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IRT Eurocard

Types MMM-3230 & MMX-3230

3 Channel ASI to G.703 Multiplexer / De-Multiplexer

Designed and manufactured in Australia

IRT can be found on the Internet at:
http://www.irtelectronics.com

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Instruction Book

Table of Contents

This instruction book applies to units later than S/N 0207001.

Operational Safety:

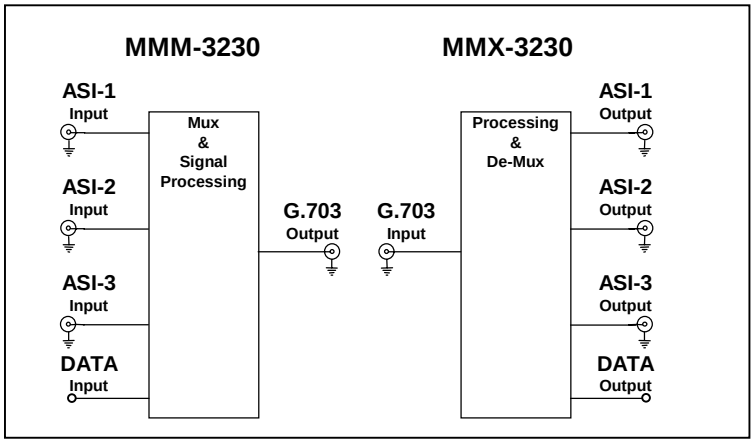
WARNING

Operation of electronic equipment involves the use of voltages and currents that may be dangerous to human life. Note that under certain conditions dangerous potentials may exist in some circuits when power controls are in the **OFF** position.
Maintenance personnel should observe all safety regulations.

Do not make any adjustments inside equipment with power **ON** unless proper precautions are observed. All internal adjustments should only be made by suitably qualified personnel. All operational adjustments are available externally without the need for removing covers or use of extender cards.

IRT Eurocard
Types MMM-3230 & MMX-3230
3 Channel ASI to G.703 Multiplexer/De-Multiplexer

General Description



The MMM-3230 and MMX-3230 are part of a family of data transcoders for converting between the commonly used MPEG2 Transport Stream formats for video distribution in the broadcast industry.

With the MMM-3230 up to three ASI and one RS422 data signals can be multiplexed together into an unframed DS3 signal for transmission down a single 45 Mb/s G.703 line.

The MMX-3230 converts and de-multiplexes the 45 Mb/s G.703 signal back into the original three ASI signals (at their original rates) and the RS422 data signal.

An on board switch on the MMM-3230 set the maximum data rates for each ASI input allowing the efficient use of the available bandwidth and for protection against overuse of the bandwidth by the other channels. Total maximum data rate up to 43.5 Mb/s is allowed. Temporary packet stuffing is used to automatically bring the rate up to 45 Mb/s.

Inputs are automatically equalised for lengths of up to 300m of Belden 8281 or equivalent cable.

RS422 9600 Baud uni-directional data may also be sent on the same link.

Front panel indication and relay alarm on the MMM-3230 transmitter shows if there is an input data rate violation. Corresponding alarm on the MMX-3230 receiver shows a loss of G.703 input.

The MMM-3230 and MMX-3230 are standard format IRT Eurocard modules and may be housed in an IRT Eurocard frame alongside distribution amplifiers, switchers and fibre optic modules.

Note: Also available in a 34 Mb/s G.703 version. See “Configuration - switch settings” section for configuration table.

Standard features:

- **Up to 3 ASI and 1 Data stream on one 45 Mb/s G.703 link**
- **Input rate stuffing to 45 Mb/s G.703 rate**
- **Selectable input maximum data rates**
- **Automatic Input equalisation up to 300m**
- **Suitable for Single Frequency Network (SFN) use**
- **Eurocard format**

Technical Specifications

MMM-3230:

Inputs:

Type 1	3 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Maximum payload Data Rate	43.5 Mb/s.

Channel Data Rate Assignments

I/P1		I/P2		I/P3	
40	+	0	+	0	(Mb/s)
35	+	5	+	0	
30	+	10	+	0	
25	+	15	+	0	
20	+	20	+	0	
30	+	5	+	5	
25	+	10	+	5	
20	+	15	+	5	
20	+	10	+	10	
15	+	15	+	10	

Type 2 RS422 9600 Baud Uni directional.

