR5	152–0601–01			SEMICOND DVC,DI:RECTIFIER,SI,150V,1A,35NS	04713	MUR115RL
A2CR6	152–0601–01			SEMICOND DVC,DI:RECTIFIER,SI,150V,1A,35NS	04713	MUR115RL

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2CR7	152–0601–01			SEMICOND DVC,DI:RECTIFIER,SI,150V,1A,35NS	04713	MUR115RL
A2CR160	152–0582–00			DIO,RECT:SCHTKY;20V,3A,.475VF,80A IFSM;1N5820	80009	152–0582–00
A2CR161	152–0582–00			DIO,RECT:SCHTKY;20V,3A,.475VF,80A IFSM;1N5820	80009	152–0582–00
A2CR162	152–0582–00			DIO,RECT:SCHTKY;20V,3A,.475VF,80A IFSM;1N5820	80009	152–0582–00
A2CR163	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A2E1	276–0818–00			COIL,EM:100MHZ,FERRITE,BEAD ON LEAD, IMP: 100 OHM @ 100MHZ,	80009	276–0818–00
A2E2	276–0818–00			COIL,EM:100MHZ,FERRITE,BEAD ON LEAD, IMP: 100 OHM @ 100MHZ,	80009	276–0818–00
A2F1	159–0025–00			FUSE,CARTRIDGE:3AG,0.5A,250V,0.25SEC	71400	AGC–CW–1/2
				MOUNTING PARTS		
	344–0329–00			CLIP,ELECTRICAL:	S3629	0G 751.0052
				(QUANTITY 2)		
				END MOUNTING PARTS		
A2FL1	119–1946–00			FILTER,RFI:1A,250V,400HZ W/PC TERM	S4307	FN326–1/02–K–D–T
A2J2	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J4	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 10)		
A2J6	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J7	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J8	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J9	131–3987–00			CONN,CIRC:PCB,AUDIO;MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING	82389	E3MRA
				MOUNTING PARTS		
	213–0055–00			SCR,TPG,TF:2–32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
				END MOUNTING PARTS		
A2J10	131–3987–00			CONN,CIRC:PCB,AUDIO;MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING	82389	E3MRA
				MOUNTING PARTS		
A2J10	213–0055–00			SCR,TPG,TF:2–32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
				END MOUNTING PARTS		
A2J12	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J30	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 2)		
A2J31	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
				(QUANTITY 2)		
A2J106	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 16)		
A2J107	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 16)		
A2J108	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J111	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J112	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 2)		
A2J122	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 5)		
A2J123	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 3)		
A2J124	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 2)		
A2J128	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 10)		
A2L4	108–0538–00			COIL,RF:FIXED,2.7UH	80009	108–0538–00
A2L5	108–0538–00			COIL,RF:FIXED,2.7UH	80009	108–0538–00
A2L7	108–1491–00			COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L8	120–1180–00			XFMR,RF:VAR	80009	120–1180–00
A2L9	114–0411–00			COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L10	114–0364–00			COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L11	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L12	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L13	108–1491–00			COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L14	120–1180–00			XFMR,RF:VAR	80009	120–1180–00
A2L15	114–0411–00			COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L16	114–0364–00			COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L17	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L18	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L19	108–1491–00			COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L20	120–1180–00			XFMR,RF:VAR	80009	120–1180–00
A2L21	114–0411–00			COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L22	114–0364–00			COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L23	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2L24	114–0366–00			COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L25	120–1889–00			XFMR,RF:	80009	120–1889–00
A2L26	108–1263–00			COIL,RF:FXD,10UH, 10%,Q=70,SRF 27 MHZ,DCR 0.043 OHM,I MAX 2.1ARDL LEAD	80009	108–1263–00
A2L27	108–1263–00			COIL,RF:FXD,10UH, 10%,Q=70,SRF 27 MHZ,DCR 0.043 OHM,I MAX 2.1ARDL LEAD	80009	108–1263–00
A2L28	108–0245–00			CHOKE,RF:FIXED,3.9UH, +/– 10 %, Q 35, DCR 0.264 OHM, SRF 61 MHZON PWRD IRON FORM	76493	B6310–1
A2L29	108–0245–00			CHOKE,RF:FIXED,3.9UH, +/– 10 %, Q 35, DCR 0.264 OHM, SRF 61 MHZON PWRD IRON FORM	76493	B6310–1
A2L30	108–0538–00			COIL,RF:FIXED,2.7UH	80009	108–0538–00
A2L31	114–0411–00	671–2715–01		COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L31	114–0411–00	671–2650–01		COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L31	114–0411–00	671–2717–01		COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L31	114–0411–00	671–2716–01		COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L31	114–0411–00	671–2718–01		COIL,RF:VAR,0.9UH–1.0UH	80009	114–0411–00
A2L32	120–1180–00	671–2715–01		XFMR,RF:VAR	80009	120–1180–00
A2L32	120–1180–00	671–2650–01		XFMR,RF:VAR	80009	120–1180–00
A2L32	120–1180–00	671–2717–01		XFMR,RF:VAR	80009	120–1180–00
A2L32	120–1180–00	671–2716–01		XFMR,RF:VAR	80009	120–1180–00
A2L32	120–1180–00	671–2718–01		XFMR,RF:VAR	80009	120–1180–00
A2L33	108–1491–00	671–2715–01		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L33	108–1491–00	671–2650–01		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L33	108–1491–00	671–2717–01		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L33	108–1491–00	671–2716–01		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L33	108–1491–00	671–2718–01		COIL,RF:FXD,TOROIDAL,9.0UH,5.5%	TK1345	108–1491–00
A2L34	114–0364–00	671–2715–01		COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L34	114–0364–00	671–2650–01		COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L34	114–0364–00	671–2717–01		COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L34	114–0364–00	671–2716–01		COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L34	114–0364–00	671–2718–01		COIL,RF:VAR,1.42–1.68UH	80009	114–0364–00
A2L35	114–0366–00	671–2715–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L35	114–0366–00	671–2650–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L35	114–0366–00	671–2717–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L35	114–0366–00	671–2716–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L35	114–0366–00	671–2718–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L36	114–0366–00	671–2715–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L36	114–0366–00	671–2650–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L36	114–0366–00	671–2717–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2L36	114–0366–00	671–2716–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2L36	114–0366–00	671–2718–01		COIL,RF:VAR,2.40–2.70UH,Q MIN 190 @ 2.6 UH, POT CORE	54937	114–0366–00
A2P2	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P6	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P7	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P8	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P30	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P31	131–0993–02			BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P108	131–0993–05	671–2715–01		BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P108	131–0993–05	671–2650–01		BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P108	131–0993–05	671–2717–01		BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P108	131–0993–05	671–2716–01		BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P108	131–0993–05	671–2718–01		BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2P111	131–0993–02	671–2715–01		BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P111	131–0993–02	671–2650–01		BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P111	131–0993–02	671–2717–01		BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P111	131–0993–02	671–2716–01		BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P111	131–0993–02	671–2718–01		BUS,CNDCT:SHUNT ASSY,RED	00779	1–850100–O
A2P122	198–5783–00			WIRE,SET ELEC:TSG111/TSG121/TSG131	80009	198–5783–00
A2P123	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A2Q3	151–1171–00			XSTR,PWR:MOS,N–CH;50V,12A,0.12 OHM;BUZ71A/IRFZ22/MTP15N05E,TO–220	80009	151–1171–00
A2Q4	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A2Q6	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A2Q7	151–0188–00			XSTR,SIG:BIPOLAR,PNP;40V,200MA,250MHZ, AMPL;2N3906,TO–92 EBC	80009	151–0188–00
A2Q8	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q9	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q10	151–0190–00			XSTR,SIG:BIPOLAR,NPN;40V,200MA,300MHZ, AMPL;2N3904,TO–92 EBC	80009	151–0190–00
A2Q11	151–0195–02			XSTR,SIG:BIPOLAR,NPN;150MHZ,2N5223/MPS6521,TO–92 EBC	80009	151–0195–02
A2R3	315–0471–00			RES,FXD,FILM:470 OHM,5%,0.25W	80009	315–0471–00
A2R15	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A2R16	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R17	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R18	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R19	322–3273–00	B010000		RES,FXD:MET FILM;6.81K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3273–00
	322–3262–00	B020907		RES,FXD,FILM:5.23K OHM,1%,0.2W	80009	322–3262–00
A2R20	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R21	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R22	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R23	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A2R24	322–3283–00			RES,FXD,FILM:8.66K OHM,1%,0.2W,TC=T0	80009	322–3283–00
A2R29	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2–G1500F
A2R30	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	91637	CCF50–2–G1500F
A2R31	322–3225–00			RES,FXD,FILM:2.15K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 2K15
A2R32	322–3223–00			RES,FXD,FILM:2.05K OHM,1%,0.2W,TC=T0	80009	322–3223–00
A2R40	322–3085–07	671–2713–01		RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R40	322–3085–07	671–2714–01		RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R40	322–3085–07	671–2715–01		RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R40	322–3085–07	671–2650–01		RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R40	322–3085–07	671–2717–01		RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R41	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R42	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R45	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R46	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R47	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3001–00
A2R48	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R49	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R50	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A2R51	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A2R52	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R53	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R54	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R57	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R58	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R59	322–3212–00			RES,FXD,FILM:1.58K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K58
A2R60	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A2R61	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R62	322–3285–00			RES,FXD,FILM:9.09K OHM,1%,0.2W,TC=T0	80009	322–3285–00
A2R63	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A2R64	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R65	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R66	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3001–00
A2R67	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R68	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R69	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A2R70	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A2R71	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R72	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R73	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R76	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R77	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R78	322–3212–00			RES,FXD,FILM:1.58K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K58
A2R79	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A2R80	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R81	322–3284–00			RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R82	311–2234–00			RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R83	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R84	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R85	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R86	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R87	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R88	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A2R89	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R90	317–0036–00			RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R91	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A2R92	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AX-IAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R93	322–3068–00			RES,FXD:MET FILM;49.9 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3068–00
A2R94	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A2R95	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R96	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R97	322–3212–00			RES,FXD,FILM:1.58K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K58
A2R98	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A2R99	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AX-IAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R100	322–3285–00			RES,FXD,FILM:9.09K OHM,1%,0.2W,TC=T0	80009	322–3285–00
A2R101	311–2235–00			RES,VAR,TRMR:CERMET;10K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	80009	311–2235–00
A2R106	322–3404–00			RES,FXD,FILM:158K OHM,1%,0.2W,TC=T0	91637	CCF50–2F15802F
A2R107	322–3404–00			RES,FXD,FILM:158K OHM,1%,0.2W,TC=T0	91637	CCF50–2F15802F
A2R126	311–2262–00			RES,VAR,NONWW:TRMR,1M OHM,20%,0.5W	80009	311–2262–00
A2R129	322–3132–00			RES,FXD,FILM:232 OHM,1%,0.2W,TC=T0	80009	322–3132–00
A2R130	315–0750–00			RES,FXD,FILM:75 OHM,5%,0.25W	80009	315–0750–00
A2R131	308–0702–00			RES,FXD,WW:0.33 OHM,5%,2W	75042	SPH–R3300J
A2R135	322–3414–00			RES,FXD:MET FILM;200K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF501G20002F
A2R136	322–3218–00			RES,FXD:MET FILM;1.82K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3218–00
A2R137	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A2R150	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A2R151	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A2R152	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A2R153	322–3260–00			RES,FXD,FILM:4.99K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 4K99
A2R154	322–3233–00			RES,FXD,FILM:2.61K OHM,1%,0.2W,TC=T0	80009	322–3233–00
A2R160	322–3109–00			RES,FXD,FILM:133 OHM,1%,0.2W,TC=T0	91637	CCF50–2F133R0F
A2R161	322–3235–00			RES,FXD:MET FILM;2.74K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K74

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R181	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A2R182	322–3068–00			RES,FXD:MET FILM;49.9 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3068–00
A2R193	322–3012–00			RES,FXD,FILM:13 OHM,1%,0.2W,TC=T0	57668	CRB20FXE301E
A2R194	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A2R195	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R196	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF50–2–G1500F
A2R197	322–3114–00			RES,FXD:MET FILM;150 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	91637	CCF50–2–G1500F
A2R198	307–0503–00			RES NTWK,FXD,FI:(9) 510 OHM,20%,0.125W	91637	CSC10A01511GDO3
A2R199	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R211	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AX-IAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R212	307–0650–00			RES NTWK,FXD,FI:9,2.7K OHM,5%,0.150W	11236	750–101–R2.7K
A2R213	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R214	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R215	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R216	322–3213–00			RES,FXD,FILM:1.62K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K62
A2R217	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A2R218	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A2R219	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R220	317–0036–00	671–2715–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R220	317–0036–00	671–2650–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R220	317–0036–00	671–2717–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R220	317–0036–00	671–2716–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R220	317–0036–00	671–2718–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R221	322–3001–00			RES,FXD:MET FILM;10 OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3001–00
A2R222	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R223	317–0036–00	671–2715–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R223	317–0036–00	671–2650–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R223	317–0036–00	671–2717–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R223	317–0036–00	671–2716–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R223	317–0036–00	671–2718–01		RES,FXD,CMPSN:3.6 OHM,5%,0.125W	80009	317–0036–00
A2R224	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AX-IAL,T&R,SM BODY	91637	CCF502–C75ROOBT

