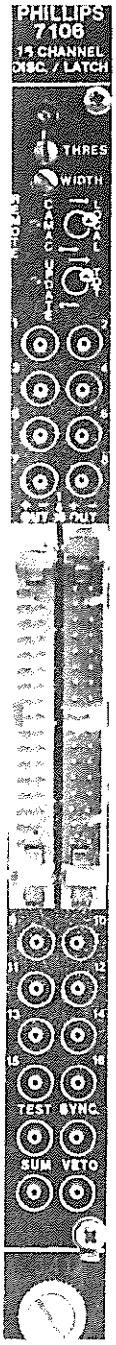
Phillips Scientific | 16 Channel Discriminator Latch | CAMAC MODEL 7106

FEATURES

- 16 Channels in a Single Width CAMAC Module
- 125 MHz Rate Capability <8 nSec Double Pulse Resolution
- Deadtimeless Updating or Time-Over-Threshold Operation
- Synchronized Operation - Retimed Output Mode
- Internal DATA LATCH captures output states at end of SYNC period
- Common Fast Veto or Individually masked inhibiting
- Local or Remote Modes of Operation
- Linear Summed Output - for Majority Logic Decisions
- Threshold range -10 mV to -1 Volt - CAMAC programmable
- Threshold level readable from CAMAC regardless of Mode
- Test Features allow easy testing of all Channels
- Two Differential ECL Outputs per Channel



DESCRIPTION

The model 7106 is a high-performance, 16 channel leading edge discriminator packaged in a single width CAMAC module. The most commonly asked for features have been designed into this discriminator, making it an extremely versatile instrument.

The 7106 threshold is variable from -10 mV to -1.033 Volts by either a front panel control when in LOCAL mode, or via CAMAC when in REMOTE mode. The module always powers up in the LOCAL mode which helps eliminate the possibility of having all the thresholds going to minimum, sometimes causing damage to sensitive detectors if the trigger rate were too high. The threshold can be measured at the front panel test point (voltage is ten times threshold) or may be read via CAMAC (10-bit ADC with 1 mV resolution) independent of the MODE of the module.

A linear summed output provides a -1 mA current for each channel that is active. By feeding the SUM output into a discriminator, the user can perform prompt majority logic decisions, selecting events based upon a minimum or maximum number of channels fired, often greatly simplifying the logic required for complex triggers.

Inhibiting of the discriminator can be performed by applying a NIM signal to the VETO input connector, which inhibits all 16 channels simultaneously. Individual channels may be masked (REMOTE mode only) by writing into the internal mask register via CAMAC. The mask register is disabled whenever the 7106 is in LOCAL mode.

The outputs can be retimed by applying a NIM signal to the SYNC input connector. The state of all channels will be held for the duration of the SYNC input signal. This feature allows the channel profile to be maintained while an event trigger processor captures the profile. In addition to freezing the outputs of the discriminator, the SYNC signal also causes the states of all outputs to be transferred into an internal 16-bit register for subsequent readout via CAMAC. The CAMAC read of the DATA LATCH returns (in addition to 16-bits of data) a Q=1 response, if and only if, a SYNC signal has occurred since the last read of the DATA LATCH. A Q=0 indicates that the DATA LATCH has not been updated since the last CAMAC read.

The 7106 can be used as an updating or Time-Over-Threshold (TOT) discriminator as selected with the front panel Update/TOT switch. The updating output is variable from 4.5 nSec to 110 nSec and will be extended should an input occur while the output is active. In the TOT mode, the output will equal the Time-Over-Threshold of the input or the Preset output duration, whichever is longer. A special TOT mode can be enabled (via internal jumper, one per channel) such that the output duration will equal

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5 nSec or the Time-Over-Threshold of the channel, whichever is longer. A mixture of both types of TOT mode can be used within one module. A front panel LED is on when the UPDATE mode is selected.

Connecting a NIM signal (5 nSec minimum duration to the TEST input connector will cause those channels not MASKED off to be triggered just as if a normal input signal exceeded the threshold of each channel. A CAMAC command has been included (F25) which when executed will cause all channels not MASKED off to be triggered in the same manner as the TEST input. There is one difference, the CAMAC command (F25) will only execute if the 7106 is in the REMOTE mode. The Q response to the F25 command will indicate whether or not the test pulse was generated. Q=1 means it was. The TEST feature, used in conjunction with the MASK register, allows user defined output patterns to be generated for testing complex triggers.

The front panel switch labeled CAMAC/LOCAL determines which features are programmable. When the switch is in the LOCAL position, CAMAC can only monitor the 7106; i.e., read THRESHOLD voltage and DATA LATCH contents. While in LOCAL the effects of the MASK register and internal Threshold DAC are disabled, but both registers can still be written into and read out. Switching between LOCAL and CAMAC will not alter the contents of any internal register. When the front panel switch is in the CAMAC position, the mode of the 7106 (LOCAL or REMOTE) is programmable via CAMAC. When programmed into the REMOTE mode, the THRESHOLD is controlled by an internal 10-bit DAC, and the MASK register is enabled. CAMAC can also force the 7106 into the LOCAL mode which is identical to positioning the switch to LOCAL with one exception and that is that CAMAC can force the unit back into the REMOTE mode (only if the switch is in CAMAC). A front panel LED is on when the 7106 is in the REMOTE mode.

INPUT CHARACTERISTICS

Signal Inputs:

One LEMO style connector per channel; 50 ohms ±1% direct coupled, reflections < ±2% for 3nSec risetime. Can withstand transients to ±100 Volts (2 amps) for 1 μSec with no damage to the inputs. Clamps at -5.5 Volts and +0.7 Volts. Offset < ±1 mVolt.

Threshold:

Common threshold for all 16 channels from -10 mV to -1.033 Volts ± 2 mV or ±2%, whichever is greater. Adjustable from a 15-turn front panel control when in LOCAL mode or a 10-bit DAC when in REMOTE mode. A front panel test point provides a DC voltage ten times the threshold setting ± 2%. The threshold can also be measured via CAMAC regardless of LOCAL/REMOTE (uses 10-bit ADC, -1 mV/bit). Input hysteresis is typically 4 mV.

Veto:

One LEMO style connector; Input common to all 16 channels; Accepts a normal NIM level (-500 mV or greater), 50 ohms direct coupled. Inhibits all channels, must precede the input pulse by 3 nSec and overlap the leading edge of the input signal by 2 nSec. Minimum width must be > 5 nSec.

Sync:

One LEMO style connector; Input common to all 16 channels. Accepts a normal NIM level (-500 mV or greater), 50 ohms direct coupled. Minimum width is 10 nSec. The state of the outputs at the time the SYNC occurs are held for the duration of the SYNC pulse. The output states are transferred to a DATA LATCH at the trailing edge of the SYNC pulse. The SYNC pulse duration must be > 40 nSec if the DATA LATCH feature is used.

Test Input:

One LEMO style connector; Input common to all 16 channels. Accepts a normal NIM level (-500 mV or greater), 50 ohms direct coupled. Minimum input width is 5 nSec. Threshold must be set to -50 mV or less for Test signal to trigger all un-masked channels.