Output:

Type	1 x G.703, 75Ω BNC connector.
Electrical Characteristics	B3ZS encoded.
Data Rate	44.736 Mb/s.

Alarm Output:

Contact closure on error, loss of power.

MMX-3230:

Input:

Type	1 x G.703, 75Ω BNC connector.
Electrical Characteristics	B3ZS encoded.
Data Rate	44.736 Mb/s.

Outputs:

Type 1	3 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Data Rate	same as MMM-3230 input rate.
Type 2	RS-422 9600 Baud Uni directional.

Alarm Output:

Contact closure on loss of G.703 input, loss of power.

Power Requirements

28 Vac CT (14-0-14) or ±16 Vdc.

Power consumption 6.5 VA.

Other

Temperature range		0 - 50° C ambient.
Mechanical		Suitable for mounting in IRT 19" rack chassis with input, output and power connections on the rear panel.
Finish	Front panel	Grey, black lettering & red IRT logo.
	Rear assembly	Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals.
Dimensions		6 HP x 3 U x 220 mm IRT Eurocard.

Due to our policy of continuing development, these specifications are subject to change without notice.

Configuration

Link settings

MMM-3230 CONFIGURATION INFORMATION

Program 3230mmm.tdf LK6A Installed

LK3 When the Channel assignment selector SW1 is set for "40 + 0 + 0" the maximum data rate for Channel A is 43.5Mbits/s using 204 byte packets and for 188 byte packets this will be 40.15Mbits/s.
If you install LK3 the maximum data rate for both size packets will be 43.5Mbits/s however, in this mode there will be a momentary corruption of the 9600 Data channel if the packet size changes.

LK5 Installing this link will cause the G703 output shape to change from "high" to "shaped".

LK7 Installing this link will terminate the RS-422 data line.

Program 3230mmm_384.tdf (If optionally installed in U9) LK6B Installed

LK2 When this link is installed the maximum recommended data rate for the Data channel increases from 9600 Baud to 384000 Baud if LK2 is also installed in the MMX-3230.

MMX-3230 CONFIGURATION INFORMATION

Program 3230mmx.tdf LK6A Installed

LK5 Do not install.

Program 3230mmx_384.tdf (If optionally installed in U9) LK6B Installed

LK2 When this link is installed the maximum recommended data rate for the Data channel increases from 9600 Baud to 384000 Baud if LK2 is also installed in the MMM-3230.

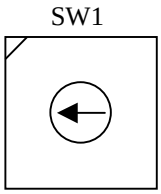
LK10 Installing this link will terminate the RS-422 data line.

Switch settings

MMM-3230:

The MMM-3230 Multiplexer works in a channel protection mode. The necessity for protection arises if the data rate of the inputs exceeds the maximum allowable for a MMM-3230 Transmitter (43.5Mb/s). Without protection all used channels would suffer errors. With protection, the available data rate can be divided among the input channels and if a channel tries to exceed its allocation only that channel is adversely affected.

A switch, SW1, on the MMM-3230 sets the maximum data rates for each ASI input.



For **204 byte packets** the following allocation is possible.

Switch 1 Position	Channel Data Rate Assignment		
	I/P 1	I/P 2	I/P 3
0	43.50	0	0
1	38.26	5.46	0
2	32.80	10.93	0
3	27.33	16.40	0
4	21.86	21.86	0
5	32.80	5.46	5.46
6	27.33	10.93	5.46
7	21.86	16.40	5.46
8	21.86	10.93	10.93
9	16.40	16.40	10.93

These data rates are only the maximum allowed for the channel. Any lower rate may be used.

For **188 byte packets** the following is true –

Switch 1 Position	Channel Data Rate Assignment			
	I/P 1	I/P 2	I/P 3	
0	43.50	0	0	LK3 in
0	40.10	0	0	LK3 out
1	35.26	5.03	0	
2	30.22	10.07	0	
3	25.18	15.11	0	
4	20.14	20.14	0	
5	30.22	5.03	5.03	
6	25.18	10.07	5.03	
7	20.14	15.11	5.03	
8	20.14	10.07	10.07	
9	15.11	15.11	10.07	

In the single channel mode only, a change of packet size from 188 to 204 or vice versa will cause an interruption to the data channel. If this interruption is unacceptable the LK3 can be installed which will lock the data rates as shown, so preventing the transient data channel corruption

MMM-3230 34Mb version:

Maximum payload Data Rate 33.5 Mb/s.