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R225	322–3085–07			RES,FXD:MET FILM;75 OHM,0.1%,0.2W,TC=25 PPM;AXIAL,T&R,SM BODY	91637	CCF502–C75ROOBT
A2R226	311–2230–00			RES,VAR,TRMR:CERMET;500 OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 500
A2R227	322–3193–00	671–2715–01		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R227	322–3193–00	671–2650–01		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R227	322–3193–00	671–2717–01		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R227	322–3193–00	671–2716–01		RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R227	322–3168–00	671–2718–01		RES,FXD,FILM:549 OHM,1%,0.2W,TC=T0	91637	CCF50–2F549R0F
A2R228	322–3133–00			RES,FXD,FILM:237 OHM,1%,0.2W,TC=T0	91637	CCF50–2F237R0F
A2R229	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R230	322–3056–01			RES,FXD,FILM:37.4 OHM,0.5%,0.2W,TC=T0	57668	CRB20 DXE 37E4
A2R231	311–2234–00	671–2715–01		RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R231	311–2234–00	671–2650–01		RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R231	311–2234–00	671–2717–01		RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R231	311–2234–00	671–2716–01		RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R231	311–2234–00	671–2718–01		RES,VAR,TRMR:CERMET;5K OHM,20%,0.5W,0.197 SQ,TOP ADJUST;T&R	TK1450	GF06UT 5K
A2R232	322–3284–00	671–2713–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3284–00	671–2714–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3284–00	671–2715–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3284–00	671–2650–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3284–00	671–2717–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3284–00	671–2716–01		RES,FXD,FILM:8.87K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 8K87
A2R232	322–3224–00	671–2718–01		RES,FXD,FILM:2.1K OHM,1%,0.2W,TC=T0	91637	CCF50–2F21000F
A2R233	322–3212–00			RES,FXD,FILM:1.58K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 1K58
A2R235	322–3097–00			RES,FXD:MET FILM;100 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 100E
A2R236	322–3487–00	671–2716–01		RES,FXD,FILM:500 OHM,1%,0.2W,TC=TO	80009	322–3487–00
A2R236	322–3314–00	671–2716–03		RES,FXD,FILM:150 OHM,1%,0.2W,TC=TO	80009	322–3314–00
A2R236	322–3487–00	671–2718–01		RES,FXD,FILM:500 OHM,1%,0.2W,TC=TO	80009	322–3487–00
A2R236	322–3314–00	671–2718–03		RES,FXD,FILM:150 OHM,1%,0.2W,TC=TO	80009	322–3314–00
A2R237	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2R238	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R239	322–3126–00			RES,FXD,FILM:200 OHM,1%,0.2W,TC=T0	80009	322–3126–00
A2R240	322–3108–00			RES,FXD,FILM:130 OHM,1%,0.2W,TC=T0	80009	322–3108–00
A2R241	323–0085–00			RES,FXD,FILM:75.0 OHM,1%,0.5W,TC=T0	80009	323–0085–00
A2R242	322–3165–00			RES,FXD,FILM:511 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 511E
A2R243	322–3112–00			RES,FXD,FILM:143 OHM,1%,0.2W,TC=T0	80009	322–3112–00
A2R244	322–3058–00			RES,FXD:MET FILM;39.2 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3058–00
A2R245	322–3073–00			RES,FXD:MET FILM;56.2 OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	80009	322–3073–00
A2R246	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AXIAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A2R247	323–0042–00			RES,FXD,FILM:26.7 OHM,1%,0.5W,TC=T0	80009	323–0042–00
A2R248	322–3077–00			RES,FXD,FILM:61.9 OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 61E9
A2T1	120–1885–01			XFMR,PWR:	80009	120–1885–01
A2TP1	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP2	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP3	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP4	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP5	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP6	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP7	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP8	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP9	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP10	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP11	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP13	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP14	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP15	214–4085–00	671–2715–01		TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2TP15	214–4085–00	671–2650–01		TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP15	214–4085–00	671–2717–01		TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP15	214–4085–00	671–2716–01		TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP15	214–4085–00	671–2718–01		TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2TP16	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A2U1	156–4024–00			IC,LIN:BIPOLAR,OP–AMP;190MHZ,CUR FEEDBACK,1 TO 40 GAIN RANGE;AD9617JN,DIP08.3	80009	156–4024–00
A2U2	156–4024–00			IC,LIN:BIPOLAR,OP–AMP;190MHZ,CUR FEEDBACK,1 TO 40 GAIN RANGE;AD9617JN,DIP08.3	80009	156–4024–00
A2U3	156–0527–00			IC,LIN:BIPOLAR,VR;NEG,15V,1.0A,4%;MC7915CT,TO–220	80009	156–0527–00
A2U4	156–4170–00			IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U5	156–6376–00			IC,CONV:BIPOLAR,D/A;12–BIT,20MHZ,2LSB,CUR OUT,LATCHED;TDC1012RSC1,PLCC28.3	80009	156–6376–00
				MOUNTING PARTS		
	136–1005–00			SKT,PL–IN ELEK:	00779	3–821581–1
				END MOUNTING PARTS		
A2U9	156–3373–00			IC,DGTL:ACMOS,FLIP FLOP;OCTAL D–TYPE, 3–STATE;74AC374,DIP30.3,TUBE	02735	CD74AC374E
A2U21	160–9052–01	671–2713–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9052–01
A2U21	160–9059–00	671–2714–01		IC,MEMORY:CMOS,PROM;8K X 8,40NS,RGTR;7C265,PRGM,DIP28.3	80009	160–9059–00
A2U21	160–9059–00	671–2715–01		IC,MEMORY:CMOS,PROM;8K X 8,40NS,RGTR;7C265,PRGM,DIP28.3	80009	160–9059–00
A2U21	160–9052–01	671–2650–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9052–01
A2U21	160–9222–01	671–2717–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9222–01
A2U21	160–9214–01	671–2716–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9214–01
A2U21	160–9229–00	671–2718–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9229–00
				MOUNTING PARTS		
	136–1038–00			SKT,DIP:	00779	2–641873–1
				END MOUNTING PARTS		
A2U23	160–9054–01	671–2713–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9054–01
A2U23	160–9067–00	671–2714–01		IC,DGTL:CMOS,PROM;2048 X 8,RGTR,7C245–35,PRGM,DIP24	80009	160–9067–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2U23	160–9067–00	671–2715–01		IC,DGTL:CMOS,PROM;2048 X 8,RGTR,7C245–35,PRGM,DIP24	80009	160–9067–00
A2U23	160–9054–01	671–2650–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9054–01
A2U23	160–9223–01	671–2717–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9223–01
A2U23	160–9215–01	671–2716–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9215–01
A2U23	160–9230–00	671–2718–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;PRGM,7C277.DIP28.3	80009	160–9230–00
				MOUNTING PARTS		
	136–1038–00			SKT,DIP:	00779	2–641873–1
				END MOUNTING PARTS		
A2U25	160–9056–01	671–2713–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9056–01
A2U25	160–9208–00	671–2714–00		IC,MEMORY:CMOS,PROM,32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9208–00
A2U25	160–9208–00	671–2715–01		IC,MEMORY:CMOS,PROM,32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9208–00
A2U25	160–9056–01	671–2650–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9056–01
A2U25	160–9224–01	671–2717–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9224–01
A2U25	160–9216–01	671–2716–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9216–01
A2U25	160–9231–00	671–2718–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9231–00
				MOUNTING PARTS		
	136–1038–00			SKT,DIP:	00779	2–641873–1
				END MOUNTING PARTS		
A2U27	160–9058–01	671–2713–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9058–01
A2U27	160–9209–00	671–2714–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9209–00
A2U27	160–9209–00	671–2715–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;PRGM,7C277,DIP28.3	80009	160–9209–00
A2U27	160–9058–01	671–2650–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9058–01
A2U27	160–9225–01	671–2717–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9225–01
A2U27	160–9217–01	671–2716–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR;7C277,PRGM,DIP28.3	80009	160–9217–01
A2U27	160–9232–00	671–2718–01		IC,MEMORY:CMOS,PROM;32K X 8,50NS,RGTR,PRGM,7C277,DIP28.3	80009	160–9232–00
				MOUNTING PARTS		

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
	136–1038–00			SKT,DIP:	00779	2–641873–1
				END MOUNTING PARTS		
A2U29	156–3019–00			IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM,SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U30	156–4170–00			IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U31	156–6376–00			IC,CONV:BIPOLAR,D/A;12–BIT,20MHZ,2LSB,CUR OUT,LATCHED;TDC1012RSC1,PLCC28.3	80009	156–6376–00
				MOUNTING PARTS		
	136–1005–00			SKT,PL–IN ELEK:	00779	3–821581–1
				END MOUNTING PARTS		
A2U32	156–3019–00			IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U33	156–4170–00			IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U34	156–6172–00			IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
				MOUNTING PARTS		
	136–1005–00			SKT,PL–IN ELEK:	00779	3–821581–1
				END MOUNTING PARTS		
A2U37	156–3019–00			IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U102	160–9060–01	671–2713–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9060–01
A2U102	160–9210–00	671–2714–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9210–00
A2U102	160–9210–00	671–2715–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9210–00
A2U102	160–9060–01	671–2650–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9060–01
A2U102	160–9226–01	671–2717–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9226–01
A2U102	160–9218–01	671–2716–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9218–01
A2U102	160–9233–00	671–2718–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9233–00
				MOUNTING PARTS		
	136–0963–00			SKT,PL–IN ELEK:MICROCKT,32 PIN	00779	2–644018–3
				END MOUNTING PARTS		
A2U103	160–9061–00	671–2713–01		IC,DGTL:CMOS,PROM;1024 X 8,7C281–45,PRGM,DIP24	80009	160–9061–00
A2U103	160–9061–00	671–2714–01		IC,DGTL:CMOS,PROM;1024 X 8,7C281–45,PRGM,DIP24	80009	160–9061–00
A2U103	160–9061–00	671–2715–01		IC,DGTL:CMOS,PROM;1024 X 8,7C281–45,PRGM,DIP24	80009	160–9061–00
A2U103	160–9061–00	671–2650–01		IC,DGTL:CMOS,PROM;1024 X 8,7C281–45,PRGM,DIP24	80009	160–9061–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2U103	160–9227–00	671–2717–01		MICROCKT,DGTL:CMOS,1024 X 8,PROM,PRGM,7C281–45,DIP24	80009	160–9227–00
A2U103	160–9219–00	671–2716–01		MICROCKT,DGTL:CMOS,1024 X 8,PROM,PRGM,7C281–45,DIP24	80009	160–9219–00
A2U103	160–9219–00	671–2718–01		MICROCKT,DGTL:CMOS,1024 X 8,PROM,PRGM,7C281–45,DIP24	80009	160–9219–00
				MOUNTING PARTS		
	136–0925–00			SKT,DIP:	91506	224–AG30D
				END MOUNTING PARTS		
A2U104	160–9062–01	671–2713–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9062–01
A2U104	160–9212–00	671–2714–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9212–00
A2U104	160–9212–00	671–2715–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9212–00
A2U104	160–9062–01	671–2650–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9062–01
A2U104	160–9228–01	671–2717–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9228–01
A2U104	160–9220–01	671–2716–01		IC,MEMORY:CMOS,EPROM;512K X 8,150NS;27C040,PRGM,DIP32.6	80009	160–9220–01
A2U104	160–9235–00	671–2718–01		IC,MEMORY:CMOS;EPROM,256K X 8,200NS;PRGM,27C020,DIP32.6	80009	160–9235–00
				MOUNTING PARTS		
	136–0963–00			SKT,PL–IN ELEK:MICROCKT,32 PIN	00779	2–644018–3
				END MOUNTING PARTS		
A2U106	156–0368–03			IC,DGTL:ECL,TRANSLATOR;QUAD TTL–TO–ECL;10124,DIP16.3,TUBE	80009	156–0368–03
A2U108	156–0316–04			IC,DGTL:ECL,TRANSLATOR;QUAD ECL TO TTL;10125,DIP16.3,TUBE	04713	MC10125P/L
A2U150	156–3373–00			IC,DGTL:ACMOS,FLIP FLOP;OCTAL D–TYPE, 3–STATE;74AC374,DIP30.3,TUBE	02735	CD74AC374E
A2U160	156–4104–00			IC,LIN:	80009	156–4104–00
A2U161	160–9063–00	671–2713–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,30NS;EPM5064,PRGM,PLCC44	80009	160–9063–00
A2U161	160–9063–00	671–2714–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,30NS;EPM5064,PRGM,PLCC44	80009	160–9063–00
A2U161	160–9063–00	671–2715–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,30NS;EPM5064,PRGM,PLCC44	80009	160–9063–00
A2U161	160–9063–00	671–2650–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,30NS;EPM5064,PRGM,PLCC44	80009	160–9063–00
A2U161	160–9234–00	671–2717–01		MICROCKT,DGTL:CMOS,1024 X 8 PROM,PRGM,7C281–45,DIP24	80009	160–9234–00
A2U161	160–9221–00	671–2716–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,PRGM,30NS;EPM5064,PLCC44,TUBE	80009	160–9221–00
A2U161	160–9236–00	671–2718–01		IC,DGTL:CMOS,PLD;OPT,64 MACRO-CELL,PRGM,30NS;EPM5064,PLCC44,TUBE	80009	160–9236–00
				MOUNTING PARTS		

