5.11 FACTORY INSTALLED OPTIONS

5.11.1 IEEE-OPTION

This option enables the oscilloscope to be controlled by an IEEE-system using the SCPI protocol (SCPI = Standard Commands for Programmable Instruments). The IEEE connector is located at the rear panel of the oscilloscope. The version number of this factory-installable option is /40. The interface circuitry is located at the microprocessor unit A3. The specification of the interface is given in chapter 2.17. Programming data is given in a separate 'SCPI Programming Manual'.

The description is a part of the explanation of the complete unit A3 and is given in chapter 5.3. The IEEE-option requires additional software and thus requires an additional flash-ROM D1015. The IEEE-components in an oscilloscope without IEEE- option are not inserted.

5.11.2 AUXILIARY OUTPUTS OPTION

Introduction

This option comprises 3 rear panel BNC outputs that provide Y- out, MTB-gate-out and DTB-gate-out signals. The characteristics of the output signals are listed in chapter 2.16.3 'Optional outputs' in this manual. This option is always combined with the EXTTRIG option (see section 5.11.3).

General description

MTB-gate-out and DTB-gate-out are realized by adding rear panel BNC sockets and coaxial interconnection cables. The coaxial cables lead to the already existing 2-pole connectors on signal unit A1. The necessary circuitry is already present on unit A1. Refer for this to figure 1. The Y- out requires a small printed circuit board, a rear panel BNC socket and a coaxial interconnection cable. The small printed circuit board is equipped with soldering pins that fit directly into unit A1. The lay-out of this unit is given in figure 2; the belonging circuit diagram in figure 3.

Circuit description

The balanced input signals for the Y-out unit are FNCYOP0 and FNCYOP1. The signals originate from pin 5 and 6 of D1301 in the Y-functions section of signal unit A1.
The input current signal is applied to common base circuit V1001/V1002. Then it is applied as current signal to pin 9 and 8 of N1001. The output current signals are routed from pin 11 and 6 to pin 13 and 16. The voltage signal at output pins 12 is used as feedback via C1002/R1009. The voltage signal at output pin 1 is used as output signal via the emitterfollowers N1001/2,3,4 and V1006. Feedback is achieved via R1024/C1011.

Parts list

Item number	Description	Service ord code
C 1001	10nF/63V	5322 122 34098
C 1002	3.3pF/63V	5322 122 32286
C 1005	3.9pF/63V	5322 122 31944
C 1006	1pF/63V	5322 122 32447
C 1009	10pF/63V	5322 122 32448
C 1011	3.9pF/63V	5322 122 31944
C 1012	10nF/63V	5322 122 34098
C 1013	10nF/63V	5322 122 34098
C 1014	22pF/63V	4822 122 33575
C 1017	22nF/63V	5322 122 32654
C 1018	100nF/63V	4822 122 33496
C 1019	100nF/63V	4822 122 33496
C 1021	100nF/63V	4822 122 33496

Item	Description	Service ord code
R 1001	12k1/1%	4822 051 51213
R 1002	1k1/1%	4822 051 51102
R 1003	1k/1%	4822 051 51002
R 1004	51E1/1%	5322 111 91893
R 1005	1L/1%	4822 051 10102
R 1006	5k11/1%	4822 051 55112
R 1007	750E/1%	4822 051 57501
R 1008	750E/1%	4822 051 57501
R 1009	21E5/1%	5322 111 92014
R 1011	51E1/5%	5322 111 91893
R 1012	51E1/5%	5322 111 91893
R 1013	100E/1%	4822 051 51001
R 1014	100E/1%	4822 051 51001
R 1015	5k11/1%	4822 051 55112
R 1016	110E/1%	4822 051 51101
R 1017	750E/1%	4822 051 57501
R 1018	110E/1%	4822 051 51101
R 1019	5K11/1%	4822 051 55112
R 1021	562E/1%	5322 117 10487
R 1022	562E/1%	5322 117 10487
R 1023	147E/1%	4822 051 51471
R 1024	31E6/1%	5322 117 117 32
R 1026	100E/1%	4822 051 51001
R 1027	101E/1%	5322 117 11733
R 1028	750E/1%	4822 051 57501
R 1029	1k33/1%	4822 051 51332
R 1031	1K/1%	4822 051 51002
R 1032	5k11/1%	4822 051 55112
R 1033	75E/1%	5322 117 11741
R 1034	75E/1%	5322 117 11741
R 1036	1k/1%	4822 051 51002
R 1037	51E1/1%	5322 111 91893
R 1038	511E/1%	4822 051 55111
R 1039	511E/1%	4822 051 55111
R 1041	4E7/5%	4822 051 10478
R 1042	4E7/5%	4822 051 10478
R 6101	1k/1%	4822 051 51002
R 8053	1E/5%	4822 051 10108
R 8073	1k/1%	4822 051 51002
R 8137	3k16/1%	4822 724 53162
R 8138	3k16/1%	4822 724 53162
V 1001	BF579	5322 130 61819
V 1002	BF579	5322 130 61819
V 1006	BFR53	5322 130 61244
V 1007	BZX84-C6V2	5322 130 33671
X 1011	Male Header	5322 265 20525