OUTPUT CHARACTERISTICS

Signal Outputs:

Two ECL outputs per channel producing -.8 Volts and -1.6 Volts across 100 ohms. Ideal for driving flat twisted pair cables. Output risetimes and falltimes are typically 1.5 nSec.

Output Duration:

A front panel switch (UPDATE/TOT) allows either Updating or Time-Over-Threshold (TOT) operation common to all 16 channels.

Updating: The output width is preset via front panel 15-turn screwdriver adjustment, continuously variable from 4.5 nSec to 110 nSec with a stability of ±.15%/°C of setting. Width uniformity of .5nSec or 5%, whichever is greater.

TOT: The normal TOT mode (no internal jumpers) provides an output equal to the duration of the TOT of the input or the preset width, whichever is longer. (The preset width is common to all 16 channels). The special TOT mode (enabled via jumper on a per channel basis) provides an output equal to 5 nSec or the TOT whichever is longer, independent of the preset width setting.

Sum Output:

One LEMO style connector; Output common to all 16 channels; -1 mA output pulse (-50 mV into 50 ohms) for each channel triggered. Output duration is equal to the output width of the respective channel. Output risetimes and falltimes are less than 3 nSec into 50 ohms. Maximum output before internal clamping takes place is -1.8 volts.

CAMAC COMMANDS

N F(0) A(0):

Reads back the contents of the MASK register (R1-R16), channel one of the discriminator is associated with bit R1 (Q, X response =1).

N F(0) A(1):

Reads the contents of the internal DATA LATCH (R1-R16). X is always returned =1, but Q=1 only if a SYNC input occurred since the last read DATA LATCH command. (N F(0) A(1) Channel one is associated with bit R1. A bit=1 means the associated channel was active when SYNC pulse occurred.

N F(1) A(0):

Reads back the contents of the internal DAC threshold register (R1-R10). (Q and X response always returned =1). The internal DAC controls the threshold of the unit only when the unit is in the REMOTE mode. The DAC register can be read back independent of the mode of the unit.

N F(1) A(1):

Reads the current threshold level and status (independent of the mode of the 7106), R1-R10, R14-R16, Q and X response always =1.
R1-R10: ADC reading, -1 mV/bit conversion gain

R14: Reflects the state of the SYNC input at the time the N F(1) A(1) command executes.
1 = No SYNC present,
0 = SYNC is present.
R15: 1 = Time-Over-Threshold mode in effect.
0 = UPDATE mode is in effect.
R16: 1 = LOCAL mode is in effect
0 = REMOTE mode is in effect

In addition to returning the threshold level and status, another conversion is automatically started at S2 time. The user should wait at least 500 μSec following major DAC threshold changes before reading the threshold with the N F(1) A(1) command. the N F(17) A(1) command can be used to start an ADC cycle.

N F(16) A(0):

Writes into the MASK register (W1-W16), always returns Q and X equal to one. The contents of the MASK register have affect only when the 7106 is in the REMOTE mode of operation. When in REMOTE, writing a zero into a bit position will disable the channel associated with that bit. (Channel one is associated with W1, channel 16 with W16.) The MASK register may be written into and read out independent of the mode of the 7106.

N F(17) A(0):

Writes into the internal Threshold DAC register (W1-W10), always returns Q and X equal to one. The Threshold DAC only controls the threshold level of the unit while the 7106 is in the REMOTE mode of operation. The conversion gain is -(10 mV + 1 mV/bit), which spans -10 mV to -1.033 Volts. The Threshold DAC register may be written into or read out independent of the mode of operation of the 7106. Allow 1 mSec settling time for DAC changes greater than 10% of full scale.

N F(17) A(1):

Starts a Threshold ADC cycle, always returns Q and X equal to one. The ADC cycle lasts 60 μSEC max. Note that the read Threshold command also starts a new conversion at S2 time.

N F (24) A(0):

Clears the internal mode bit at S1 Time. If the front panel control CAMAC/LOCAL is in the CAMAC position then clearing the internal mode bit will force the 7106 into the LOCAL mode of operation. Always returns Q and X equal to one.

N F(25) A(0):

Generates a test input to all channels not MASKED off if the 7106 is in the REMOTE mode of operation. If the unit is in LOCAL, then no test cycle is initiated. X is always returned equal to one, but Q is returned equal to one only if a test cycle was generated.

N F(26) A (0):

Sets the internal mode bit at S1 time. If the front panel control CAMAC/LOCAL is in the CAMAC position then setting the internal mode bit will force the 7106 into the REMOTE mode of operation. If the control is in LOCAL, the unit remains in LOCAL (the internal mode bit is still set, but it does not change the mode of the unit). (Always returns Q and X equal to one.)

N F(27) A(0):

Returns Q=1 if the unit is in REMOTE else Q=0. X is always returned equal to one.

Z:

Upon receipt of the Z at S2 time, the following actions take place.

The internal mode bit is cleared. (insures LOCAL mode is in effect) The MASK register is loaded with all ones. The Threshold DAC is set to -1.033 Volts.

GENERAL CHARACTERISTICS

Rate:
125 MHz minimum input to output, typically 140 MHz.

Double-Pulse Resolution:
Less than 8 nSec; typically 7 nSec with output width set at minimum.

Time Slewing:
Less than 600 pSec for inputs from two times threshold to 20 times threshold, for 1 nSec input risetimes.

Input to Output Delay:
Signal input to output less than 11 nSec. Test input to output less than 15 nSec.

Multiple Pulsing:
None

Power Supply Requirements (Maximum)

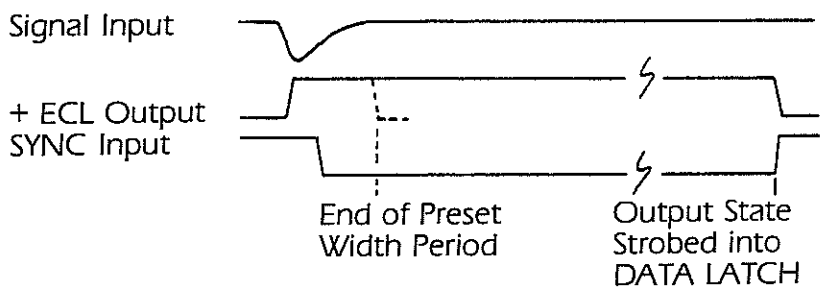
-6 V @ 3.0 Amps	-24 V @ 30 mA
+6 V @ 1.0 Amps	+24 V @ 200 mA

Operating Temperature:
0°C to 60°C ambient.

Packaging:
Standard single width CAMAC module in accordance with ESONE Report EUR 4100.