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
	136–1047–00			SKT,PLCC:PCB;44 POS,0.05 CTR,0.360 H X 0.125 TAIL,TIN	80009	136–1047–00
				END MOUNTING PARTS		
A2U163	160–8640–00	671–2715–01		IC,DGTL:PRGM,7C245	80009	160–8640–00
A2U163	160–8640–00	671–2650–01		IC,DGTL:PRGM,7C245	80009	160–8640–00
A2U163	160–8713–00	671–2717–01		IC,DGTL:PRGM,7C245	80009	160–8713–00
A2U163	160–8640–00	671–2716–01		IC,DGTL:PRGM,7C245	80009	160–8640–00
A2U163	160–8851–00	671–2718–01		IC,DGTL:CMOS;PROM,2048–X 8,7C245–35,DIP24	80009	160–8851–00
				MOUNTING PARTS		
	136–0925–00			SKT,DIP:	91506	224–AG30D
				END MOUNTING PARTS		
A2U164	156–3637–00			IC,DGTL:ACTCMOS,FLIP FLOP;HEX D–TYPE, CLEAR;74ACT174,DIP16.3,TUBE	80009	156–3637–00
A2U165	156–6172–00	671–2715–01		IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
A2U165	156–6172–00	671–2650–01		IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
A2U165	156–6172–00	671–2717–01		IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
A2U165	156–6172–00	671–2716–01		IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
A2U165	156–6172–00	671–2718–01		IC,CONV:BIPOLAR,D/A;10 BIT,20MHZ,CUR OUT,0.5LSBINL;TDC1041R3C1,PLCC28–1,TUBE	80009	156–6172–00
				MOUNTING PARTS		
	136–1005–00	671–2650–01		SKT,PL–IN ELEK:	00779	3–821581–1
	136–1005–00	671–2715–01		SKT,PL–IN ELEK:	00779	3–821581–1
	136–1005–00	671–2716–01		SKT,PL–IN ELEK:	00779	3–821581–1
	136–1005–00	671–2717–01		SKT,PL–IN ELEK:	00779	3–821581–1
	136–1005–00	671–2718–01		SKT,PL–IN ELEK:	00779	3–821581–1
				END MOUNTING PARTS		
A2U166	156–3019–00	671–2715–01		IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U166	156–3019–00	671–2650–01		IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U166	156–3019–00	671–2717–01		IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U166	156–3019–00	671–2716–01		IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U166	156–3019–00	671–2718–01		IC,LIN:BIPOLAR,V REF;1.235V,1.0%,150PPM, SHUNT,MICRO-POWER;LM385BZ–1.2,TO–92	27014	LM385BZ–1.2
A2U167	156–4170–00	671–2715–01		IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U167	156–4170–00	671–2650–01		IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A2U167	156–4170–00	671–2717–01		IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U167	156–4170–00	671–2716–01		IC,LIN:BIPOLAR OP–AMP;CUR FEEDBACK,100MHZ,HI OUT CUR;OPA603AP,DIP08.3	80009	156–4170–00
A2U167	156–4024–00	671–2718–01		IC,LIN:BIPOLAR,OP–AMP;190MHZ,CUR FEEDBACK,1 TO 40 GAIN RANGE;AD9617JN,DIP08.3	80009	156–4024–00
A2W112	174–2617–00	671–2715–01		CA ASSY,RF:75 OHM COAX,4.75 L	80009	174–2617–00
A2W112	174–2617–00	671–2650–01		CA ASSY,RF:75 OHM COAX,4.75 L	80009	174–2617–00
A2W112	174–2617–00	671–2717–01		CA ASSY,RF:75 OHM COAX,4.75 L	80009	174–2617–00
A2W112	174–2617–00	671–2716–01		CA ASSY,RF:75 OHM COAX,4.75 L	80009	174–2617–00
A2W112	174–2617–00	671–2718–01		CA ASSY,RF:75 OHM COAX,4.75 L	80009	174–2617–00
				(CONNECTED AT A2J112 & A4J506)		
A2W151	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A2W156	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A2Y1	119–3175–00			OSCILLATOR:14.31818MHZ	80009	119–3175–00
A3	671–2183–01			CIRCUIT BD ASSY:TOP BNC	80009	671–2183–01
A3J401	131–3378–00			CONN,RF JACK:	00779	227677–1
A3J402	131–5223–00			CONN,CIRC:PCB,MINI DIN;FEM,RTANG,4 POS,0.503 H X 0.137 TAIL,SILVER	80009	131–5223–00
A3J403	131–3378–00			CONN,RF JACK:	00779	227677–1
A3J404	131–3378–00			CONN,RF JACK:	00779	227677–1
A3J405	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 16)		
A3W405	174–2966–00			CA ASSY,SP,ELEC:RBN;IDC,16,28 AWG,1.9 L,2X8, 0.1 CTR,RECPT BOTH ENDS,ACCOM 0.L025 SQ PIN	80009	174–2966–00
A4	671–2184–01			CIRCUIT BD ASSY:BOTTOM BNC	80009	671–2184–01
A4J501	131–3378–00			CONN,RF JACK:	00779	227677–1
A4J502	131–3378–00			CONN,RF JACK:	00779	227677–1
A4J503	131–3378–00			CONN,RF JACK:	00779	227677–1
A4J504	131–3378–00			CONN,RF JACK:	00779	227677–1
A4J505	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 10)		
A4J506	131–3766–00			CONN,HDR:PCB;MALE,RTANG,1 X 2,0.1 CTR,0.235 MLG X 0.110 TAIL,30 GOLD,0.025 SQ	00779	A7232–2
A4W505	174–2967–00			CA ASSY,SP,ELEC:RBN;IDC,10,28 AWG,1.6 L,2X5, 0.1 CTR,RECPT BOTH ENDS,ACCOM 0.025 SQ PIN	80009	174–2967–00
A5	671–2790–01		B020999	CIRCUIT BD ASSY:AUDIO	80009	671–2790–01
A5	671–2790–02	B030000		CIRCUIT BD ASSY:AUDIO	80009	671–2790–02

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
				ATTACHED PARTS		
	214–4528–01	671–2790–02		SPRING,GROUND:STAINLESS STEEL	8X345	214–4528–01
				END ATTACHED PARTS		
A5C4	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C81	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C83	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C84	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C85	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C86	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C110	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A5C111	283–0594–02			CAP,FXD,MICA DI:1000PF,1%,100V,T&A	09023	CDA15FA102F03
A5C112	283–0177–05			CAP,FXD,CER DI:1UF,+80–20%,25V	04222	SR303E105ZAAAP1
A5C113	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C114	290–1313–00			CAP,FXD,ELCTLT:10UF,20%,50V,105 DEG	80009	290131300
A5C150	290–1313–00			CAP,FXD,ELCTLT:10UF,20%,50V,105 DEG	80009	290131300
A5C256	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C259	281–0777–00			CAP,FXD,CER:MLC;51PF,5%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0777–00
A5C260	281–0777–00			CAP,FXD,CER:MLC;51PF,5%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0777–00
A5C261	281–0777–00			CAP,FXD,CER:MLC;51PF,5%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0777–00
A5C262	281–0777–00			CAP,FXD,CER:MLC;51PF,5%,100V,0.100 X 0.170;AXIAL,MI	80009	281–0777–00
A5C350	281–0775–01			CAP,FXD,CER:MCL;0.1UF,20%,50V,Z5U,0.170 X 0.100;AXIAL	04222	SA105E104MAA
A5C351	290–0943–02			CAP,FXD,ELCTLT:47UF,20%,25V	55680	UVX1E470MDA1TD
A5C352	290–0943–02			CAP,FXD,ELCTLT:47UF,20%,25V	55680	UVX1E470MDA1TD
A5CR1	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A5CR2	152–0141–02			DIO,SIG:ULTRA FAST;40V,150MA,4NS,2PF;1N4152,DO–35,T&R	80009	152–0141–02
A5FL1	119–4225–00			FILTER,EMI:T–CIRCUIT, 25MHZ CUT–OFF, INS LOSS 25DB@100–1000MHZ, C0.5A,50V,180PF,70 OHM,.094	TK2058	ZJSC–R47–181 TAH
A5FL2	119–4225–00			FILTER,EMI:T–CIRCUIT, 25MHZ CUT–OFF, INS LOSS 25DB@100–1000MHZ, C0.5A,50V,180PF,70 OHM,.094	TK2058	ZJSC–R47–181 TAH
A5FL3	119–4225–00			FILTER,EMI:T–CIRCUIT, 25MHZ CUT–OFF, INS LOSS 25DB@100–1000MHZ, C0.5A,50V,180PF,70 OHM,.094	TK2058	ZJSC–R47–181 TAH
A5FL4	119–4225–00			FILTER,EMI:T–CIRCUIT, 25MHZ CUT–OFF, INS LOSS 25DB@100–1000MHZ, C0.5A,50V,180PF,70 OHM,.094	TK2058	ZJSC–R47–181 TAH
A5J9	131–3987–00			CONN,CIRC:PCB,AUDIO;MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING	82389	E3MRA
				MOUNTING PARTS		
	213–0055–00			SCR,TPG,TF:2–32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
				END MOUNTING PARTS		
A5J10	131–3987–00			CONN,CIRC:PCB,AUDIO;MALE,RTANG,3 POS,1.22 H X 1.024 W,CTR PLZ,LATCHING	82389	E3MRA

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
				MOUNTING PARTS		
	213–0055–00			SCR,TPG,TF:2–32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
				END MOUNTING PARTS		
A5J12	131–1426–00			CONN,HDR:PCB;MALE,RTANG,1 X 36,0.1 CTR,0.23 MLG X 0.195 TAIL,GLD,STACKABLE	22526	65524–136
A5J128	131–0608–00			TERM,PIN:0.365 L X 0.025 BRZ GLD PL	80009	131–0608–00
				(QUANTITY 10)		
A5P12	131–0993–05			BUS,CNDCT:SHUNT ASSY,GRN	00779	850100–5
A5Q1	151–1045–00			XSTR,SIG:JFET,P–CH;4.5V(SELECTED),5MA, 1MS,GENER-AL;2N5460_SPECIAL,TO–92	80009	151–1045–00
A5Q2	151–1025–00			XSTR,SIG:JFET,N–CH;6V,15MA,4.5MS,AMPL;J304/PN4416,TO–9 2 SDG	22229	F2263
A5R102	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A5R103	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A5R104	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A5R105	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A5R108	322–3222–00			RES,FXD:MET FILM;2K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K00
A5R109	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A5R110	322–3318–00			RES,FXD:MET FILM;20K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 20K0
A5R112	322–3273–00			RES,FXD:MET FILM;6.81K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3273–00
A5R113	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A5R114	322–3418–00			RES,FXD:MET FILM;221K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 221K
A5R115	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A5R116	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A5R117	322–3039–00			RES,FXD,FILM:24.9 OHM,1%,0.2W,TC=T0	80009	322–3039–00
A5R118	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A5R119	322–3289–00			RES,FXD:MET FILM;10K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	80009	322–3289–00
A5R120	322–3239–00			RES,FXD,FILM:3.01K OHM,1%,0.2W,TC=T0	57668	CRB20 FXE 3K01
A5R121	322–3280–00			RES,FXD,FILM:8.06K OHM,1%,0.2W,TC=T0	80009	322–3280–00
A5R122	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K
A5R123	311–2236–00			RES,VAR,TRMR:CERMET;20K OHM,20%,0.5W,0.197 SQ,SIDE ADJUST;T&R	TK1450	GF06UT 20K

Replaceable electrical parts list (Cont.)

Component number	Tektronix part number	Serial no. effective	Serial no. discont'd	Name & description	Mfr. code	Mfr. part number
A5R124	322–3193–00			RES,FXD:MET FILM;1K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 1K00
A5R125	322–3326–00			RES,FXD,FILM:24.3K OHM,1%,0.2W,TC–T0	91637	CCF50–2F24301F
A5R127	322–3226–00			RES,FXD:MET FILM;2.21K OHM,1%,0.2W,TC=100 PPM;AX-IAL,T&R,SM BODY	57668	CRB20 FXE 2K21
A5R209	321–0673–07			RES,FXD,FILM:17K OHM,0.1%,0.125W,TC=T9	07716	CEAE17001B
A5R210	321–0962–07			RES,FXD,FILM:8K OHM,0.1%,0.125W,TC=T9	80009	321–0962–07
A5TP12	214–4085–00			TERM,TEST PT:0.070 ID,0.220 H,0.063 DIA PCB,0.015 X 0.032 BRS,W/ RED NYL CLR	26364	104–01–02
A5U40	156–1291–00			IC,LIN:BIFET,OP–AMP;DUAL,LOW POWER;TL062CP,DIP08.3	80009	156–1291–00
A5U41	156–1272–00			IC,LIN:BIPOLAR,OP–AMP;DUAL,HI OUT DRIVE,LOW NOISE;NE5532N,DIP08.3	80009	156–1272–00
A5U42	156–1272–00			IC,LIN:BIPOLAR,OP–AMP;DUAL,HI OUT DRIVE,LOW NOISE;NE5532N,DIP08.3	80009	156–1272–00
A5U43	156–0402–00			IC,MISC:BIPOLAR,TIMER;LM555CN,DIP08.3	80009	156–0402–00
A5W128	174–2967–00			CA ASSY,SP,ELEC:RIBBON;IDC,10,28 AWG,1.6 L,2X5,0.1 CTR,RECPT BOTH ENDS,ACCOM 0.025 SQ PIN	80009	174–2967–00
A5W129	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00
A5W130	131–4566–00			BUS,CNDCT:0 OHM,300 SPACING,SM BODY	80009	131–4566–00

Diagrams

Diagrams/Circuit Board Illustrations

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2–1975.

Logic symbology is based on ANSI Y32.14–1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

Overline, parenthesis, or leading slash indicate a low asserting state.

Example: $\overline{\text{ID CONTROL}}$, (ID CONTROL), or /ID CONTROL.

Abbreviations are based on ANSI Y1.1–1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966 -- Drafting Practices.
Y14.2, 1973 -- Line Conventions and Lettering.
Y10.5, 1968 -- Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway, New York, New York 10018

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

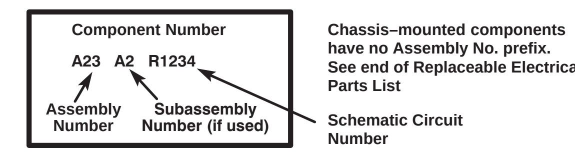
Capacitors: Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

The following information and special symbols may appear in this manual.

Assembly Numbers

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the diagram (in circuit board outline), circuit board illustration title, and lookup table for the schematic diagram.

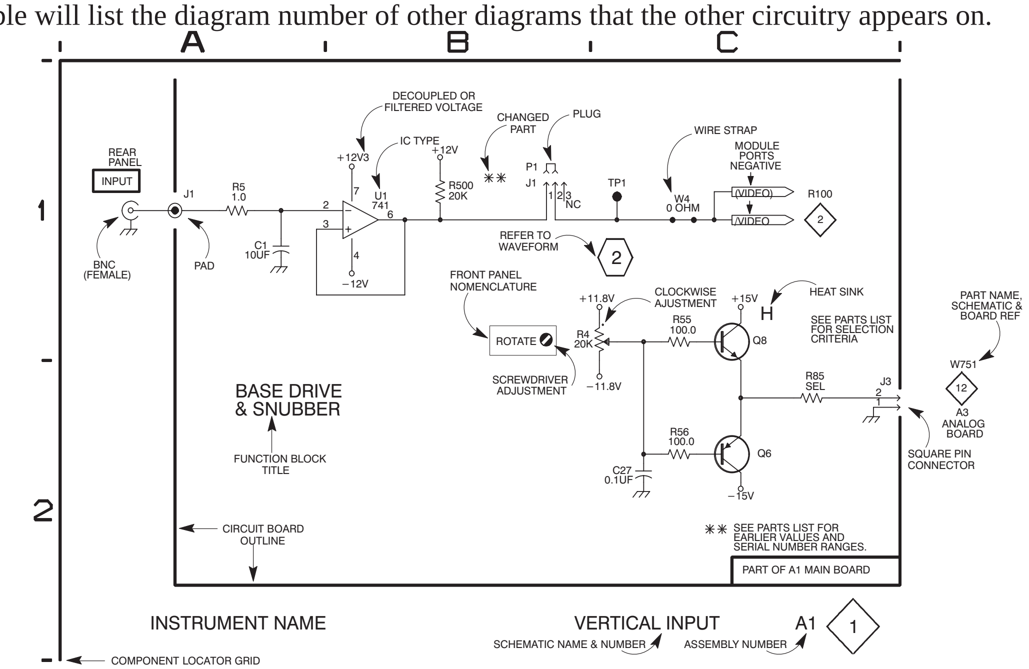
The Replaceable Electrical Parts List is arranged by assembly number in numerical sequence; the components are listed by component number. Example:

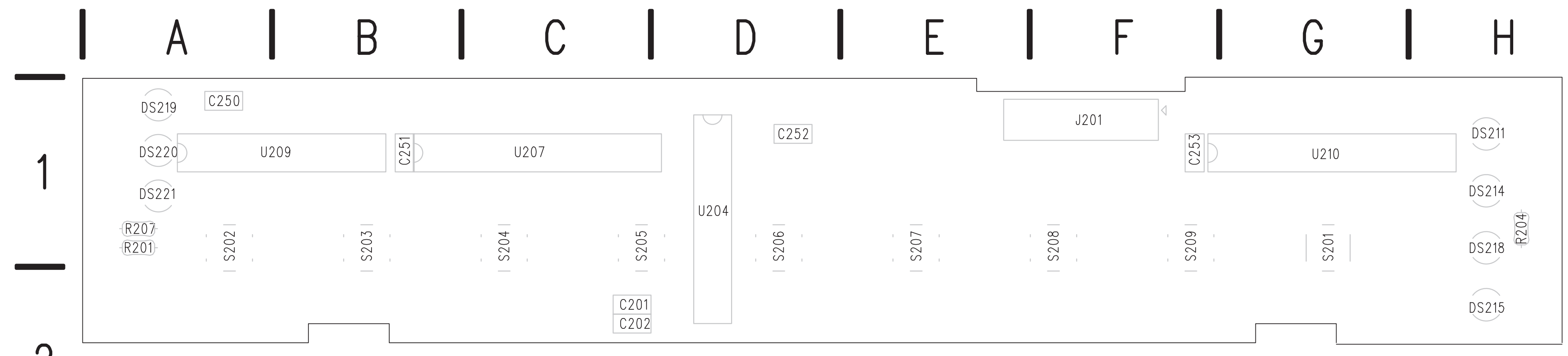


Grid Coordinates

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table.