Channel Data Rate Assignments

I/P1		I/P2		I/P3	
30	+	0	+	0	(Mb/s)
26.25	+	3.75	+	0	
22.5	+	7.5	+	0	
18.75	+	11.25	+	0	
15	+	15	+	0	
22.5	+	3.75	+	3.75	
18.75	+	7.5	+	3.75	
15	+	11.25	+	3.75	
15	+	7.5	+	7.5	
11.25	+	11.25	+	7.5	

In particular, for **204 byte packets** the following allocation is possible.

Switch 1 Position	**Channel Data Rate Assignment**		
	I/P 1	**I/P 2**	**I/P 3**
0	33.50	0	0
1	29.32	4.19	0
2	25.13	8.38	0
3	20.94	12.56	0
4	16.75	16.75	0
5	25.13	4.19	4.19
6	20.94	8.38	4.19
7	16.75	12.56	4.19
8	16.75	8.38	8.38
9	12.56	12.56	8.38

These data rates are only the <u>maximum</u> allowed for the channel. Any lower rate may be used.

And for **188 byte packets** the following is true –

Switch 1 Position	**Channel Data Rate Assignment**			
	I/P 1	**I/P 2**	**I/P 3**	
0	33.50	0	0	LK3 in
0	30.87	0	0	LK3 out
1	27.02	3.86	0	
2	23.16	7.72	0	
3	19.30	11.57	0	
4	15.20	15.43	0	
5	23.16	3.86	3.86	
6	19.30	7.72	3.86	
7	15.20	11.57	3.86	
8	15.20	7.72	7.72	
9	11.57	11.57	7.72	

Installation

Pre-installation:

Handling:

This equipment may contain or be connected to static sensitive devices and proper static free handling precautions should be observed.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Power:

AC mains supply: Ensure that operating voltage of unit and local supply voltage match and that correct rating fuse is installed for local supply.

DC supply: Ensure that the correct polarity is observed and that DC supply voltage is maintained within the operating range specified.

Earthing:

The earth path is dependent on the type of frame selected. In every case particular care should be taken to ensure that the frame is connected to earth for safety reasons. See frame manual for details.

Signal earth: For safety reasons a connection is made between signal earth and chassis earth. No attempt should be made to break this connection.

Installation in frame or chassis:

See details in separate manual for selected frame type.

Signal Connections:

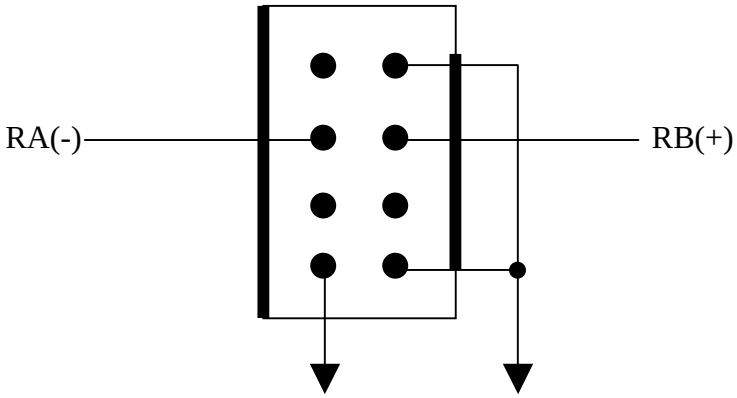
All ASI & G.703 inputs and outputs are by 75Ω BNC connectors.

Alarm output is via a two-pin 0.1" header. Alarm condition is when there is a short between these two pins. This corresponds to either a loss of power or if there is an input data rate violation on the MMM-3230, or a loss of power or a loss of G.703 input on the MMX-3230.