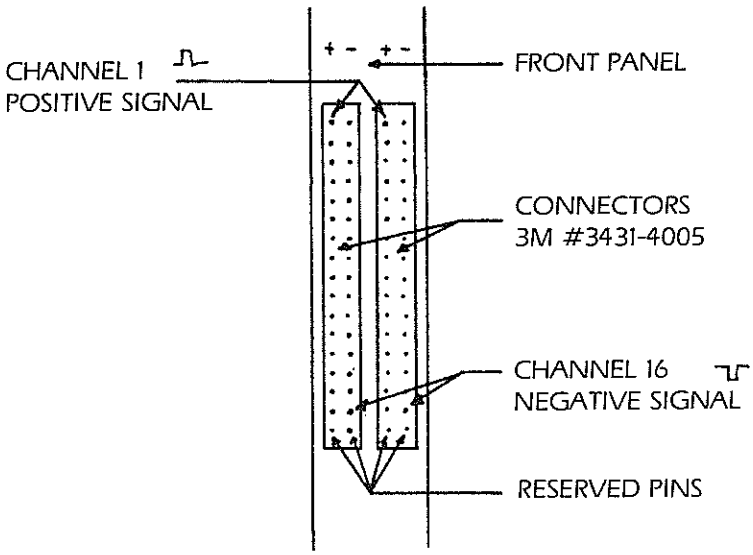
Quality Control:
Standard 36-hour, cycled burn-in with switched power cycles.

LATCHED OPERATION



The state of the ECL outputs at the time the SYNC input occurs are held for the duration of the SYNC input pulse. The output states are transferred into a DATA LATCH at the trailing edge of the SYNC input. The DATA LATCH can be read via CAMAC.

OUTPUT SIGNAL CONNECTOR



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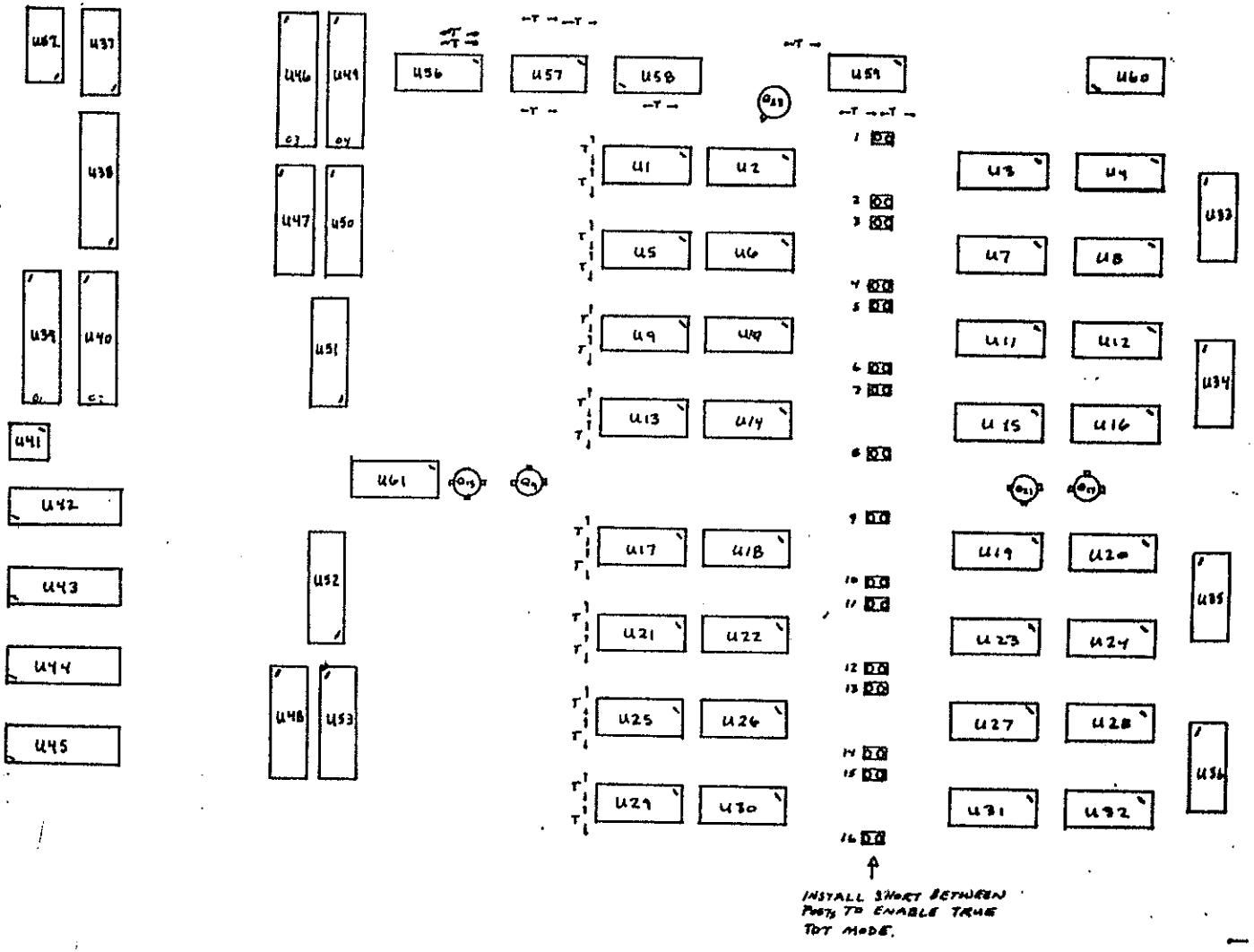