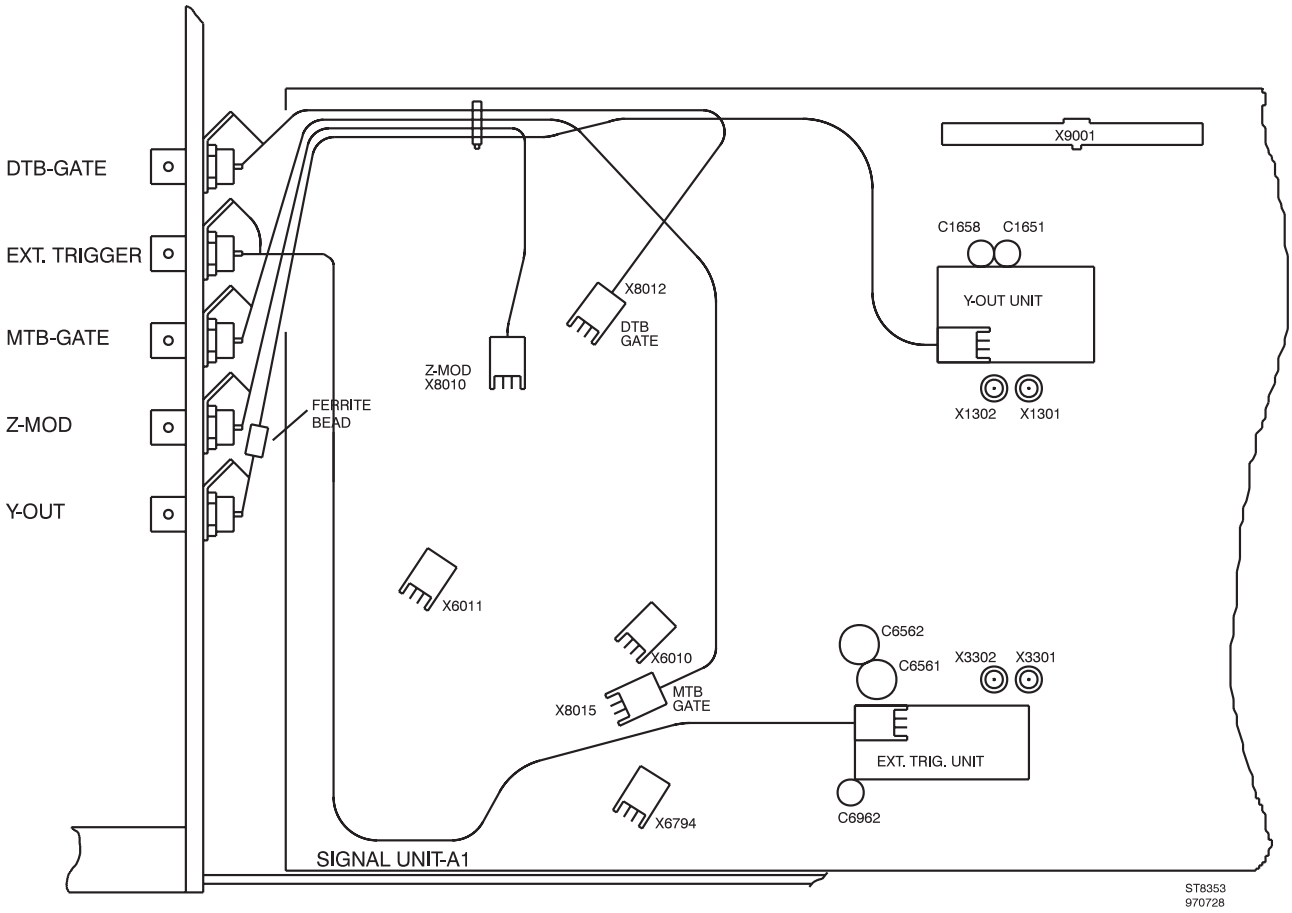


Fig. 1. Location