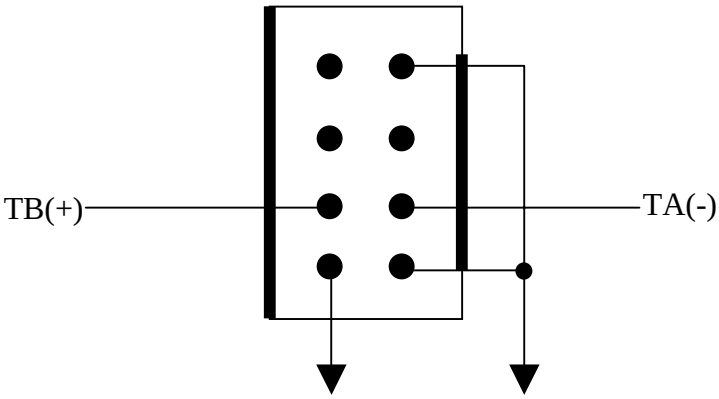
RS-422 data input and output connections are made via HE-14 8 pin double row connectors on both the MMM-3230 and the MMX-3230.

RS-422 pin assignments

MMM-3230



MMX-3230



Connectors viewed from top.

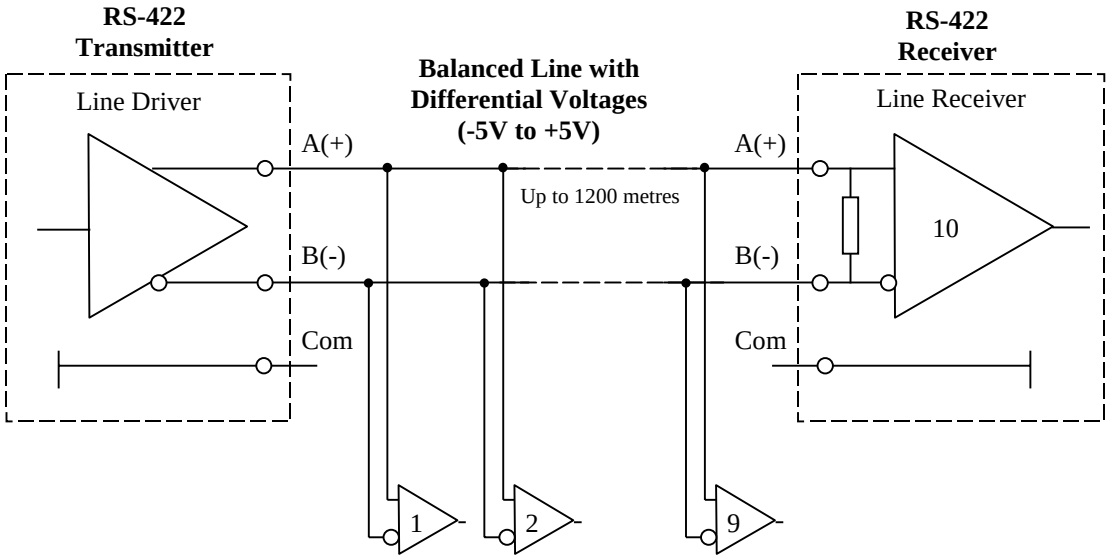
The RS-422 Standard

The RS-422 standard introduced in the early 1970s defines a balanced (or differential) data communications interface using two separate wires for each signal. Due to the high noise immunity of the RS-422 standard, high data speeds and long distances can be achieved.

The RS-422 specification allows reliable serial data communications for:

- Distances up to 1200 metres
- Data rates of up to 10 Mb/s

Only one line driver is allowed on a line, and up to ten line receivers can be driven by it. Figure 1.1 illustrates RS-422.