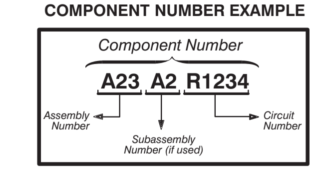
When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration will only appear opposite the first diagram; the lookup table will list the diagram number of other diagrams that the other circuitry appears on.





A1 Front Panel Board

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

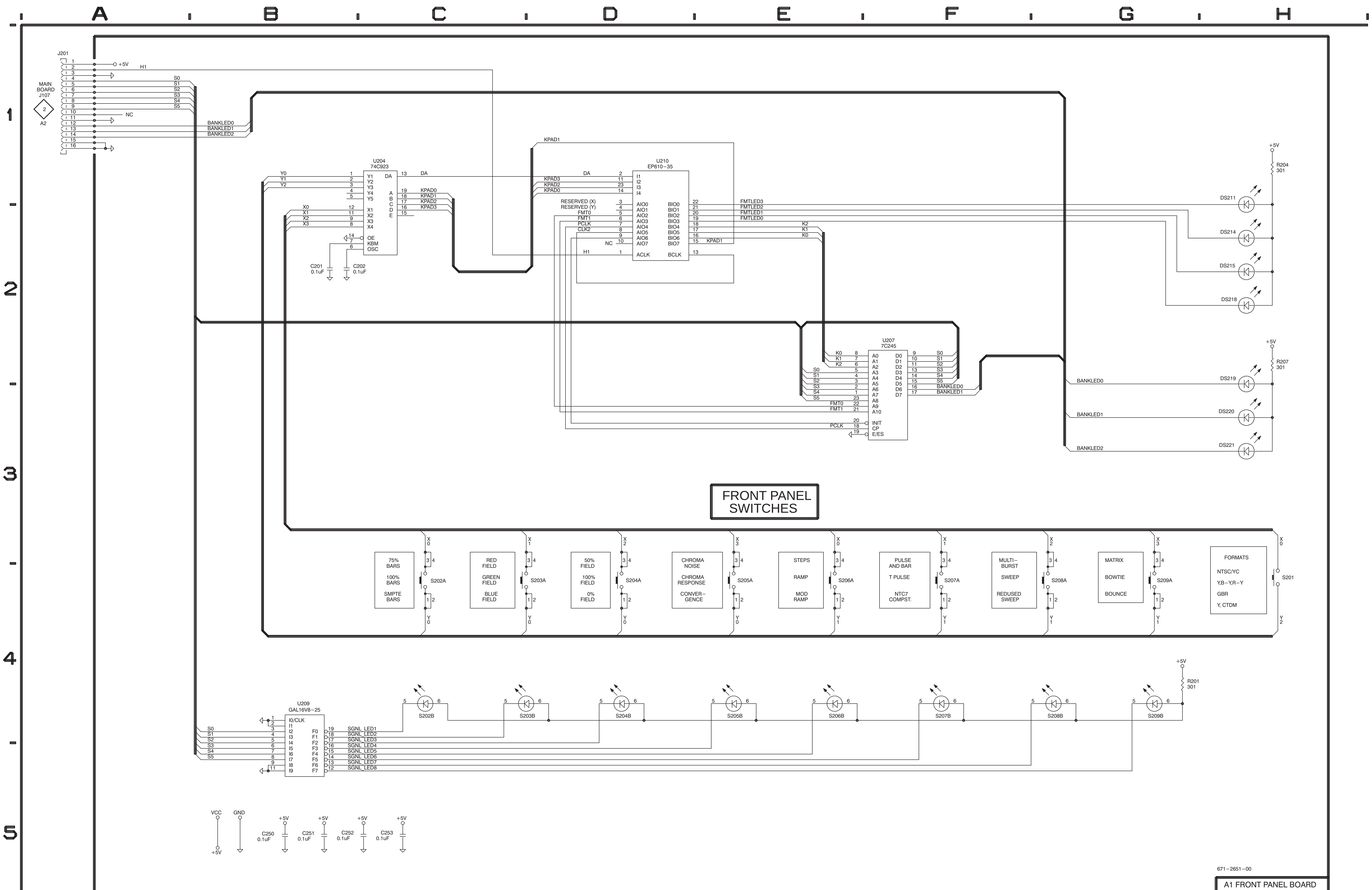
STATIC SENSITIVE DEVICES

SCHEMATIC DIAGRAM <1> FRONT PANEL BOARD

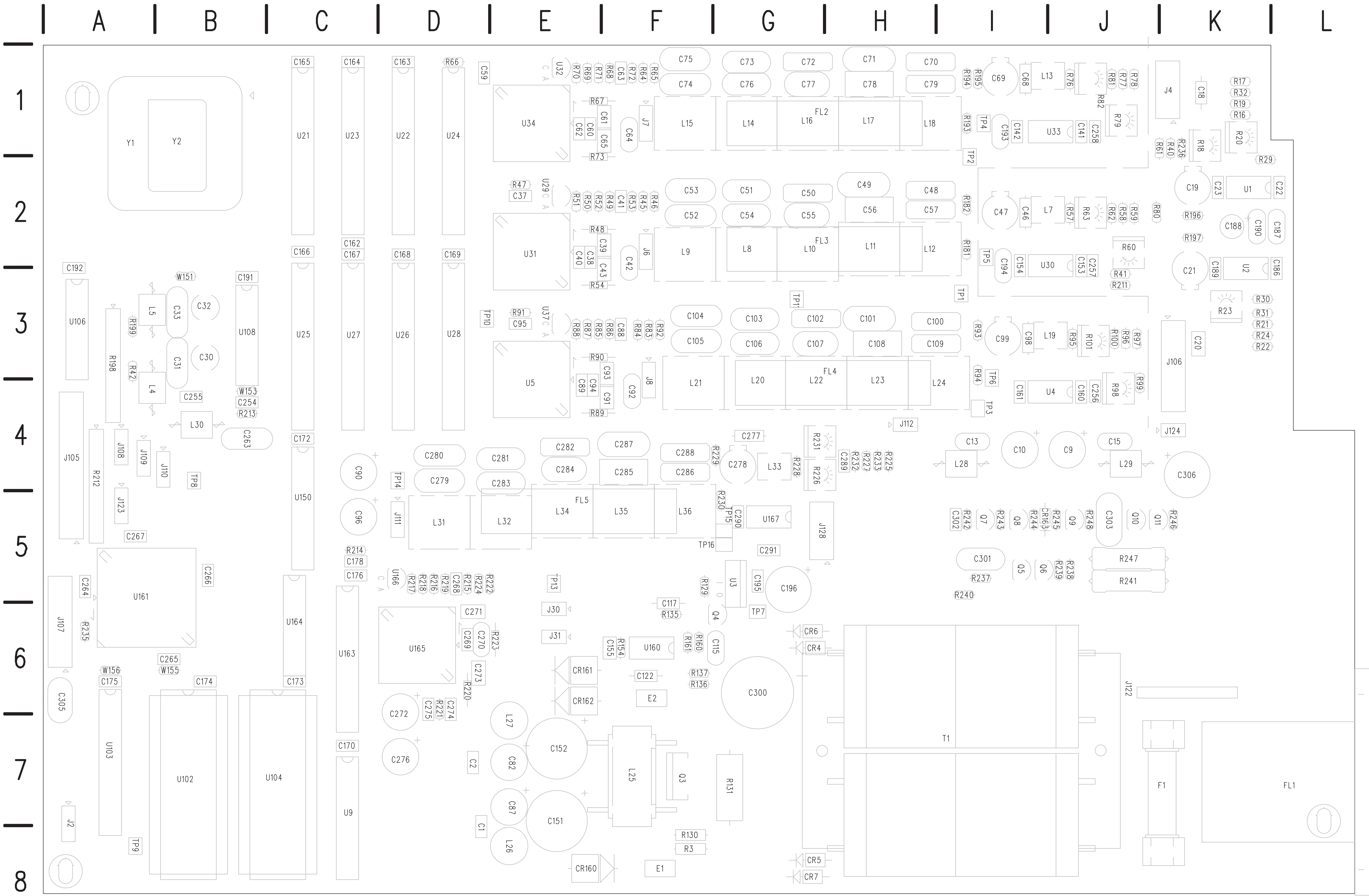
The schematic diagram and circuit board illustration has an alphanumeric grid to assist in locating parts within that diagram or board.

ASSEMBLY A1.

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C201	B2	C2	S202B	C4	A1
C202	B2	C2	S203A	C4	B1
C250	B5	A1	S203B	C4	B1
C251	B5	B1	S204A	D4	C1
C252	C5	D1	S204B	D4	C1
C253	C5	F1	S205A	E4	C1
			S205B	E4	C1
DS211	H1	H1	S206A	E4	D1
DS214	H2	H1	S206B	E4	D1
DS215	H2	H2	S207A	F4	E1
DS218	H2	H1	S207B	F4	E1
DS219	H2	A1	S208A	G4	F1
DS220	H3	A1	S208B	G4	F1
DS221	H3	A1	S209A	G4	F1
			S209B	G4	F1
J201	A1	F1			
			U204	C1	D1
R201	G4	A1	U207	F2	C1
R204	H1	H1	U209	B4	A1
R207	H2	A1	U210	D1	G1
S201	H4	G1			
S202A	C4	A1			



FRONT PANEL
SWITCHES
J201
MAIN BOARD J107
U204
74C923
U210
EP610-35
U207
7C245
U209
GAL16V8-25
75% BARS
100% BARS
SMPTE BARS
RED FIELD
GREEN FIELD
BLUE FIELD
50% FIELD
100% FIELD
0% FIELD
CHROMA NOISE
CHROMA RESPONSE
CONVER-GENCE
STEPS
RAMP
MOD RAMP
PULSE AND BAR
T PULSE
NTC7 COMPST.
MULTI-BURST
SWEEP
REDUSED SWEEP
MATRIX
BOWTIE
BOUNCE
FORMATS
NTSC/YC
Y,B-Y,R-Y
GBR
Y, CTDM
671-2651-00
A1 FRONT PANEL BOARD



A2 Main Board

STATIC SENSITIVE DEVICES

A2 Main Board

CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
C1	5	F2	D7
C2	5	F3	D7
C9	5	G3	J4
C10	5	G4	I4
C13	5	G4	I4
C15	5	G3	J4
C18	3	F2	K1
C19	3	G2	K2
C20	3	F4	K3
C21	3	G4	K2
C22	3	F1	L2
C23	3	F1	K2
C30	1	E5	B4
C31	1	E5	B3
C32	1	E5	B3
C33	1	E5	B3
C37	3	B4	E2
C38	3	B4	E2
C39	3	B4	F2
C40	3	B4	E2
C41	3	A4	F2
C42	3	B4	F2
C43	3	B4	F2
C46	3	E5	I2
C47	3	F5	I2
C48	3	D4	H2
C49	3	D4	H2
C50	3	D4	G2
C51	3	C4	G2
C52	3	C4	F2
C53	3	C4	F2
C54	3	C3	G2
C55	3	C3	G2
C56	3	D3	H2
C57	3	D3	H2
C59	3	B2	D1
C60	3	B2	E1
C61	3	B2	F1
C62	3	B2	E1
C63	3	A2	F1
C64	3	B2	F1
C65	3	B2	F1
C68	3	E3	I1
C69	3	F3	I1
C70	3	D1	H1
C71	3	D1	H1
C72	3	D1	G1
C73	3	C1	G1
C74	3	C1	F1
C75	3	C1	F1
C76	3	C1	G1
C77	3	C1	G1
C78	3	D1	H1
C79	3	D1	H1
C82	5	F3	E7
C87	5	F2	E7
C88	4	C2	F3
C89	4	C1	E3
C90	4	B3	C4
C91	4	B2	F4
C92	4	B2	F4
C93	4	C2	F3
C94	4	C2	E3
C95	4	C2	E3
C96	4	C2	C5
C98	4	G2	I3
C99	4	G2	I3
C100	4	E1	H3
C101	4	E1	H3
C102	4	E1	G3
C103	4	D1	G3
C104	4	D2	F3
C105	4	D2	F3

CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
C106	4	D1	G3
C107	4	E1	G3
C108	4	E1	H3
C109	4	E1	H3
C115	5	D3	G6
C117	5	B3	F6
C122	5	C3	F6
C141	3	E2	J1
C142	3	E2	I1
C151	5	F2	E7
C152	5	F3	E7
C153	3	E4	J2
C154	3	E5	I2
C155	5	B3	E6
C160	4	G1	J4
C161	4	G1	I4
C162	5	B5	C2
C163	5	B5	D1
C164	5	C5	C1
C165	5	C5	C1
C166	5	C5	C2
C167	5	D5	C2
C168	5	D5	D2
C169	5	D5	D2
C170	5	E5	C7
C172	5	E5	C4
C173	5	E5	C6
C174	5	E5	B6
C175	5	F5	A6
C176	5	F5	C5
C178	5	F5	C5
C186	3	F3	L2
C187	3	F1	K2
C188	3	F3	K2
C189	3	F4	K2
C190	3	F4	K2
C191	1	G5	B3
C192	1	D5	A3
C193	3	E2	I1
C194	3	E5	I2
C195	5	G4	G5
C196	5	G4	G6
C236	3	H1	K1
C254	1	F5	B4
C255	1	F5	B4
C256	4	G2	J4
C257	3	E5	J2
C258	3	E3	J1
C263	2	F4	
C264	1	B3	A5
C265	1	B3	B6
C266	1	B3	B5
C267	1	B3	A5
C268	4	C4	D5
C269	4	C4	D6
C270	4	B4	D6
C271	4	B4	E6
C272	4	B5	D6
C273	4	C4	D6
C274	4	C4	D6
C275	4	C4	D5
C276	4	C4	D7
C277	4	G4	G4
C278	4	G4	G4
C279	4	D4	D4
C280	4	D4	D4
C281	4	D4	E4
C282	4	E4	E4
C283	4	D3	E4
C284	4	E3	E4
C285	4	E3	F4
C286	4	E3	F4