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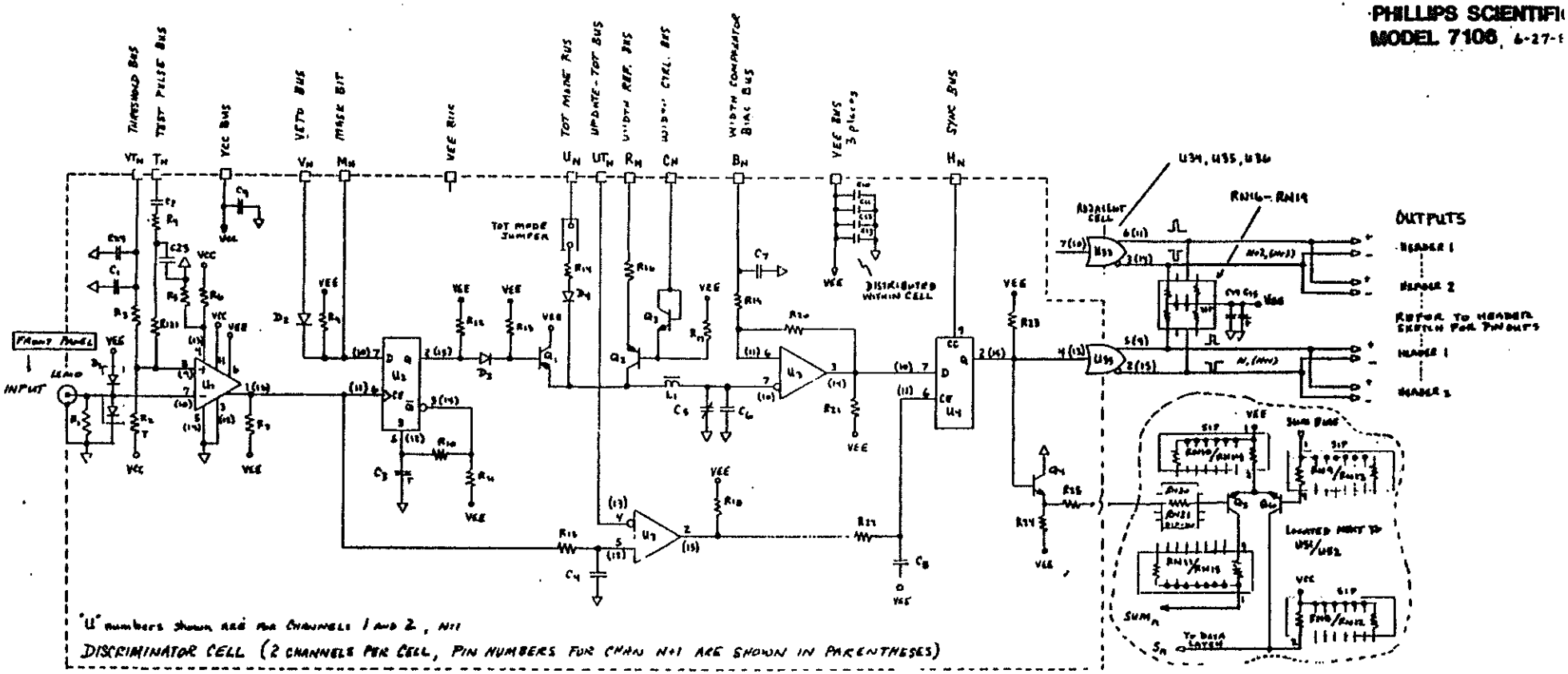
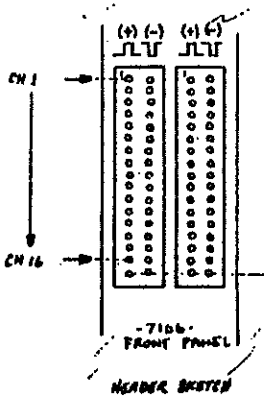
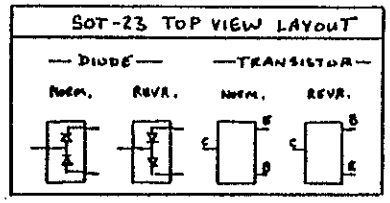
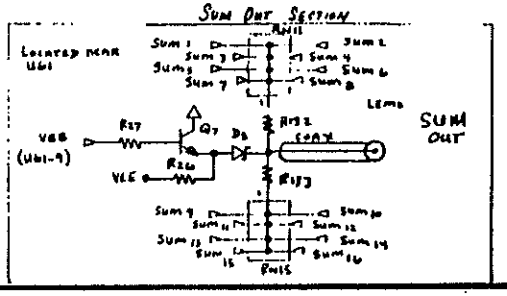








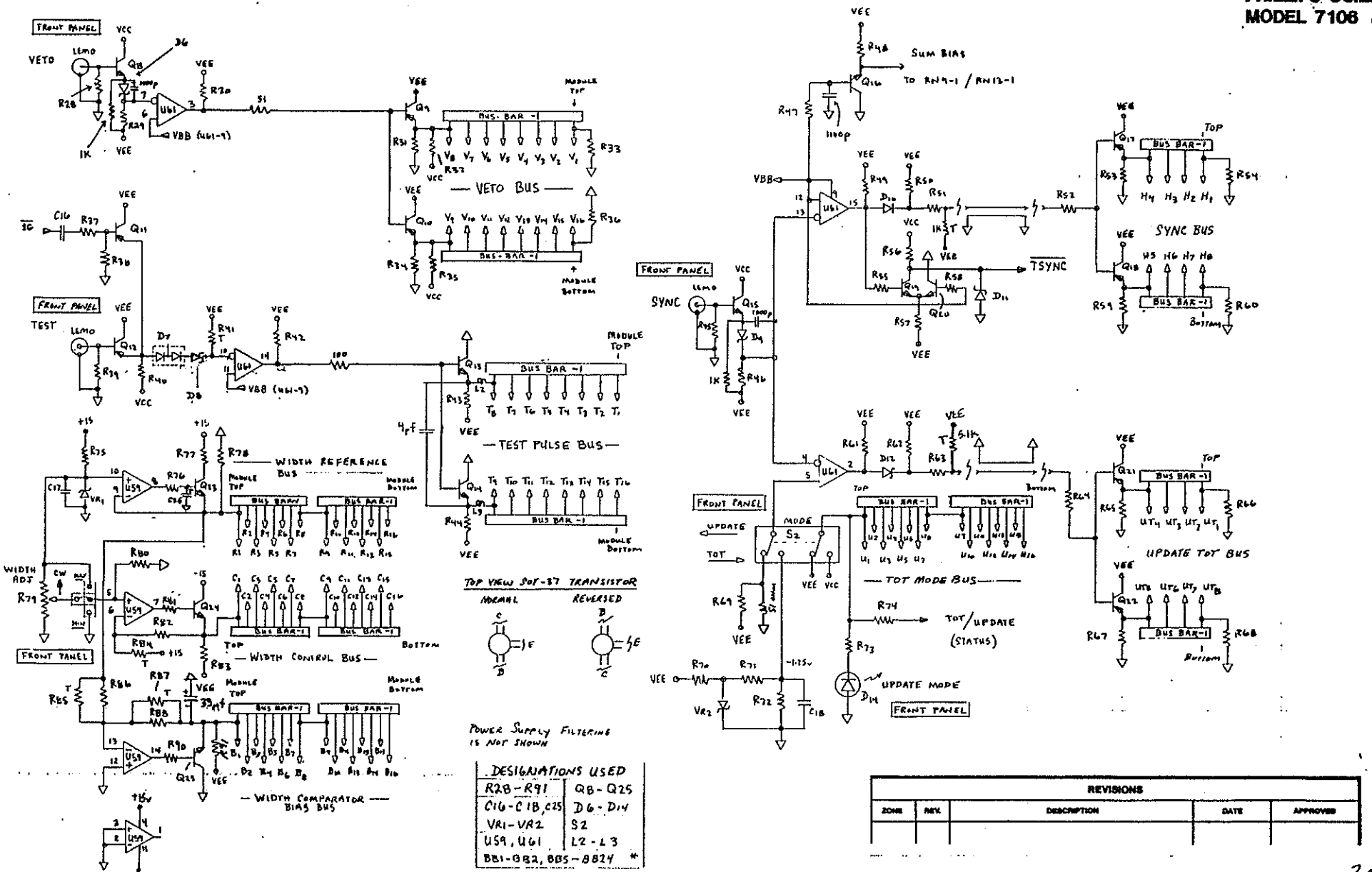
CHANNELS	U NUMBERS	
1, 2	U1 - U4, U33	TOP OF MODULE
3, 4	U5 - U8, U33	
5, 6	U9 - U12, U34	
7, 8	U13 - U16, U34	
9, 10	U17 - U20, U35	
11, 12	U21 - U24, U35	
13, 14	U25 - U28, U36	
15, 16	U29 - U32, U36	BOTTOM OF MODULE