of options Y-out and external trigger

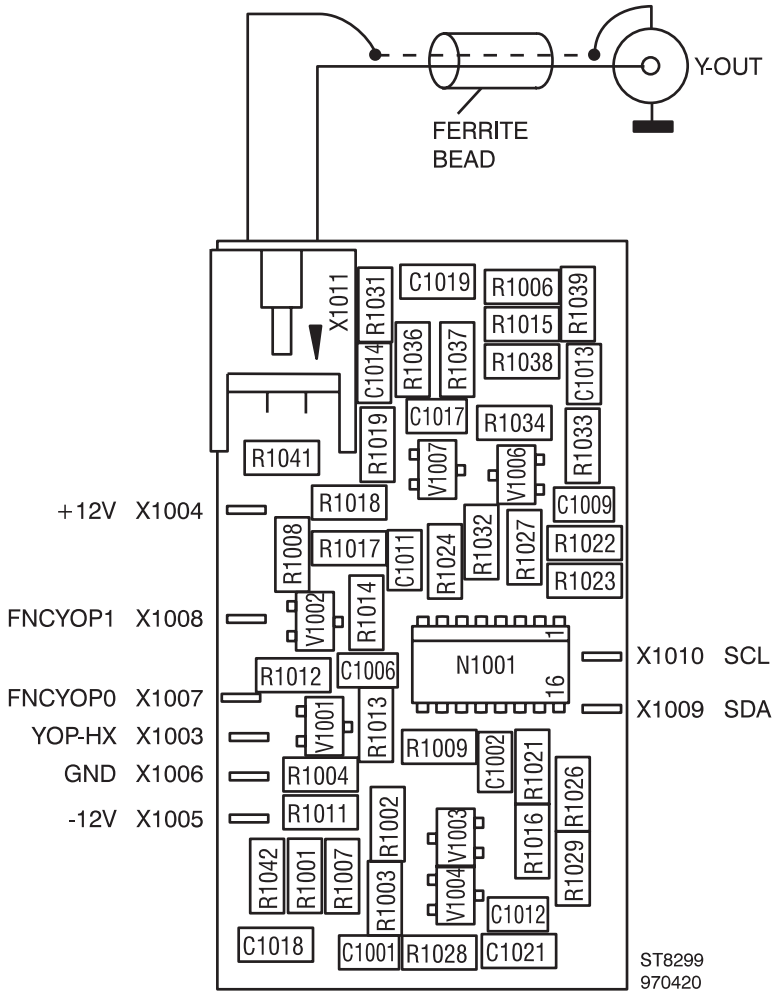