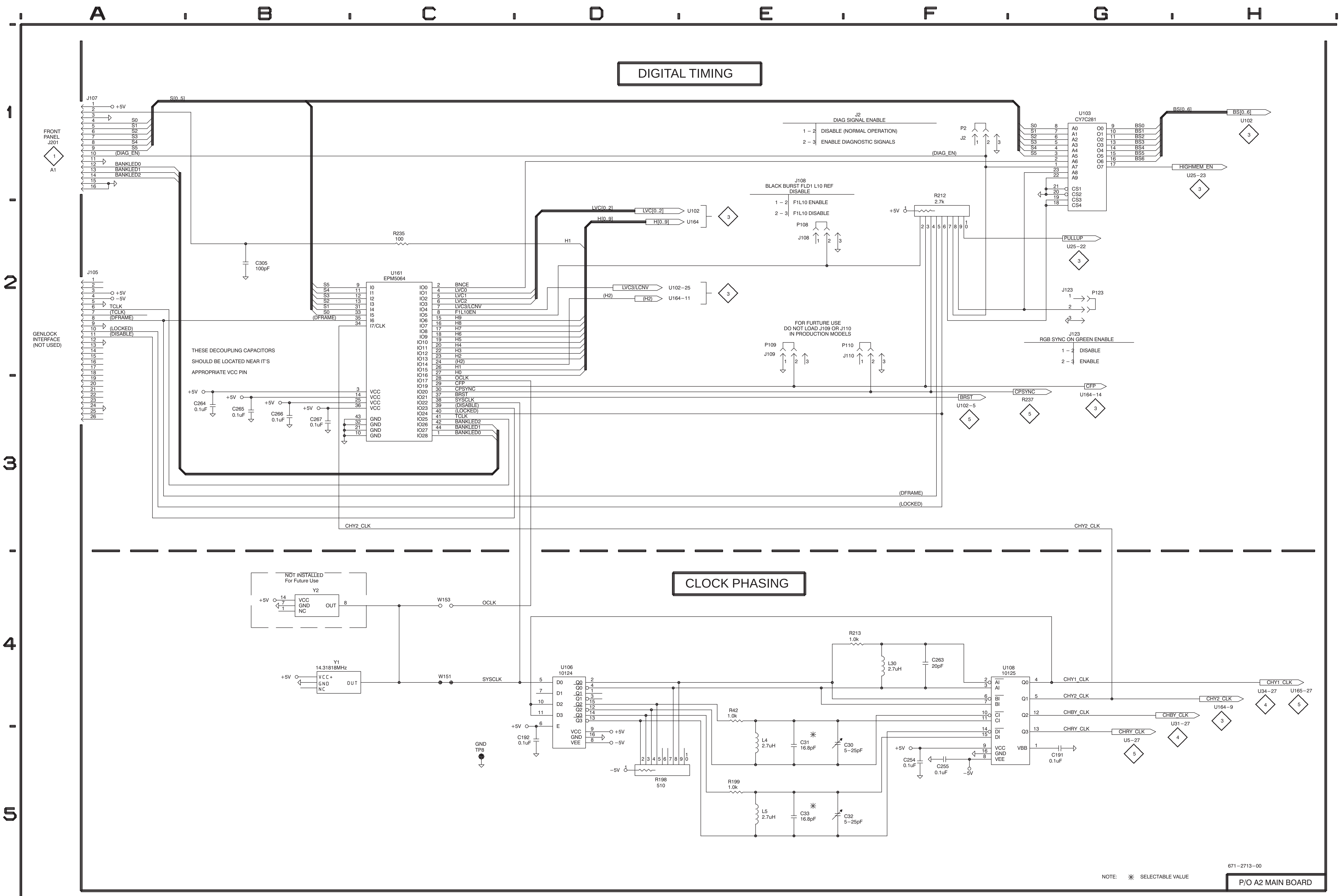
CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
C287	4	E4	F4
C288	4	E4	F4
C289	4	G4	H4
C290	4	G3	G5
C291	4	G3	G5
C300	5	D1	G6
C301	4	G4	I5
C302	4	F4	I5
C303	4	G5	J5
C305	1	B2	A6
CR4	5	D1	G6
CR5	5	D1	G8
CR6	5	D1	G6
CR7	5	D2	G8
CR160	5	E2	E8
CR161	5	E2	E6
CR162	5	E2	E6
CR163	4	F5	I5
E1	5	E2	F8
E2	5	E2	F7
F1	5	B1	K7
F1A	5	B1	K7
FL1	5	A1	K8
FL2	3	C2	G1
FL3	3	C5	G2
FL4	4	E2	G3
FL5	4	E4	E5
J2	1	F1	A7
J4	3	H1	K1
J6	3	B3	F2
J7	3	B1	F1
J8	4	C1	F3
J30	5	G2	E6
J31	5	G2	E6
J105	1	A2	A5
J106	3	H2	K3
J107	1	A1	A6
J108	1	E2	A4
J109	1	E2	A4
J110	1	F2	B4
J111	4	C3	D5
J112	4	H3	H4
J122	5	C1	J6
J123	1	G2	A4
J124	4	H5	K4
J128	5	H5	G5
L4	1	E5	B4
L5	1	E5	B3
L7	3	E5	I2
L8	3	C4	G3
L9	3	C4	F3
L10	3	C3	G3
L11	3	D3	H3
L12	3	D3	H3
L13	3	E3	I1
L14	3	C1	G2
L15	3	C2	F2
L16	3	C1	G2
L17	3	D1	H2
L18	3	D1	H2
L19	4	G2	I3
L20	4	D1	G4
L21	4	D2	F4
L22	4	E1	G4
L23	4	E1	H4
L24	4	E1	H4
L25	5	D2	E7
L26	5	F2	D8
L27	5	F2	E6
L28	5	F4	H4
L29	5	F3	J4
L30	2	F4	B4

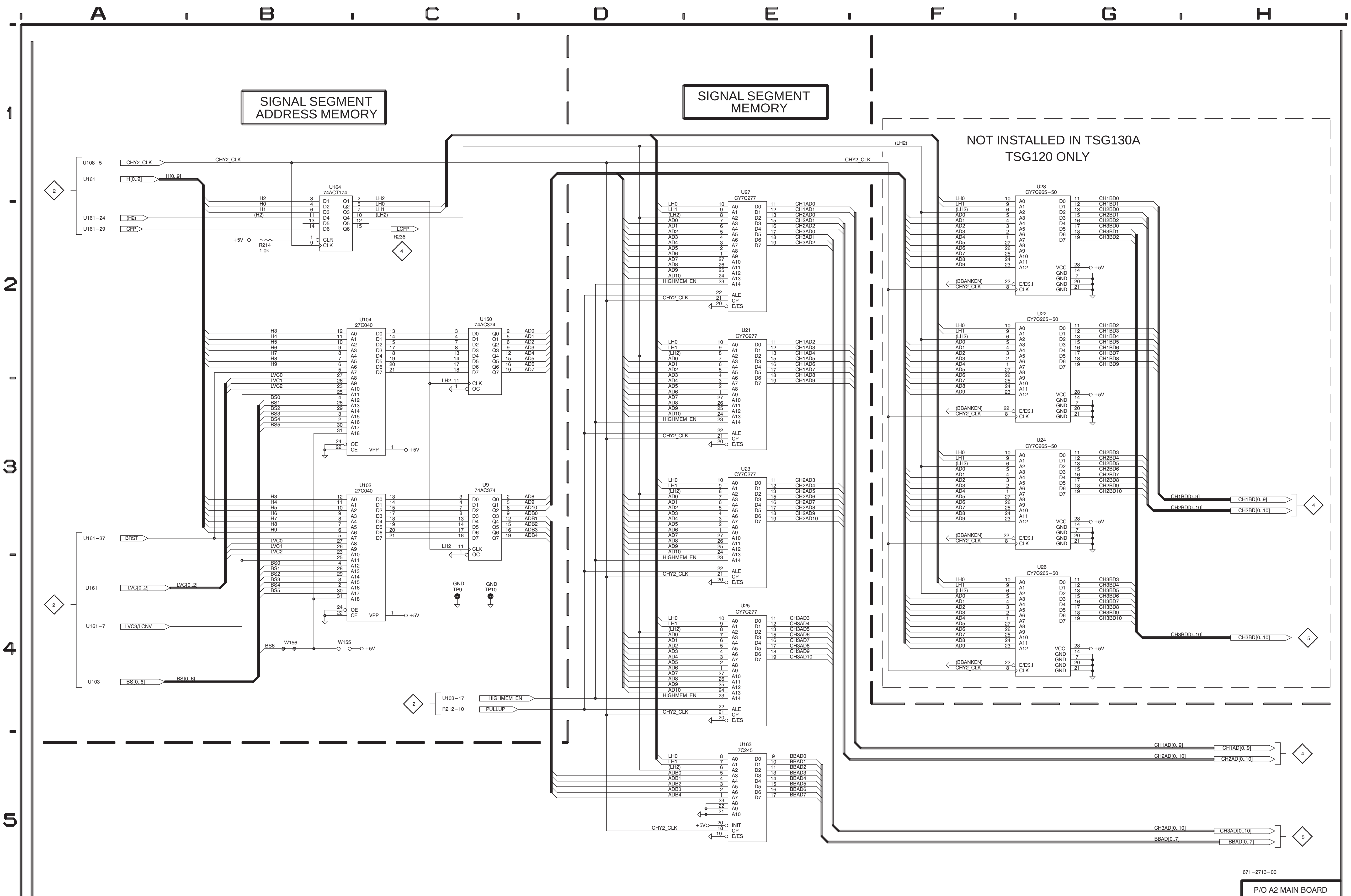
CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
L31	4	D4	D5
L32	4	D4	E5
L33	4	G3	G4
L34	4	E3	E5
L35	4	E3	F5
L36	4	E3	F5
P2	2	F1	A7
P6	4	B3	F2
P7	4	B1	F1
P8	5	C1	F3
P30	6	G2	E6
P31	6	G2	E6
P108	2	E2	A4
P109	2	E2	A4
P110	2	F2	B4
P111	5	C3	C3
P122	6	C1	K6
P123	2	G2	A5
Q3	5	D3	F7
Q4	5	B3	F6
Q5	4	G4	I5
Q6	4	G4	I5
Q7	4	G5	I5
Q8	4	G5	I5
Q9	4	G5	J5
Q10	4	H5	J5
Q11	4	H5	J5
R3	5	D3	F8
R16	3	F2	K1
R17	3	G2	K1
R18	3	G1	K1
R19	3	F2	K1
R20	3	F2	K1
R21	3	F4	K3
R22	3	G4	K3
R23	3	G3	K3
R24	3	F4	K3
R29	3	G1	K2
R30	3	G3	K3
R31	3	G4	K3
R32	3	G1	K1
R40	3	H1	K1
R41	3	G4	J3
R42	1	E4	A3
R45	3	B3	F2
R46	3	C3	F2
R47	3	B4	E2
R48	3	B4	E2
R49	4	A4	E2
R50	4	A4	E2
R51	3	A4	E2
R52	4	A4	E2
R53	4	A4	E2
R54	3	B5	E3
R57	3	E5	J2
R58	3	F5	J2
R68			
R59	3	F5	J2
R60	3	F4	J2
R61	3	H1	J1
R62	3	E5	J2
R63	3	E5	J2
R64	3	B1	F1
R65	3	C1	F1
R66	3	B1	D1
R67	3	B2	E1
R69	4	A2	E1
R70	4	A2	E1
R71	4	A2	E1
R72	4	A1	F1
R73	3	B2	E2

CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
R76	3	E3	J1
R77	3	F3	J1
R78	3	F2	J1
R79	3	F2	J1
R80	3	H2	J2
R81	3	E3	J1
R82	3	E3	J1
R83	4	C1	F3
R84	5	B2	F3
R85	5	B2	E3
R86	5	A2	F3
R87	5	A2	F3
R88	4	C2	E3
R89	4	B2	E4
R90	4	C2	E3
R91	4	C2	E3
R92	4	C1	F3
R93	4	F1	I3
R94	4	F1	I3
R95	4	G2	J3
R96	4	G2	J3
R97	4	G1	J3
R98	4	G1	J4
R99	4	H1	J3
R100	4	G2	J3
R101	4	G2	J3
R129	5	B3	F5
R130	5	D3	F8
R131	5	D3	G7
R135	5	B3	F6
R136	5	D3	F6
R137	5	C3	F6
R154	5	C3	F6
R160	5	B3	F6
R161	5	B3	F6
R181	3	E4	I2
R182	3	E4	I2
R193	3	E1	I1
R194	3	E2	I1
R195	3	E2	I1
R196	3	G1	K2
R197	3	G3	K2
R198	1	D5	A3
R199	1	E5	A3
R211	3	G4	J3
R212	1	F2	A4
R213	2	F4	B4
R214	2	B2	C5
R215	5	B4	D5
R216	5	B4	D5
R217	4	C5	D5
R218	5	A4	D5
R219	5	A4	D5
R220	4	C5	D6
R221	4	C4	D5
R222	4	C3	E5
R223	4	B5	E6
R224	4	C4	D5
R225	4	H3	H4
R226	4	G3	G5
R227	4	H3	H4
R228	4	G3	G4
R229	4	F3	G4
R230	4	F3	G5
R231	4	G4	G4
R232	4	G3	H4
R233	4	H3	H4
R235	1	C2	A6
R236	3	H1	K1
R237	4	G4	I5
R238	4	G4	J5
R239	4	G4	J5