DESIGNATIONS USED

R-RN, RN-RN	L1
C1-C15, C23-24	RN8 - RN19
Q1 - Q7	D1 - D5
U1 - U36	R32 - R33

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

1 of 4



DESIGNATIONS USED	
R28 - R91	Q8 - Q25
C16 - C18, C25	D6 - D14
VR1 - VR2	S2
U59, U61	L2 - L3
BB1-BB2, BB5-BB24 *	

* VCC AND VEE USE BB7,8 AND BB13,14,17,18 RESPECTIVELY

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

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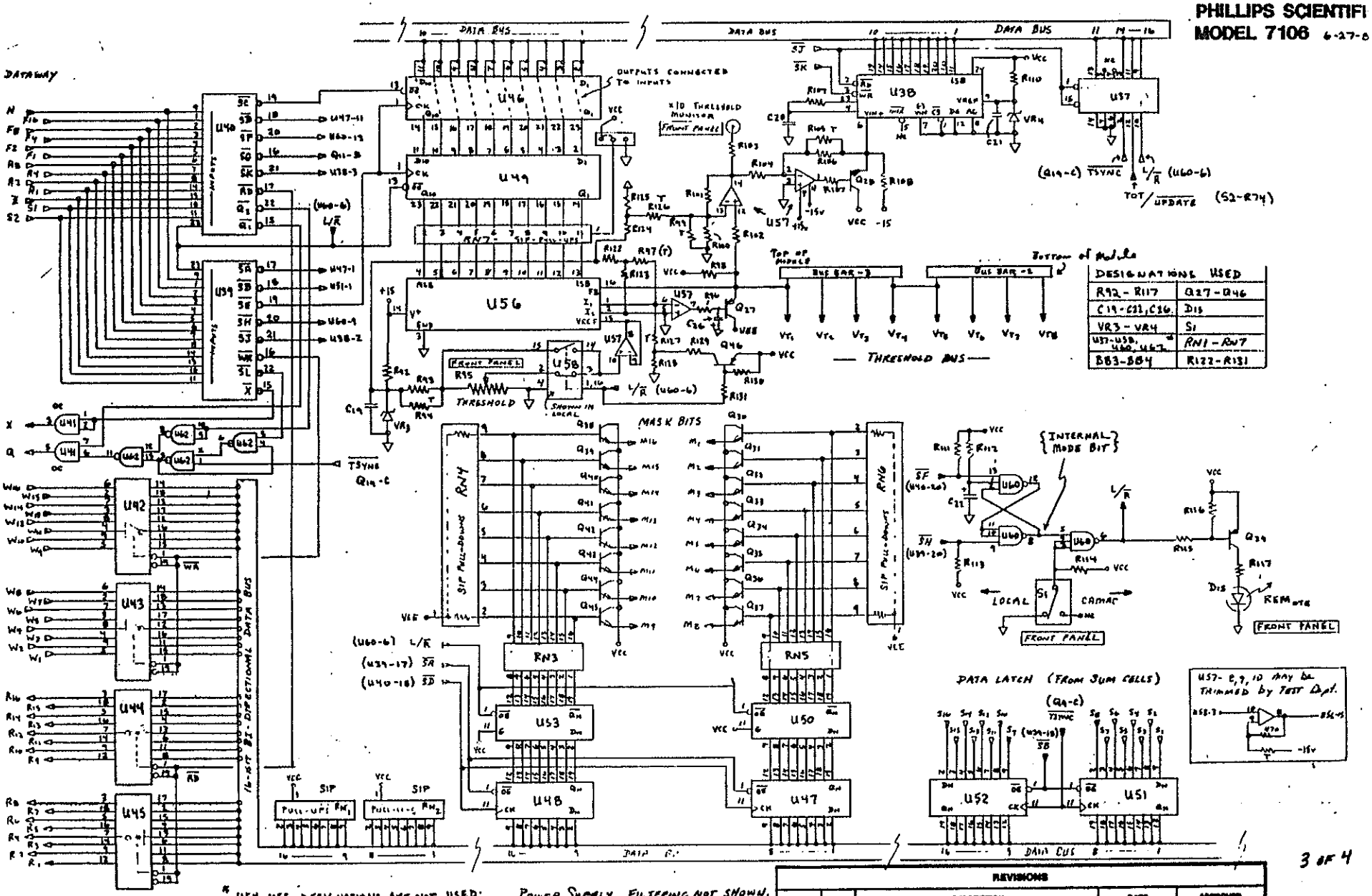
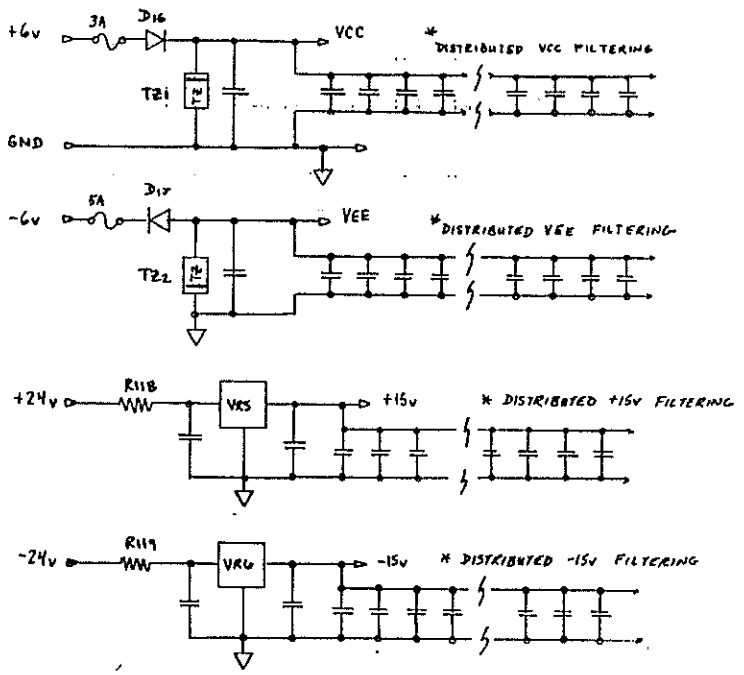


DESIGNATIONS USED	
R92 - R117	Q27 - Q46
C19 - C21, C36	Dis
VR3 - VR4	S1
U37 - U38, U60, U62	RN1 - RN7
BB3 - BB4	R122 - R131

* U54, U55 DESIGNATIONS ARE NOT USED; POWER SUPPLY FILTERING NOT SHOWN.