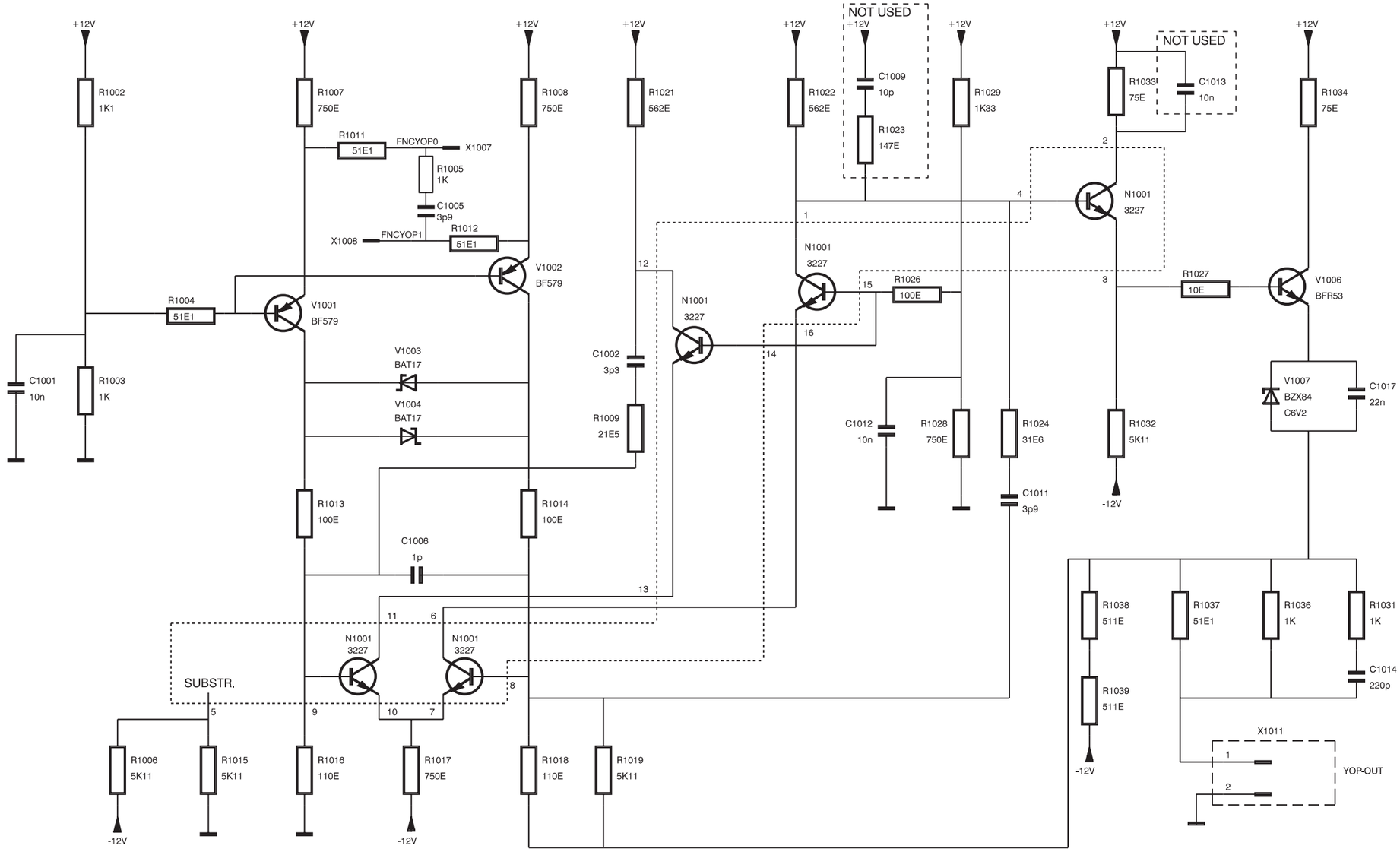