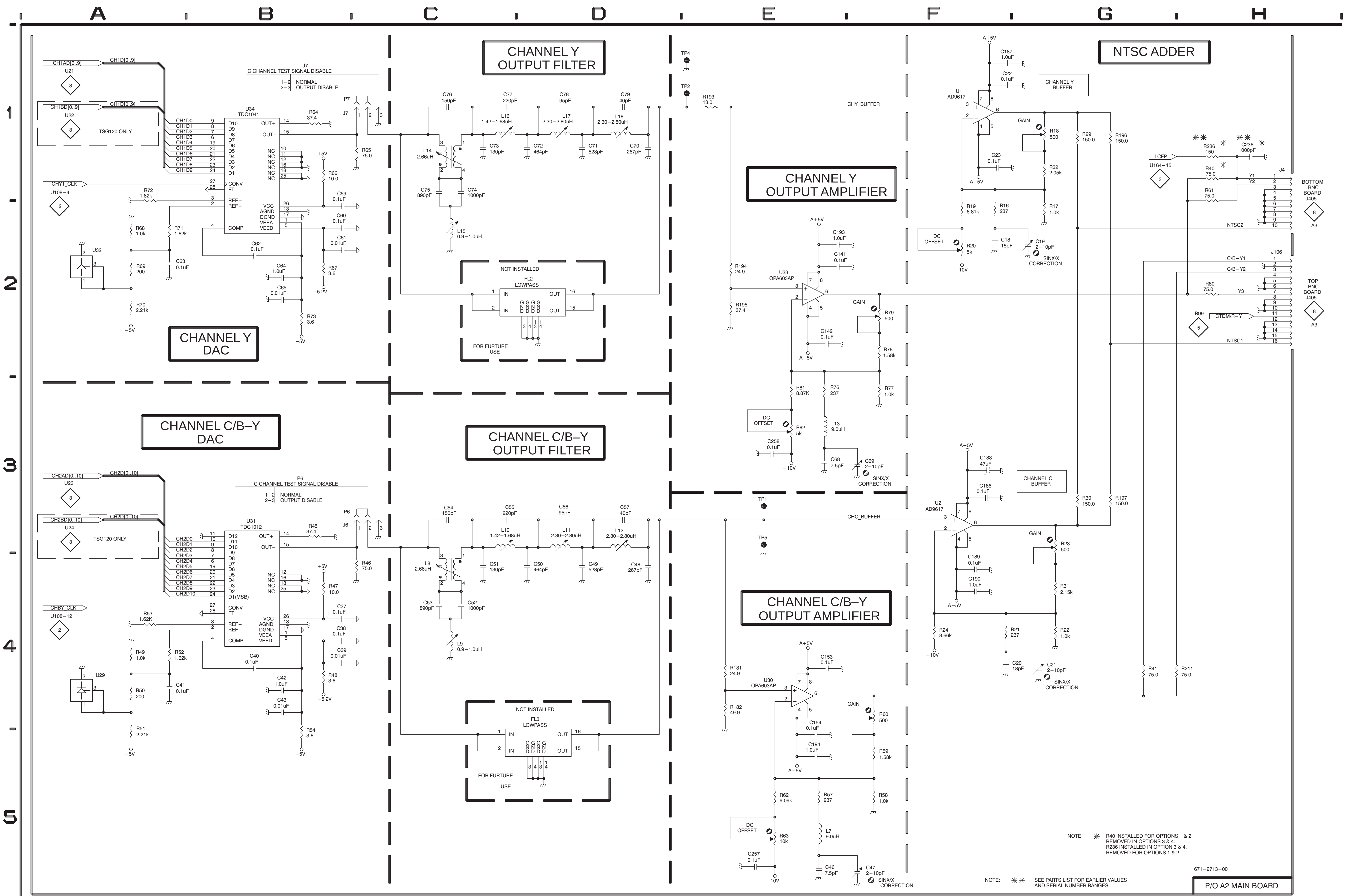
CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	BOARD LOCATION
R240	4	G4	I5
R241	4	H5	J5
R242	4	F4	I5
R243	4	F5	I5
R244	4	F5	I5
R245	4	F5	J5
R246	4	H5	K5
R247	4	H5	J5
R248	4	G5	J5
R379	3	A4	E2
R380	3	A2	E1
R381	4	B2	E3
R382	4	B4	D5
T1	5	C1	J6
TP1	3	E3	I3
TP2	3	E1	I2
TP3	4	F1	I4
TP4	3	E1	I1
TP5	3	E3	I2
TP6	4	F1	I3
TP7	5	G4	G6
TP8	1	C5	B4
TP9	2	C4	A8
TP10	2	C4	D3
TP11	4	E2	G3
TP13	5	F3	E5
TP14	4	E4	D4
TP15	4	F3	G5
TP16	4	F3	G5
U1	3	F1	K2
U2	3	F3	K2
U3	5	F4	F5
U4	4	G1	J3
U5	4	B1	D3
U9	2	C3	C7
U21	2	E2	C1
U22	2	G2	C1
U23	2	E3	C1
U24	2	G3	D1
U25	2	E4	C2
U26	2	G4	C2
U27	2	E2	C2
U28	2	G1	D2
U29	3	A4	E2
U30	3	E4	J2
U31	3	B3	D2
U32	3	A2	E1
U33	3	E2	J1
U34	3	B1	D1
U37	4	C2	E3
U102	2	B3	A6
U103	1	G1	A6
U104	2	B2	B6
U106	1	D4	A3
U108	1	F4	B3
U150	2	C2	C4
U160	5	C3	F6
U161	1	C2	A5
U163	2	E5	C5
U164	2	B1	B5
U165	4	B3	C6
U166	4	C4	D5
U167	4	G3	G5
W151	1	C4	B3
W153	1	C4	B4
W155	2	B4	B6
W156	2	B4	A6
Y1	1	B4	B1
Y2	1	B4	A1

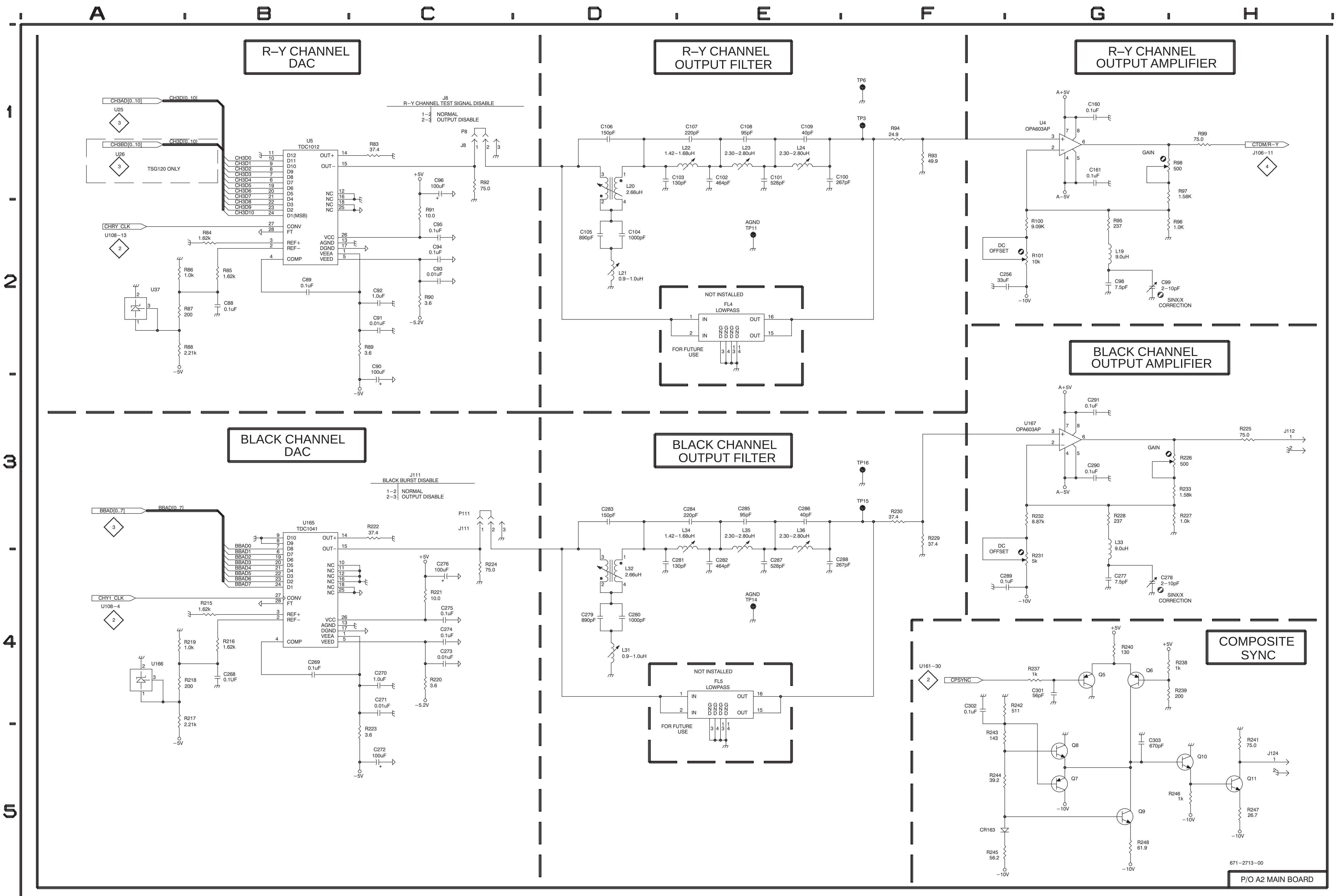
A2 Main Board Component Locator

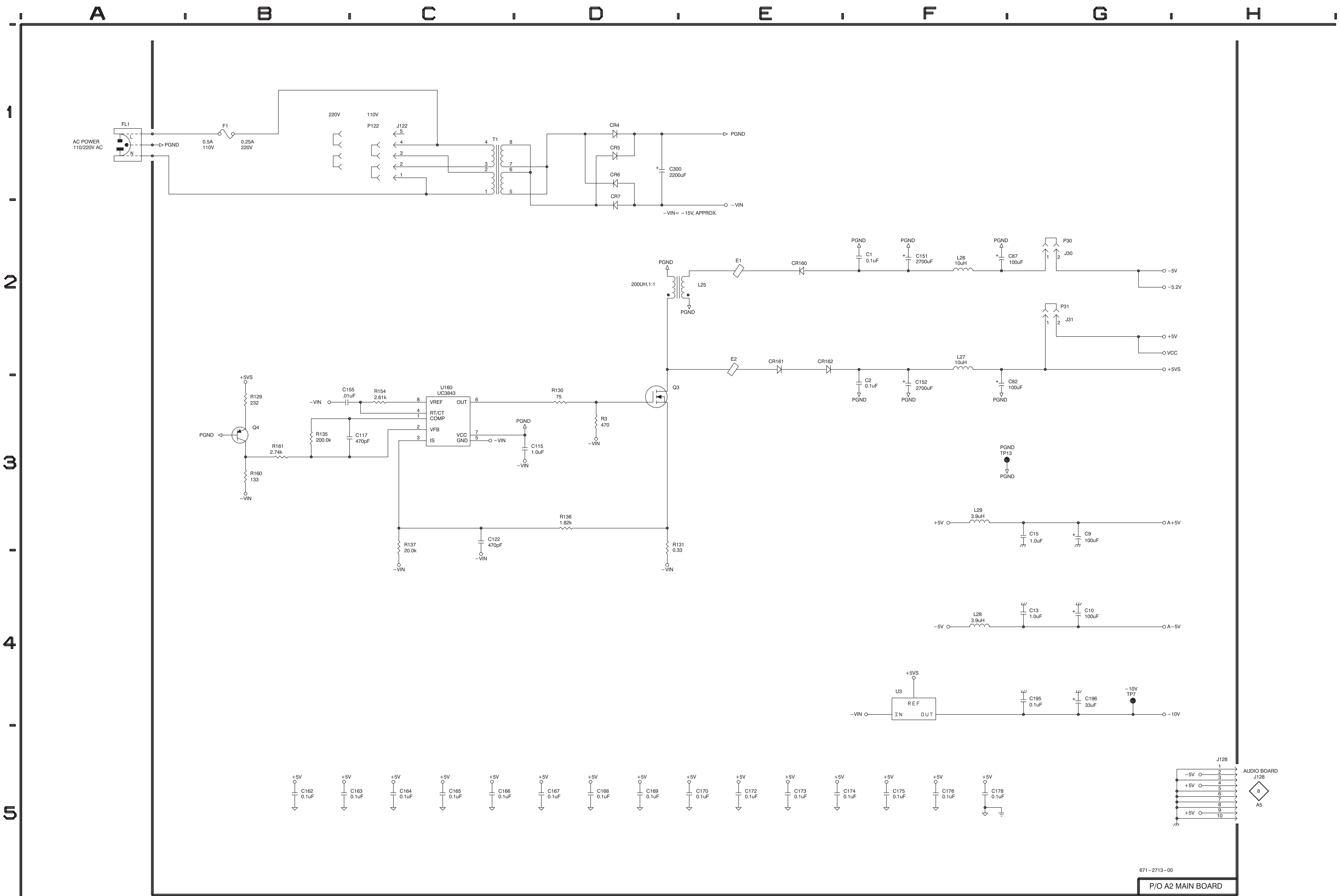

DIGITAL TIMING
CLOCK PHASING
FRONT PANEL J201
GENLOCK INTERFACE (NOT USED)
U161 EPM5064
U103 CY7C281
J2 DIAG SIGNAL ENABLE
1 – 2 DISABLE (NORMAL OPERATION)
2 – 3 ENABLE DIAGNOSTIC SIGNALS
J108 BLACK BURST FLD1 L10 REF DISABLE
1 – 2 F1L10 ENABLE
2 – 3 F1L10 DISABLE
FOR FURTURE USE
DO NOT LOAD J109 OR J110
IN PRODUCTION MODELS
J123 RGB SYNC ON GREEN ENABLE
1 – 2 DISABLE
2 – 3 ENABLE
THESE DECOUPLING CAPACITORS
SHOULD BE LOCATED NEAR IT'S
APPROPRIATE VCC PIN
NOT INSTALLED
For Future Use
Y1 14.31818MHz
U106 10124
U108 10125
NOTE: ✳ SELECTABLE VALUE
671–2713–00
P/O A2 MAIN BOARD



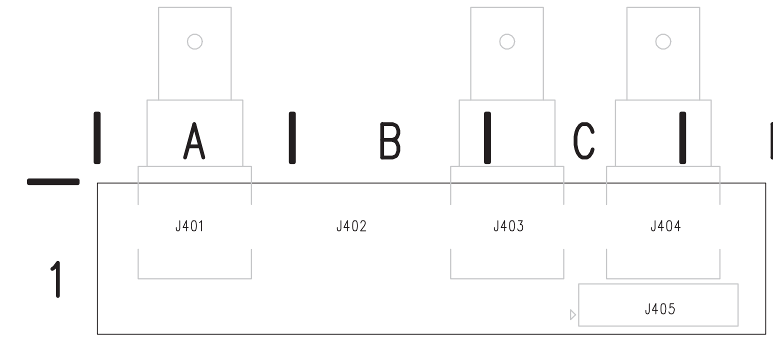
SIGNAL SEGMENT ADDRESS MEMORY
SIGNAL SEGMENT MEMORY
NOT INSTALLED IN TSG130A
TSG120 ONLY
P/O A2 MAIN BOARD
671-2713-00