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

Dataway Power



* NOT ALL CAPACITORS ARE SHOWN

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

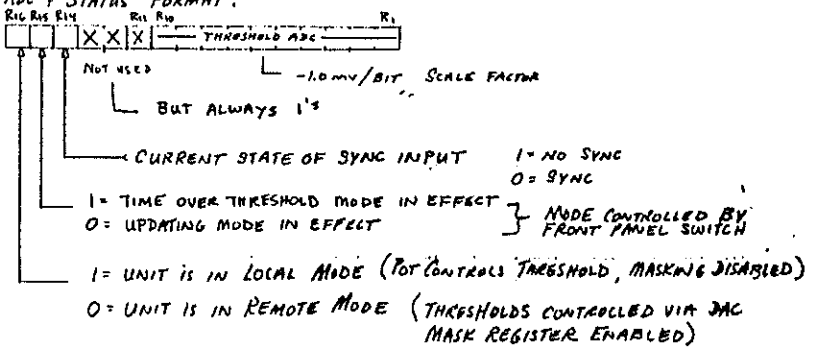
Strobe Signals Vs Camac Cycles

STROBE	Camac Cycle(s)	Q	Action
$\overline{SA}$ U39-17	N·F0·A0	R1-R16	U47,U48 READ BACK MASK REG
$\overline{SB}$ U39-18	N·F0·A1	R1-R16	U51,U52 Q=1 IF DMA READ DATA LATCH Q=0 IF NO DATA
$\overline{SC}$ U40-19	N·F1·A0	R1-R10	U46 READ BACK THRESHOLD DAC REG.
$\overline{SD}$ U40-18	N·F16·A0·S1 + $\overline{Z}$S2 ①	W1-W16	U47,U48 WRITE PATTERN INTO MASK REG.
$\overline{SE}$ U39-19	N·F17·A0·S1 + $\overline{Z}$S2 ①	W1-W10	U46 WRITE INTO THRESHOLD DAC REG
$\overline{SF}$ U40-20	N·F24·A0·S1 + Z S2 ①	X	U60 CLEARS INTERNAL MODE BIT
$\overline{SG}$ U40-16	N·F25·A0·S2	X	TRIGGERS TEST PULSE IF 7106 IS IN REMOTE MODE (Q=1) ELSE NO ACTION IS TAKEN (Q=0)
$\overline{SH}$ U39-20	N·F26·A0·S1	X	U60 SETS INTERNAL MODE BIT (STARTS ANOTHER CONVERSION @ S2.) ③
$\overline{SJ}$ U39-21	N·F1·A1 ②	R1-R11, R14-16	U38 READ THRESHOLD (ADC) AND STATUS
$\overline{SK}$ U40-21	N·F17·A1·S1 + N·F1·A1·S2	X	START THRESHOLD ADC CYCLE ②
$\overline{SL}$ U39-22	N·F0·A1·S2 + $\overline{Z}$·S2 ①		RESETS THE DATA LATCH'S Q-RESPONSE FLIP AT S2 TIME (SYNC SETS IT)

Notes:

① THE ZS2 TERMS SHOWN DO NOT GENERATE A Q AND X RESPONSE

② READ ADC & STATUS FORMAT:



③ AN ADC CYCLE IS AUTOMATICALLY STARTED AFTER A READ ADC (N·F1·A1) COMMAND.

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
R1	16	006551R1	51.1 ohms ±1%
R2	16		Trim Resistor 1/8 W CF 5%
R3	16	001051R0	51 ohms 1/8 W CF 5%
R4	16	00101000	100 ohms 1/8 W CF 5%
R5	16	001051R0	51 ohms 1/8 W CF 5%
R6	16	00101202	12K 1/8 W CF 5%
R7	16	00714700	470 ohms Chip Resistor 5%
R8			Not Used
R9	16	00711001	1K Chip Resistor 5%
R10	16	001075R0	75 ohms 1/8 W CF 5%
R11	16	00714700	470 ohms Chip Resistor 5%
R12	16	00714700	470 ohms Chip Resistor 5%
R13	16	00101001	1K 1/8 W CF 5%
R14	16	00716800	680 ohms Chip Resistor 5%
R15	16	00101000	100 ohms 1/8 W CF 5%
R16	16	00716820	682 ohms Chip Resistors ±2%
R17	16	00717501	7.5K ohms Chip Resistor ±5%
R18	16	00711001	1K ohms Chip Resistor ±5%
R19	16	00101000	100 ohms 1/8 W CF 5%
R20	16	00711000	100 ohms Chip Resistor ±5%
R21	16	00711001	1K ohms Chip Resistor ±5%
R22	16	00711000	100 ohms Chip Resistor ±5%
R23	16	00711001	1K ohms Chip Resistor ±5%
R24	16	00105100	510 1/8 W CF 5%
R25	16	001091R0	91 ohms 1/8 W CF 5%
R26	1	00101001	1K 1/8 W CF 5%
R27	1	00101000	100 ohms 1/8 W CF 5%
R28	1	001051R0	51 ohms 1/8 W CF
R29	1	00711001	1K Chip Resistor 5%
R30	1	00714700	470 Chip Resistor 5%
R31	1	007151R0	51 ohms Chip Resistor 5%
R32	1	00112200	220 ohms 1/4 W CF 5%
R33	1	007151R0	51 ohms Chip Resistor
R34	1	001051R0	51 ohms 1/8 W CF 5%
R35	1	00112200	220 1/4 W CF 5%
R36	1	007151R0	51 ohms Chip Resistor
R37	1	00103600	360 1/8 W CF 5%
R38	1	00101800	180 1/8 W CF 5%
R39	1	001051R0	51 ohms 1/8 W CF 5%
R40	1	00102000	200 ohms 1/8 W CF 5%
R41	1	00713300	330 Chip Resistor 5%
R42	1	00714700	470 ohms Chip Resistor 5%
R43	1	00713300	330 ohm Resistor 5%
R44	1	00713300	330 ohms Chip Resistor 5%
R45	1	001051R0	51 ohms 1/8 W CF 5%
R46	1	00711001	1K Chip Resistor 5%
R47	1	00101000	100 ohms 1/8 W CF 5%
R48	1	00103300	330 1/8 W CF 5%
R49	1	00714700	470 Chip Resistor
R50	1	00101001	1K 1/8 W CF 5%

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
R51	1	001051R0	51 ohms 1/8 W CF 5%
R52	1	00102R70	2.7 ohms 1/8 W CF 5%
R53	1	001051R0	51 ohms 1/8 W CF 5%
R54	1	007151R0	51 ohms Chip Resistor
R55	1	00101000	100 ohms 1/8 W CF 5%
R56	1	00101001	1K 1/8 W CF 5%
R57	1	00714700	470 Chip Resistor
R58	1	00101000	100 ohms 1/8 W CF 5%
R59	1	001051R0	51 ohms 1/8 W CF 5%
R60	1	007151R0	51 ohms Chip Resistor
R61	1	00714700	470 Chip Resistor
R62	1	00101001	1K 1/8 W CF 5%
R63	1	001091R0	91 ohms 1/8 W CF 5%
R64	1	00102R70	2.7 ohms 1/8 W CF 5%
R65	1	001051R0	51 ohms 1/8 W CF 5%
R66	1	007151R0	51 ohms Chip Resistor
R67	1	001051R0	51 ohms 1/8 W CF
R68	1	007151R0	51 ohms Chip Resistor
R69	1	00106800	680 1/8 W CF
R70	1	00104700	470 1/8 W CF
R71	1	00104700	470 1/8 W CF
R72	1	00104700	470 1/8 W CF
R73	1	00104700	470 1/8 W CF
R74	1	00105101	5.1 K 1/8 W CF
R75	1	00101601	1.6K 1/8 W CF
R76	1	00101000	100 1/8 W CF
R77	1	003439R0	39 ohms 2 W
R78	1	00101001	1K 1/8 W CF 5%
R79	1	05101002	10K 15-turn Pot.
R80	1	00101004	1 M 1/8 W CF 5%
R81	1	00101000	100 ohms 1/8 W CF
R82	1	00101001	1K 1/8 W CF 5%
R83	1	00105101	5.1K W CF 5%
R84	1		Trim Resistor 1/8 W CF 5%
R85	1		Trim Resistor 1/8 W CF 5%
R86	1	00102002	20K 1/8 W CF 5%
R87	1		Trim Resistor 1/8 W CF 5%
R88	1	00103601	3.6K 1/8 W CF 5%
R89			Not Used
R90	1	00101000	100 ohms 1/8 W CF 5%
R91	1	00103900	390 ohms 1/8 W CF 5%
R92	1	00101601	1.6K 1/8 W CF 5%
R93	1	00107502	75K 1/8 W CF 5%
R94	1		Trim Resistor 1/8 W CF 5%
R95	1	05101002	10K 15-Turn Pot.
R96	1	00101000	100 ohms 1/8 W CF 5%
R97	1		Trim Resistor
R98	1	00105100	510 ohms 1/8 W CF 5%
R99	1		Trim Resistor 1/8 W CF 5%
R100	1	00101101	1.1K 1/8 W CF 5%
R101	1	00109101	9.1K 1/8 W CF 5%
R102	1	00101002	10K 1/8 W CF 5%
R103	1	00101001	1K 1/8 W CF 5%
R104	1	00109101	9.1K 1/8 W CF 5%
R105	1		Trim Resistor