Fig. 2. Printed circuit board lay-out of Y-out unit



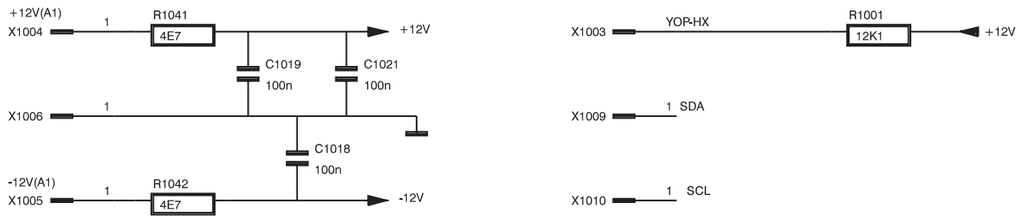


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Fig. 3. Circuit diagram of Y-out unit

5.11.3 EXTERNAL TRIGGER OPTION

Introduction

The External Trigger Input option provides an extra input at the rear of the oscilloscope. This input can be used as the trigger source for the Main Time Base (MTB). The option is factory-installable only. The external trigger requires a small printed circuit board, a rear panel BNC socket and a coaxial interconnection cable.

The small printed circuit board is equipped with soldering pins that fit directly into unit A1. Refer to figure 1 for the exact location. The lay-out of this unit is given in figure 4; the belonging circuit diagram in figure 5.

The EXT TRIG input is suitable for use with the supplied 10:1 probe. The input characteristics are similar to those of CH1...CH4.
If External is chosen as trigger source, then the following trigger functions remain available:
- trigger filters ac, dc, lf_rej and hf_rej
- level-pp function
- +/- slope selection
- noise on/off

If External trigger is chosen as trigger source, then TV trigger mode is not available.
Line (50/60 Hz mains) as trigger source is not available.
If the External trigger option is present together with 'Y- out' option, then the DTB gate output of the Y-out is not available.

A diode V7801 (BAV99, 5322 130 34337) is added on signal unit A1. This diode is connected to the 'panel version identification' circuit D9013. By means of this, the internal software knows that the external trigger option is present. Diode V7801 is located on unit A1 between V7802 and R7077.

Circuit description

Refer to figure 5 for the circuit diagram. The input signal is routed via RC circuit R1001/C1002 and a coaxial cable to the small printed circuit board. Via protection diodes V2002 the signal is applied to the operational amplifier N2021. This device functions as amplifier and level shifter. The analog multiplexer D2031 the output signal MTRIGEXT. This signal is applied to the base of transistor V6507 in the MTB trigger section on unit A1 (diagram 12). Multiplexer D2031 applies -9 V (-9EXT) to the diodes V2012 if the external trigger signal is not needed. This suppresses the signal directly at the input.

Parts list

Item	Description	Service ord code
C 1001	33pF/500V	4822 122 31202
C 2082	47uF/25V	4822 124 20699
C 2091	47uF/25V	4822 124 20699
C 2001	68pF/63V	4822 126 13694
C 2003	100nF/63V	4822 122 33496
C 2004	100nF/63V	4822 122 33496
C 2011	10nF/63V	5322 122 34098
C 2016	100nF/63V	4822 122 33496
C 2021	100pF/63V	5322 122 32531
C 2023	33pF/63V	5322 122 32659
C 2032	100nF/63V	4822 122 33496
C 2082	100nF/63V	4822 122 33496
C 2086	100nF/63V	4822 122 33496
C 2092	100nF/63V	4822 122 33496
C 2094	100nF/63V	4822 122 33496
D 2031	HEF4053CM	5322 209 33502
R 1001	750k/0.25%	5322 116 53588
R 2001	511k/1%	4822 051 55114
R 2002	511k/1%	4822 051 55114
R 2013	10M/5%	4822 051 10106
R 2014	10M/5%	4822 051 10106
R 2021	1K96/1%	5322 117 10539
R 2022	14k7/1%	4822 051 51473
R 2023	1k47/1%	4822 051 51472
R 2024	3k16/1%	4822 051 53162
R 2033	1k47/1%	4822 051 51472
R 2051	14k7/1%	4822 051 51473
R 2052	2k15/1%	4822 051 52152
R 2054	5k11/1%	4822 051 55112
R 2061	2k15/1%	4822 051 51252
R 2062	14k7/1%	4822 051 51473
R 2063	5k11/1%	4822 051 55112
R 2081	4E7/5%	4822 051 10478
R 2086	4E7/5%	4822 051 10478
R 2091	4E7/5%	4822 051 10478
R 2094	5k11/5%	4822 051 55112
V 2002	BAS28	5322 130 80214
V 2012	BAS28	5322 130 80214
V 2053	BC848C	5322 130 42136
V 2064	BC858C	4822 130 42513
V 2093	BZX84-C3V0	5322 130 32739
X 2001	Male Header	5322 265 20525