CHANNEL Y OUTPUT FILTER
NTSC ADDER
CHANNEL Y BUFFER
CHANNEL Y OUTPUT AMPLIFIER
CHANNEL Y DAC
CHANNEL C/B–Y DAC
CHANNEL C/B–Y OUTPUT FILTER
CHANNEL C BUFFER
CHANNEL C/B–Y OUTPUT AMPLIFIER
C CHANNEL TEST SIGNAL DISABLE
1–2 NORMAL
2–3 OUTPUT DISABLE
TSG120 ONLY
NOT INSTALLED
FOR FURTURE USE
BOTTOM BNC BOARD J405
TOP BNC BOARD J405
NOTE: ✳ R40 INSTALLED FOR OPTIONS 1 & 2, REMOVED IN OPTIONS 3 & 4. R236 INSTALLED IN OPTION 3 & 4, REMOVED FOR OPTIONS 1 & 2.
NOTE: ✳✳ SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.
671–2713–00
P/O A2 MAIN BOARD

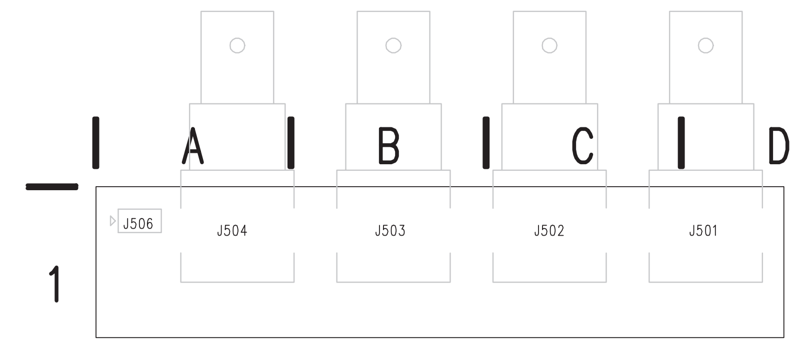

A B C D E F G H
1 2 3 4 5
R–Y CHANNEL DAC
R–Y CHANNEL OUTPUT FILTER
R–Y CHANNEL OUTPUT AMPLIFIER
BLACK CHANNEL OUTPUT AMPLIFIER
BLACK CHANNEL DAC
BLACK CHANNEL OUTPUT FILTER
COMPOSITE SYNC
TSG120 ONLY
R–Y CHANNEL TEST SIGNAL DISABLE
1–2 NORMAL
2–3 OUTPUT DISABLE
BLACK BURST DISABLE
1–2 NORMAL
2–3 OUTPUT DISABLE
NOT INSTALLED
FL4 LOWPASS
FOR FUTURE USE
NOT INSTALLED
FL5 LOWPASS
FOR FUTURE USE
DC OFFSET
GAIN
SINX/X CORRECTION
U5 TDC1012
U165 TDC1041
U4 OPA603AP
U167 OPA603AP
671–2713–00
P/O A2 MAIN BOARD



AC POWER
110/220V AC
FL1
PGND
F1
0.5A
110V
0.25A
220V
220V
110V
P122
J122
T1
CR4
CR5
CR6
CR7
C300
2200uF
−VIN= −15V, APPROX.
−VIN
200UH,1:1
L25
E1
CR160
C1
0.1uF
C151
2700uF
L26
10uH
C87
100uF
P30
J30
−5V
−5.2V
P31
J31
+5V
VCC
E2
CR161
CR162
L27
10uH
+5VS
C2
0.1uF
C152
2700uF
C82
100uF
Q3
U160
UC3843
VREF
RT/CT
COMP
VFB
IS
OUT
VCC
GND
C155
.01uF
R154
2.61k
R130
75
R3
470
R135
200.0k
C117
470pF
C115
1.0uF
R129
232
Q4
R161
2.74k
R160
133
R136
1.82k
R137
20.0k
C122
470pF
R131
0.33
TP13
L29
3.9uH
C15
1.0uF
C9
100uF
A+5V
L28
3.9uH
C13
1.0uF
C10
100uF
A−5V
U3
REF
IN
OUT
C195
0.1uF
C196
33uF
−10V
TP7
C162
C163
C164
C165
C166
C167
C168
C169
C170
C172
C173
C174
C175
C176
C178
0.1uF
J128
AUDIO BOARD
J128
A5
671−2713−00
P/O A2 MAIN BOARD

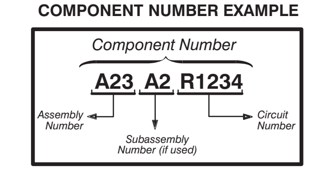


A3 Top BNC Board



A4 Bottom BNC Board

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

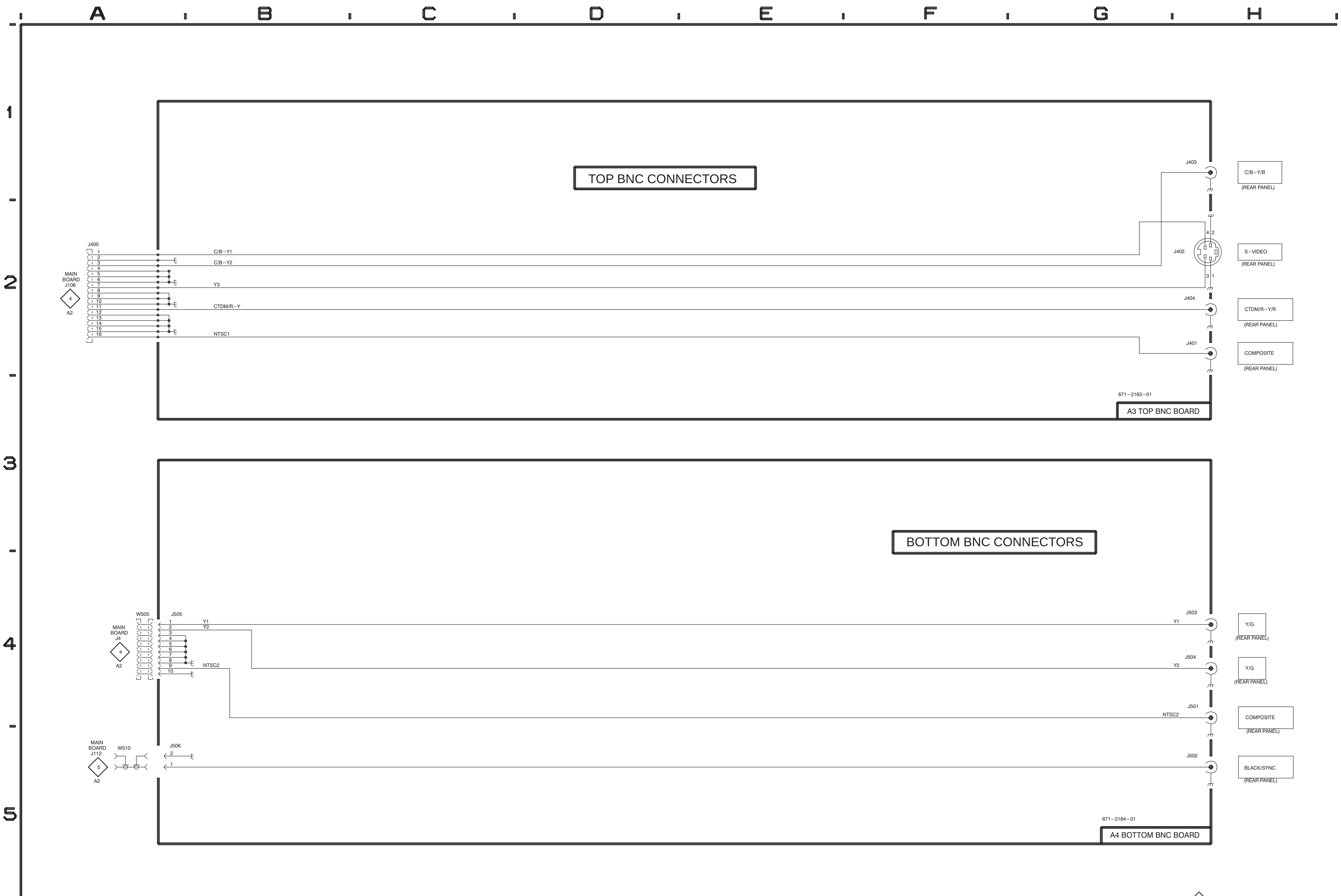
STATIC SENSITIVE DEVICES

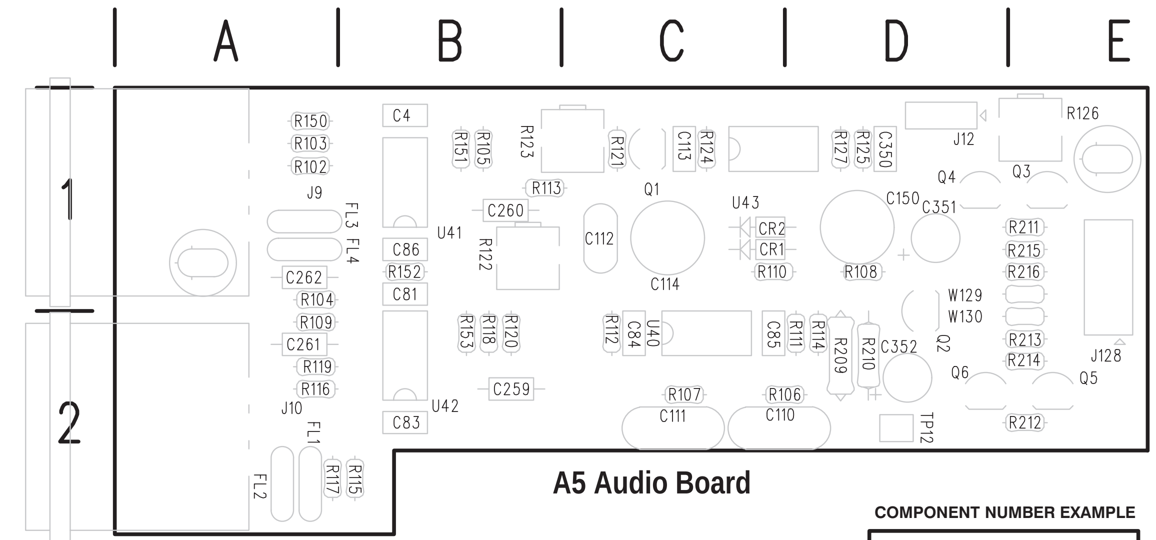
SCHEMATIC DIAGRAM <7>
TOP & BOTTOM BNC BOARDS

The schematic diagram and circuit board illustration has an alphanumeric grid to assist in locating parts within that diagram or board.

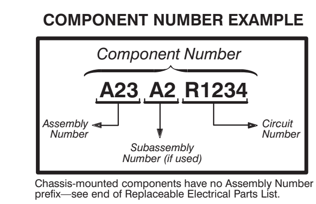
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
A3 ASSEMBLY		
J401	H2	A1
J402	H2	B1
J403	H1	C1
J404	H2	C1
J405	A2	C1
A4 ASSEMBLY		
J501	H5	D1
J502	H5	C1
J503	H4	B1
J504	H4	A1
J505	A4	D1
J506	A5	A1

A3 Top BNC Board and A4 Bottom BNC Board Component Locator


A
B
C
D
E
F
G
H
1
2
3
4
5
TOP BNC CONNECTORS
J405
MAIN BOARD J106
A2
C/B−Y1
C/B−Y2
Y3
CTDM/R−Y
NTSC1
J403
C/B−Y/B
(REAR PANEL)
J402
S−VIDEO
(REAR PANEL)
J404
CTDM/R−Y/R
(REAR PANEL)
J401
COMPOSITE
(REAR PANEL)
671−2183−01
A3 TOP BNC BOARD
BOTTOM BNC CONNECTORS
W505
J505
MAIN BOARD J4
A2
Y1
Y2
NTSC2
J503
Y/G
(REAR PANEL)
J504
Y/G
(REAR PANEL)
J501
COMPOSITE
(REAR PANEL)
MAIN BOARD J112
A2
W510
J506
J502
BLACK/SYNC
(REAR PANEL)
671−2184−01
A4 BOTTOM BNC BOARD



A5 Audio Board



STATIC SENSITIVE DEVICES

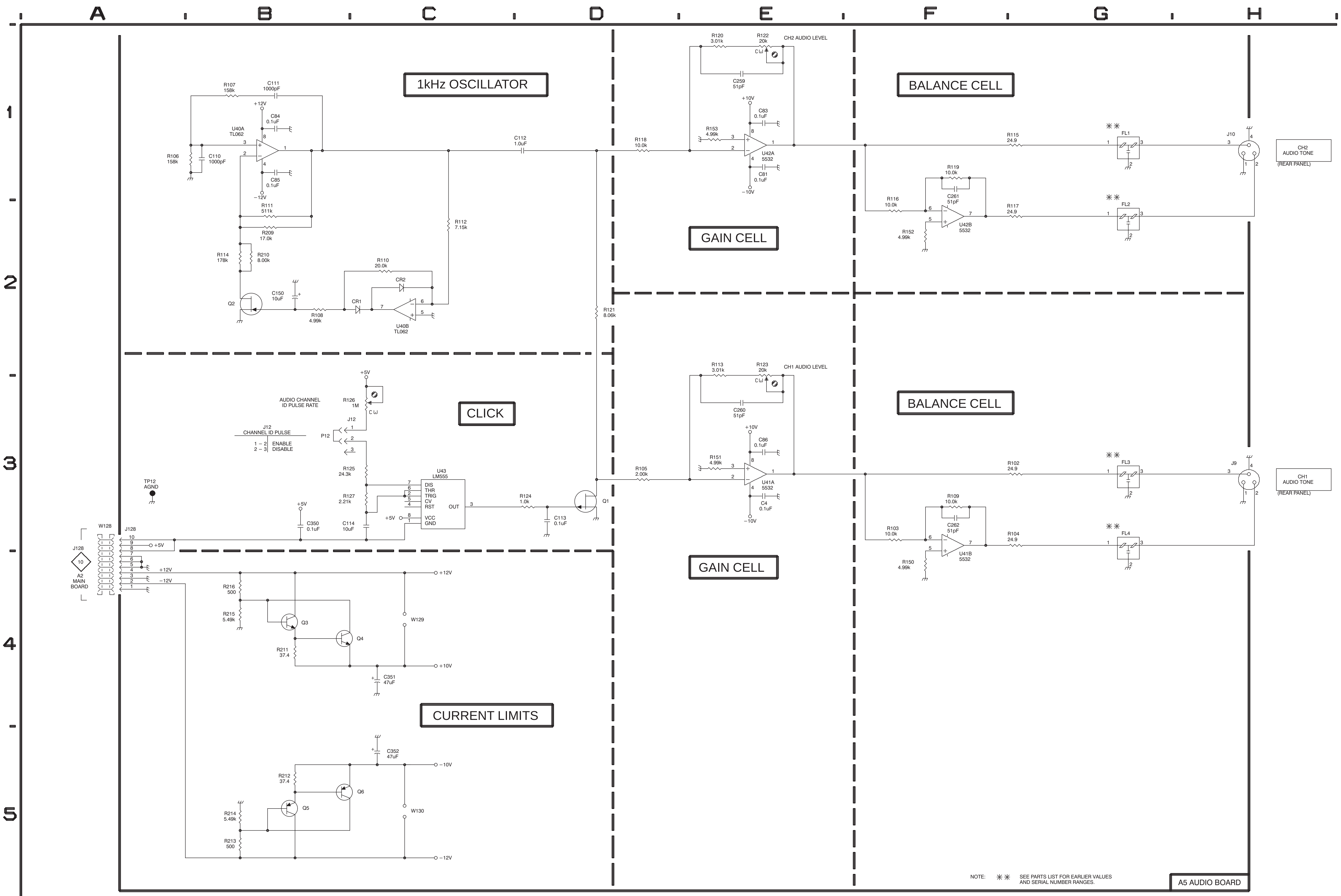
SCHEMATIC DIAGRAM <8> AUDIO BOARD

The schematic diagram and circuit board illustration has an alphanumeric grid to assist in locating parts within that diagram or board.