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
R106	1	00102401	2.4K 1/8 W CF 5%
R107	1	00101000	100 1/8 W CF 5%
R108	1	00101002	10K 1/8 W CF 5%
R109	1	00101502	15K 1/8 W CF 5%
R110	1	00104700	470 ohms 1/8 W CF 5%
R111	1	00711001	1K Chip Resistor 5%
R112	1	00102002	20K 1/8 W CF 5%
R113	1	00711001	1K Chip Resistor 5%
R114	1	00711001	1K Chip Resistor 5%
R115	1	00105101	5.1K 1/8 W CF 5%
R116	1	00102001	2K 1/8 W CF 5%
R117	1	00104700	470 1/8 W CF 5%
R118	1	003427R0	27 ohms 2 W MF 5%
R119	1	001233R0	33 ohms 1/2 W CF 5%
R120			Not Used
R121	16	00711000	100 ohms Chip Resistors ±5%
R122	1	00101002	10K 1/8 W CF 5%
R123	1	001051R0	51 ohms 1/8 W CF 5%
R124	1	00101002	10K 1/8 W CF 5%
R125	1	00101001	1K ohms 1/8 W CF 5%
R126	1		Trim Resistor 1/8 W CF 5%
R127	1		Trim Resistor 1/8 W CF 5%
R128	1	007151R0	51 ohms Chip Resistor 5%
R129	1	00711002	10K ohms Chip Resistor 5%
R130	1	00711002	10K Chip Resistor 5%
R131	1	00715101	5.1K Chip Resistor 5%
R132	1	007122R0	22 ohms Chip Resistor 5%
R133	1	007122R0	22 ohms Chip Resistor 5%
RN1	1	00801002	10K SIP R-Network 10-Pin
RN2	1	00801002	10K SIP R-Network 10-Pin
RN3	1	00935101	5.1K DIP R-Network 16-Pin
RN4	1	00806801	6 8K SIP R-Network 10-Pin
RN5	1	00935101	5.1K DIP R-Network 16-Pin
RN6	1	00806801	6.8K SIP R-Network 10-Pin
RN7	1	00811002	10K SIP R-Network 12-Pin
RN8	1	00805601	5.6K SIP Resistor 10-Pin ±2%
RN9	1	00801000	100 ohms SIP Resistor 10-Pin ±2%
RN10	1	00802701	2.7K SIP Resistor 10-Pin ±2%
RN11	1	008033R0	33 ohms SIP Resistor 10-Pin ±2%
RN12	1	00805601	5.6K ohms SIP Resistor Network 10-Pin
RN13	1	00801000	100 ohms SIP Resistor Network 10-Pin
RN14	1	00802701	2.7K ohms SIP Resistor Network 10-Pin ±2%
RN15	1	008033R0	33 ohms SIP Resistor Network 10-Pin
RN16	1	00803300	330 ohms SIP Resistor Network 10-Pin
RN17	1	00803300	330 ohms SIP Resistor Network 10-Pin
RN18	1	00803300	330 ohms SIP Resistor Network 10-Pin
RN19	1	00803300	330 ohms SIP Resistor Network 10-Pin
RN20	1	00931000	100 ohms DIP-16 Resistor Network (may be 8 ea. 100 ohms 1/8W CF)
RN21	1	00931000	100 ohms DIP-16 Resistor Network (may be 8 ea. 100 ohms 1/2 W CF)

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
C1	8	10151003	.1 mfd Mono-Cap
C2	16	101050P0	50 pfd NPO Ceramic
C3	16	10108P00	8 pfd NPO Ceramic
C4	16	101030P0	30 pfd NPO Ceramic Leader
C5	16	13000029	5-20 pfd Trim Cap (9629)
C6	16	101215P0	15 pfd NPO Chip (MP)
C7	8	10121003	.1 mfd Chip Cap.
C8	16	101215P0	15 pfd Chip Cap
C9	16	10121003	.1 mfd Chip Cap
C10	64	10121003	.1 mfd Chip Cap
C11	8	10121003	.1 mfd Chip Cap
C12	8	10121003	.1 mfd Chip Cap
C13	8	10121003	.1 mfd Chip Cap
C14	4	10151003	.1 mfd Mono Cap
C15	4	10813304	33 mfd 10 WVDC Cap
C16	1	10101002	.01 mfd Ceramic
C17	1	10151003	.1 mfd Mono Cap
C18	1	10151003	.1 mfd Mono Cap
C19	1	10151003	.1 mfd Mono Cap
C20	1	10101000	100 pfd NPO Cap
C21	1	10151003	.1 mfd Mono Cap
C22	1	10813304	33 mfd @ 10 V
C23	16	101210P0	10 pfd Chip Cap
C24	8	10121001	1000 pfd Chip Cap
C25	1	10813304	33 mfd 10 WVDC Cap
C26	1	10813304	33 mfd 10 WVDC Cap
L1	16	14000003	Ferrite Bead - Thin Wall
L2	1	14000001	3.9 mh Bead Material
L3	1	14000001	3.9 mh Bead Material
D1	16	2005AV99	BAV99 Diode Pair - SOT 23
D2	16	20004448	1N4448
D3	16	20004448	1N4448
D4	16	20004448	1N4448
D5	1	20202835	2835
D6	1	20202835	2835
D7	1	2005AV99	BAV99 Diode Pair - SOT 23
D8	1	20282835	2835
D9	1	20202835	2835
D10	1	20004448	1N4448
D11	1	20202835	2835
D12	1	20202835	2835
D13	1	20004448	1N4448
D14	1	21000000	Red LED T-1
D15	1	21000000	Red LED T-1
D16	1	20005404	1N5404
D17	1	20005404	1N5404