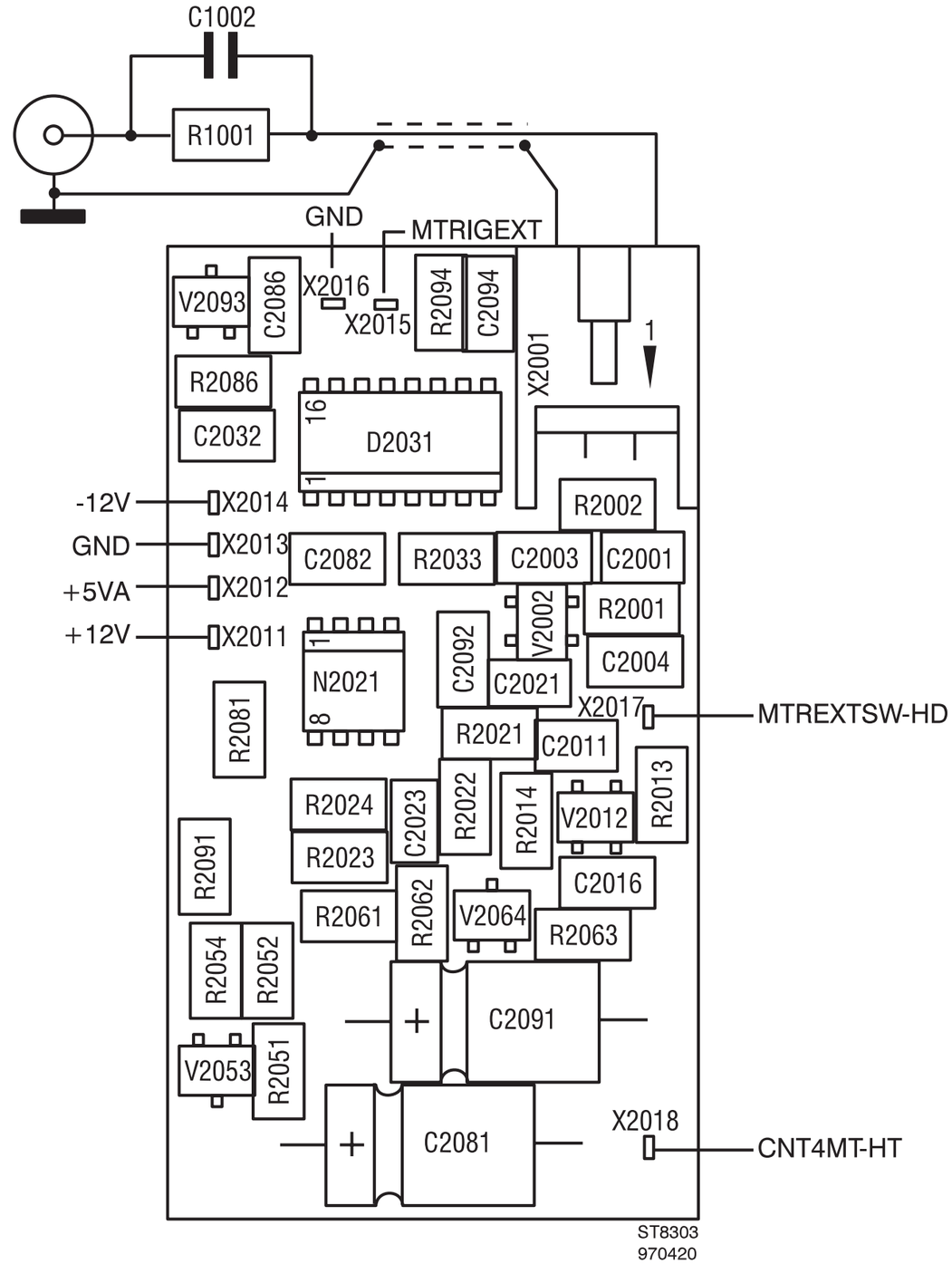
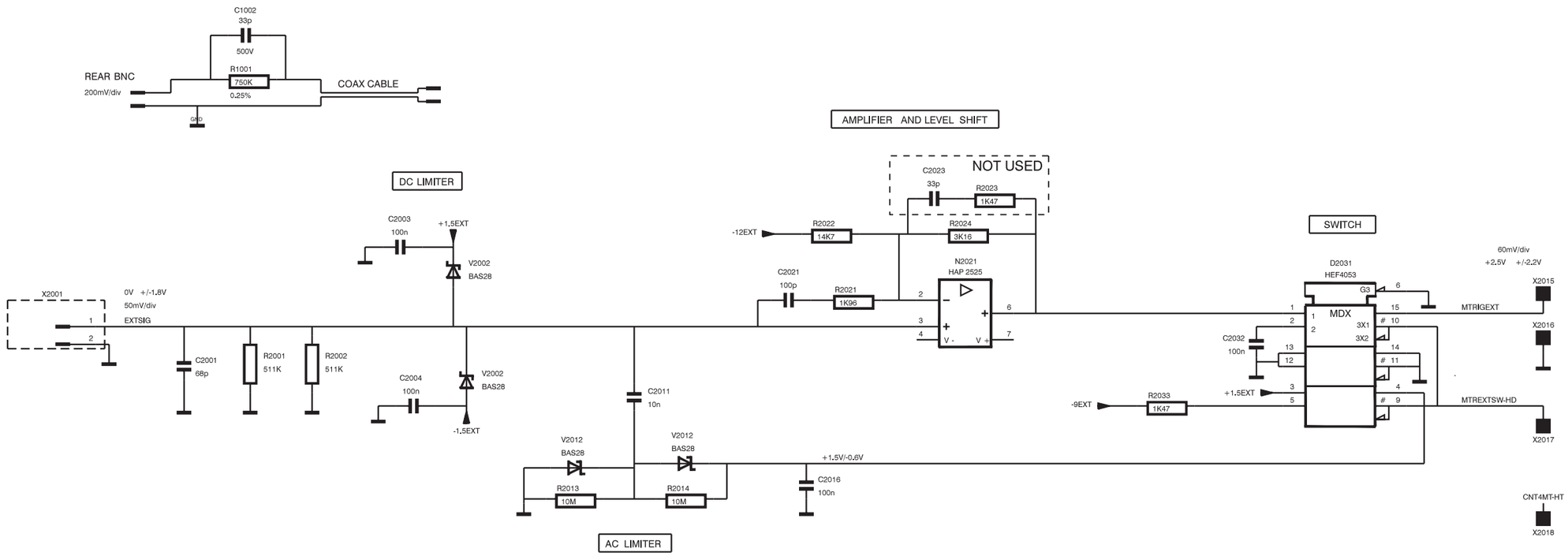
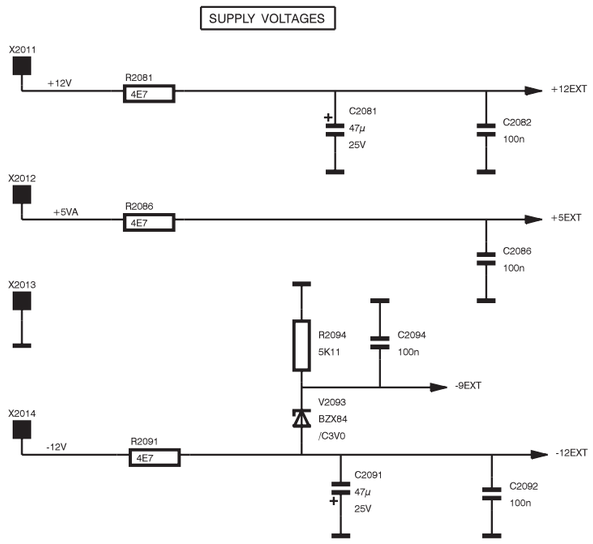
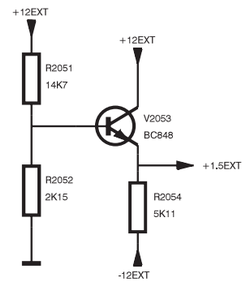
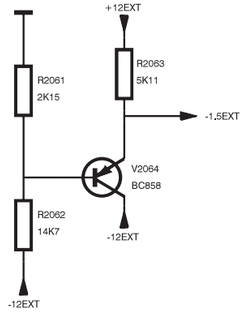


Fig. 4. Printed circuit board lay-out of external trigger unit









REF NO	TYPE	+12EXT	+5EXT	GND	-9EXT	-12EXT
N2021	LF357	7				4
D2031	HEF4053		16	8	7	

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Fig. 5. Printed circuit board lay-out of external trigger unit