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4	E4	B1
C81	E2	B1
C83	E2	B2
C84	B2	C2
C85	B2	C2
C86	E3	B1
C110	B2	C2
C111	B1	C2
C112	D2	C1
C113	D4	C1
C114	C4	C1
C150	B3	D1
C259	E1	B2
C260	E3	B1
C261	F2	A2
C262	F4	A1
C350	B4	D1
C351	C4	D1
C352	C5	D2
CR1	C3	C1
CR2	C3	C1
J9	H4	A1
J10	H2	A2
J12	B3	D1
J128	A4	E1

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P12	B3	A2
Q1	D4	C1
Q2	B3	D1
R102	F4	A1
R103	F4	A1
R104	G4	A1
R105	D4	B1
R106	B2	C2
R107	B1	C2
R108	B3	D1
R109	F4	A1
R110	C2	C1
R111	B2	D2
R112	C2	C2
R113	E3	B1
R114	B2	D2
R115	F2	A2
R116	F2	A2
R117	G2	A2
R118	D2	B2
R119	F2	A2
R120	E1	B2
R121	D3	C1
R122	E1	B1
R123	E3	B1

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
R124	C4	C1
R125	C4	D1
R126	C3	E1
R127	C4	D1
R150	F4	A1
R151	E3	B1
R152	F2	A2
R153	E2	B2
R209	B2	D2
R210	B2	D2
TP12	A4	D2
U40A	B2	C2
U40B	C3	C2
U41A	E3	B1
U41B	F4	B1
U42A	E2	B2
U42B	F2	B2
U43	C4	C1
W129	B4	E1
W130	B5	E2


1kHz OSCILLATOR
CLICK
CURRENT LIMITS
GAIN CELL
GAIN CELL
BALANCE CELL
BALANCE CELL
CH2 AUDIO LEVEL
CH1 AUDIO LEVEL
CH2 AUDIO TONE (REAR PANEL)
CH1 AUDIO TONE (REAR PANEL)
AUDIO CHANNEL ID PULSE RATE
J12 CHANNEL ID PULSE
1 – 2 ENABLE
2 – 3 DISABLE
A2 MAIN BOARD
NOTE: ✱✱ SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES.
A5 AUDIO BOARD

Replaceable Mechanical Parts

Replaceable Mechanical Parts

This section contains a list of the replaceable mechanical components for the TSG130A. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

Using the Replaceable Mechanical Parts List

The tabular information in the Replaceable Mechanical Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find all of the information you need for ordering replacement parts. The following table describes the content of each column in the parts list.

Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. code	This indicates the code of the actual manufacturer of the part.
8	Mfr. part number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations

Abbreviations conform to American National Standard ANSI Y1.1–1972.

Chassis Parts

Chassis-mounted parts and cable assemblies are located at the end of the Replaceable Electrical Parts List.

Mfr. Code to Manufacturer Cross Index

The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

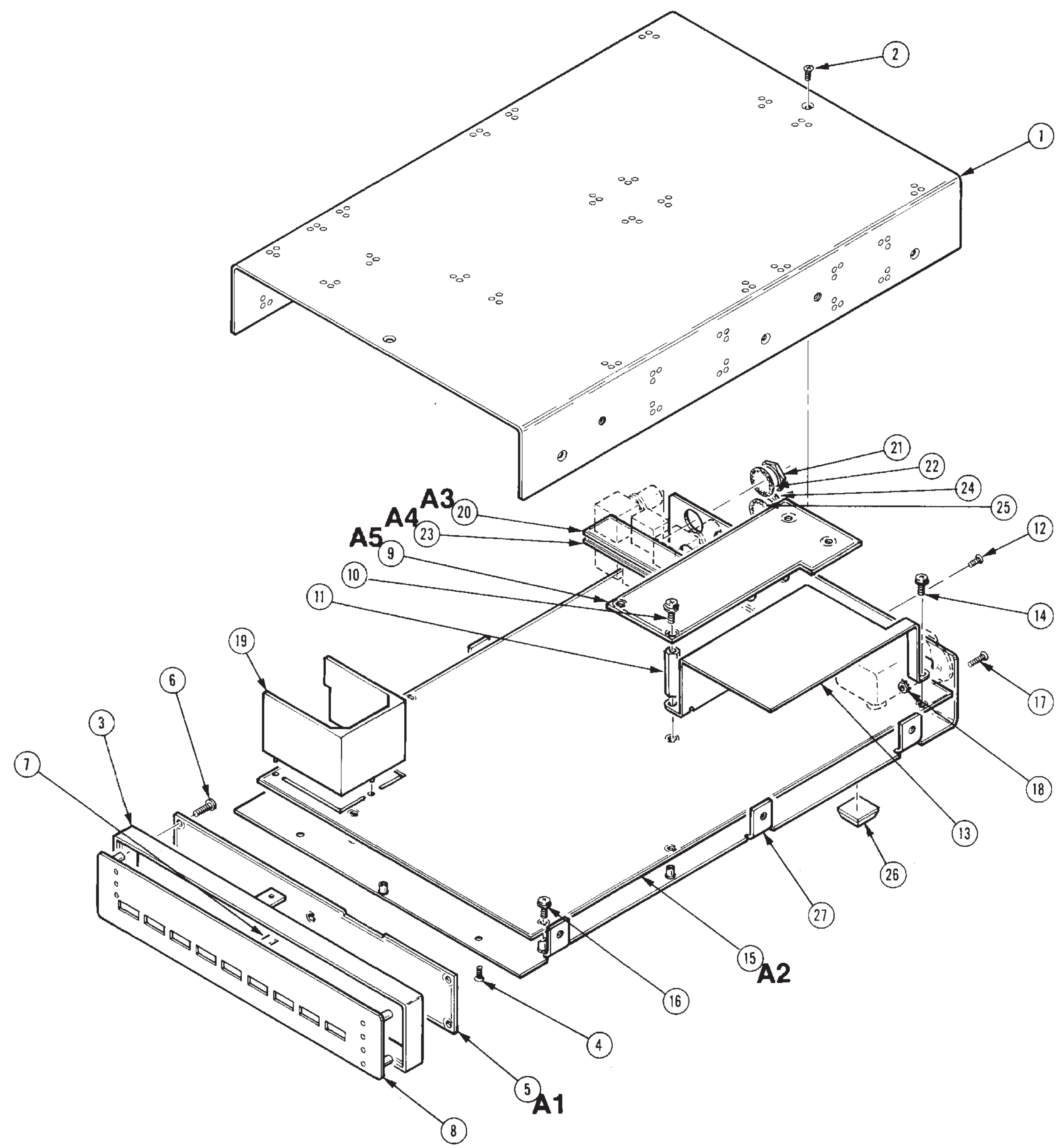
Mfr. code	Manufacturer	Address	City, state, zip code
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609–3320
TK0858	STAUFFER SUPPLY CO (DIST)		
TK1373	PATELEC–CEM (ITALY)	10156 TORINO	VAICENTALLO 62/45S ITALY
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
52152	MINNESOTA MINING AND MFG CO INDUSTRIAL TAPE DIV	3M CENTER	ST PAUL MN 55144–0001
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077–0001
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108–5181

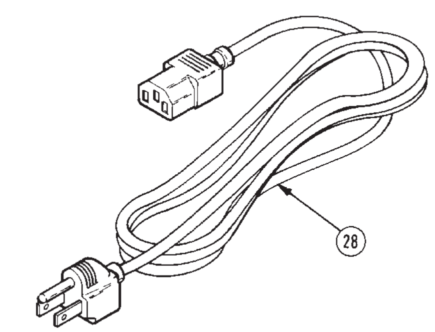
Replaceable mechanical parts list

Figure index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
1	200–3898–01			1	COVER,TOP:SAFETY CONTROLLED	80009	200–3898–01
					MOUNTING PARTS		
2	211–0119–00			8	SCREW,MACHINE:4–40 X 0.25,FLH,100 DEG,STL	93907	ORDER BY DESCR
					END MOUNTING PARTS		
3	426–2420–01			1	FRAME,FRONT:ALUMINUM	80009	426–2420–01
					MOUNTING PARTS		
4	211–0119–00			2	SCREW,MACHINE:4–40 X 0.25,FLH,100 DEG,STL	93907	ORDER BY DESCR
					END MOUNTING PARTS		
5	––––– –––––			1	CIRCUIT BD ASSY:FRONT PANEL		
					(SEE A1 REPL)		
					MOUNTING PARTS		
6	211–0244–00			5	SCR,ASSEM WSHR:4–40 X 0.312,PNH STL	TK0858	211–0244–00
7	129–1411–00			1	SPACER,POST:0.280 X 0.200,ABS	80009	129–1411–00
					END MOUNTING PARTS		
8	333–4038–00			1	PANEL,FRONT:SAFETY CONTROLLED	80009	333–4038–00
9	––––– –––––			1	CIRCUIT BD ASSY:AUDIO		
					(SEE A5 REPL)		
					MOUNTING PARTS		
10	211–0008–00	B010100	B019999	1	SCREW,MACHINE:4–40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	210–1171–00	B010100	B019999	1	WASHER,SHLDR:0.12 ID X 0.143 OD X 0.07 D	00261	A7148516P2
	211–0244–00	B020000		1	SCR,ASSEM WSHR:4–40 X 0.312,PNH STL	TK0858	211–0244–00
					END MOUNTING PARTS		
11	129–1394–00			1	SPACER,POST:1.05 SPACING,4–40 INT & 4–40 X0.187 EXT THD,0.250 HEX,STAINLESS STEEL	80009	129–1394–00
12	211–0101–00			4	SCREW,MACHINE:4–40 X 0.25,FLH,100 DEG,STL	93907	ORDER BY DESCR
13	337–3784–01			1	SHIELD,ELEC:TSG131A	80009	337–3784–01
					MOUNTING PARTS		
14	211–0244–00			1	SCR,ASSEM WSHR:4–40 X 0.312,PNH STL	TK0858	211–0244–00
					END MOUNTING PARTS		
15	––––– –––––			1	CIRCUIT BD ASSY:MAIN		
					(SEE A2 REPL)		
					MOUNTING PARTS		
16	211–0244–00			8	SCR,ASSEM WSHR:4–40 X 0.312,PNH STL	TK0858	211–0244–00
17	211–0025–00			2	SCREW,MACHINE:4–40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
18	210–0586–00			2	NUT,PL,ASSEM WA:4–40 X 0.25,STL CD PL	78189	211–041800–00
					END MOUNTING PARTS		
19	337–3750–00			1	SHIELD,ELEC:PLASTIC	80009	337–3750–00
	337–3892–00			1	SHIELD,ELEC:BE CU,CLIP ON,1 X 60	80009	337–3892–00

Replaceable mechanical parts list (Cont.)

Figure index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
20	——— ———			1	CIRCUIT BD ASSY:TOP BNC		
					(SEE A3 REPL)		
					MOUNTING PARTS		
21	220–0497–00			3	NUT,PLAIN,HEX:0.5–28 X 0.562 HEX,BRS CD PL	80009	220–0497–00
22	210–1039–00			3	WASHER,LOCK:0.521 ID,INT,0.025 THK,SST	24931	ORDER BY DESCR
					END MOUNTING PARTS		
23	——— ———			1	CIRCUIT BD ASSY:BOTTOM BNC		
					(SEE A4 REPL)		
					MOUNTING PARTS		
24	220–0497–00			4	NUT,PLAIN,HEX:0.5–28 X 0.562 HEX,BRS CD PL	80009	220–0497–00
25	210–1039–00			4	WASHER,LOCK:0.521 ID,INT,0.025 THK,SST	24931	ORDER BY DESCR
					END MOUNTING PARTS		
26	348–0844–00			4	PAD,CUSHIONING:0.05 SQ X 0.23 H,POLYURETHANE W/ PRESSURE SENS ADHESIVE	52152	SJ–5018–GRAY
27	200–3936–04			1	COVER,BOTTOM:SAFETY CONTROLLED	80009	200–3936–04
	334–3388–00			1	MARKER,IDENT:MARKED TEKTRONIX BEAVERTON	80009	334–3388–00
					STANDARD ACCESSORIES		
28	161–0066–00			1	CABLE ASSY,PWR:3,18AWG,98 L,SVT,GREY/BLK,60 DEG C,IEC BME X STR,IEC RCPT,10A/125V	80009	161–0066–00
	070–8664–05			1	MANUAL,TECH:INSTRUCTION; TSG130A	80009	070–8664–05
					OPTION ACCESSORIES		
	——— ———			1	TVGF11A:RACK MOUNT KIT		





TSG130A

TSG130A Mechanical parts exploded view