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
Q1	16	2420T920	BFT92 PNP SOT 23
Q2	16	2420T920	BFT92 PNP SOT 23
Q3	16	2420R920	BFR92 NPN SOT 23
Q4	16	2420R920	BFR92 NPN SOT 23
Q5	16	2420R920	BFR92 NPN SOT 23
Q6	16	2420R920	BFR92 NPN SOT 23
Q7	1	24203904	MMBT3904 NPN SOT 23
Q8	1	2420R920	BFR92 NPN SOT 23
Q9	1	2421Q320	BFQ32 PNP SOT 37
Q10	1	2421Q320	BFQ32 PNP SOT 37
Q11	1	2420T920	BFT92 PNP SOT 23
Q12	1	2420T920	BFT92 PNP SOT 23
Q13	1	2421R960	BFR96 NPN SOT 37
Q14	1	2421R960	BFR96 NPN SOT 37
Q15	1	2420R920	BFR92 NPN SOT 23
Q16	1	24203904	MMBT3904 NPN SOT 23
Q17	1	2421Q320	BFQ32 PNP SOT 37
Q18	1	2421Q320	BFQ32 PNP SOT 37
Q19	1	2420R920	BFR92 NPN SOT 23
Q20	1	2420R920	BFR92 NPN SOT 23
Q21	1	2421Q320	BFQ32 PNP SOT 37
Q22	1	2421Q320	BFQ32 PNP SOT 37
Q23	1	24002219	2N2219A TO-39
Q24	1	24003904	2N3904 TO-92
Q25	1	24003904	2N3904 TO-92
Q26			Not Used
Q27	1	24003906	2N3906 PNP TO-92
Q28	1	24003904	2N3904 NPN TO-92
Q29	1	24003906	2N3906 PNP TO-92
Q30	1	24203904	MMBT3904 SOT-23
Q31	1	24203904	MMBT3906 SOT-23
Q32	1	24203904	MMBT3904 SOT-23
Q33	1	24203904	MMBT3904 SOT-23
Q34	1	24203904	MMBT3904 SOT-23
Q35	1	24203904	MMBT3904 SOT-23
Q36	1	24203904	MMBT3904 SOT-23
Q37	1	24203904	MMBT3904 SOT-23
Q38	1	24203904	MMBT3904 SOT-23
Q39	1	24203904	MMBT3904 SOT-23
Q40	1	24203904	MMBT3904 SOT-23
Q41	1	24203904	MMBT3904 SOT-23
Q42	1	24203904	MMBT3904 SOT-23
Q43	1	24203904	MMBT3904 SOT-23
Q44	1	24203904	MMBT3904 SOT-23
Q45	1	24203904	MMBT3904 SOT-23
Q46	1	24203906	MMBT3906 SOT-23
U1	8	30506687	6687 Comparator IC
XU1	8	40000016	16 Pin DIP Socket
U2	8	3510H131	MC10H131P IC
XU2	8	40000016	16 Pin DIP Sockets

PARTS LIST - MODEL 7106 ECO No. 1001

Ident.	Qty.	Part Number	Description
U3	8	3510H115	MC10H115P IC
XU3	8	40000016	16 Pin DIP Socket
U4	8	3510H130	MC10H130P IC
XU4	8	40000016	16 Pin DIP Sockets
FU4	8	14000006	16 Pin Ferrite Plate
U33	4	3510101P	MC10101P IC
XU33	4	40000016	16 Pin DIP Sockets
U37	1	32010365	74HCT365 IC
XU37	1	40000016	16 Pin DIP Socket
U38	1	30501025	ADC1025CCJ-1 IC
XU38	1	40000024	24 Pin DIP Socket (13)
U39	1	3650001A	DMPAL14L8NC
XU39	1	40000024	24 Pin DIP Socket (13)
U40	1	3650002A	DMPAL14L8NC IC
XU40	1	40000024	24 Pin DIP Socket (13)
U41	1	37000451	75451B IC
XU41	1	40000008	8 Pin DIP Socket
U42	1	32010540	74HCT540N IC
XU42	1	40000020	20 Pin DIP Socket
U43	1	32010540	74HCT540N
XU43	1	40000020	20 Pin DIP Socket
U44	1	32AS0756	74AS756N
XU44	1	40000020	20 Pin DIP Socket
U45	1	32AS0756	74AS756N
XU45	1	40000020	Socket 20
U46	1	3650003A	DMPAL20X10NC
XU46	1	40000024	Socket - 24
U47	1	32LS0794	74LS794N
XU47	1	40000020	Socket - 20
U48	1	32LS0794	74LS794N
XU48	1	40000020	Socket - 20
U49	1	3650004A	DMPAL20X10NC
XU49	1	40000024	Socket - 24
U50	1	32010563	74HCT563N
XU50	1	40000020	Socket - 20
U51	1	32010574	74HCT574N
XU51	1	40000020	Socket - 20
U52	1	32010574	74HCT574N
XU52	1	40000020	Socket - 20
U53	1	32010563	74HCT563N
XU53	1	40000020	Socket - 20
U54			Not Used
XU54			Not Used
U55			Not Used
XU55			Not Used
U56	1	30501020	DAC1020LCN
XU56	1	40000016	Socket - 16
U57	1	30201014	LT1014CN
XU57	1	40000014	Socket - 14
U58	1	30203333	LF13333N
XU58	1	40000016	Socket - 16
U59	1	3020F347	LF347 IC
XU59	1	40000014	14 Pin DIP Socket

PARTS LIST - MODEL 7106 ECO NO. 1001

Ident.	Qty.	Part Number	Description
U60	1	32HC0010	74HC10N
X60	1	40000014	Socket - 14
U61	1	3510H115	MC10H115 IC
XU61	1	40000016	16 Pin DIP Socket
U62	1	32010000	74HCT00N
XU62	1	40000014	Socket - 14
VR1	1	3010329B	LM329BZ 6.92 Volt ref.
VR2	1	3010385Z	LM385Z - 2.5
VR3	1	3010329B	LM329BZ 6.92 Volt ref.
VR4	1	3010385Z	LM385Z - 2.5
VR5	1	3010340T	LM340T - 15 3 Term Fix Reg. (T0220)
VR6	1	3010320L	LM320L - 15 Term Fix Reg. (T092)
TZ1	1	54010005	ICTE - 5 Transzorb
TZ2	1	54010005	ICTE - 5 Transzorb
S1	1	50001005	PC Mount DPDT Toggle Switch
S2	1	50001004	PC Mount SPDT Toggle Switch
BB1	16	48071061	Bus Bar
BB2	4	48071062	Bus Bar
BB3	4	48071063	Bus Bar
LEMO	20	40100007	PCB Mount Connector
Header	2	40323434	34 Pin WW Header 3M
PCB1	1	85007106	Main PCB
PCB2	1	85071061	Header Interface PCB
CAMAC HARDWARE			
	1	58607106	Model 7106 Front Panel
	1	59000103	Right Side Cover
	1	59000104	Left Side Cover
	1	59000105	Top Rail
	1	59000106	Bottom Rail
	1	40950001	Test Point
	1	73010002	CAMAC Jacking Screw
	1	40011P20	1x2 Right Angle Socket
	1	40950012	Right Angle Lug
	6	65025603	2-56x3/16" Flat Head Screw Undercut
	6	65044003	4-40x3/16" Flat Head Screw Undercut
	2	65144006	4-40x3/8" Round Head Phillips Screw
	2	66134806	3-48x3/8" Fillister Head Brass
	6	73010003	3/16" Hex Binding Swage Stand off