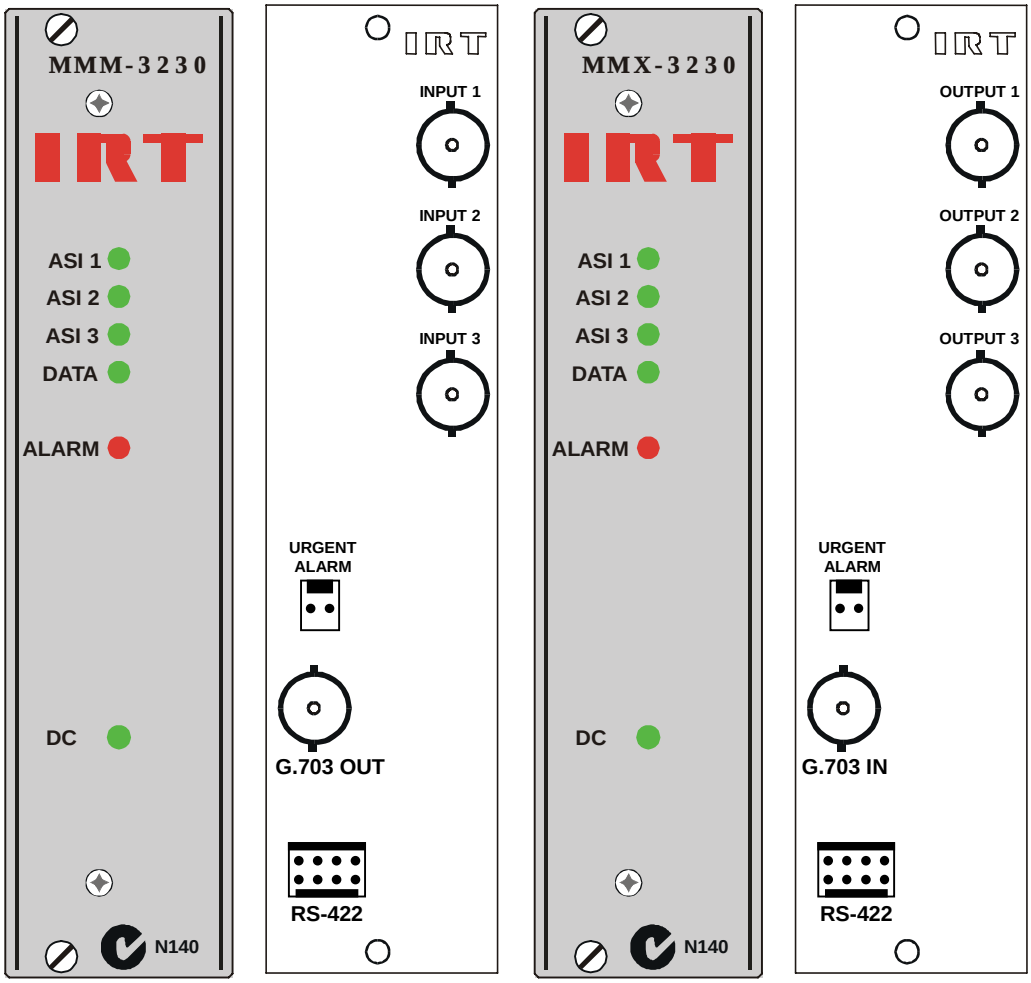
RS-422 Receivers (up to 10 devices)

Figure 1.1: RS-422 Connection

(Ref: IDC Engineers Pocket Guide)

Front & rear panel connector diagrams

The following front panel and rear assembly drawings are not to scale and are intended to show connection order and approximate layout only.



Maintenance & storage

Maintenance:

No regular maintenance is required.

Care however should be taken to ensure that all connectors are kept clean and free from contamination of any kind. This is especially important in fibre optic equipment where cleanliness of optical connections is critical to performance.

Storage:

If the equipment is not to be used for an extended period, it is recommended the whole unit be placed in a sealed plastic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to deter corrosion.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Warranty & service

Equipment is covered by a limited warranty period of three years from date of first delivery unless contrary conditions apply under a particular contract of supply. For situations when "**No Fault Found**" for repairs, a minimum charge of $A100.00 will apply, whether the equipment is within the warranty period or not.

Equipment warranty is limited to faults attributable to defects in original design or manufacture. Warranty on components shall be extended by IRT only to the extent obtainable from the component supplier.

Equipment return:

Before arranging service ensure that the fault is in the unit to be serviced and not in associated equipment. If possible, confirm this by substitution.

Before returning equipment contact should be made with IRT or your local agent to determine whether the equipment can be serviced in the field or should be returned for repair.

The equipment should be properly packed for return observing antistatic procedures.

The following information should accompany the unit to be returned:

1. A fault report should be included indicating the nature of the fault
2. The operating conditions under which the fault initially occurred.
3. Any additional information which may be of assistance in fault location and remedy.
4. A contact name and telephone and fax numbers.
5. Details of payment method for items not covered by warranty.
6. Full return address.
7. For situations when "**No Fault Found**" for repairs, a minimum charge of $A100.00 will apply, whether the equipment is within the warranty period or not.

Please note that all freight charges are the responsibility of the customer.

The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

Equipment Service
IRT Electronics Pty Ltd
26 Hotham Parade
ARTARMON
N.S.W. 2064
AUSTRALIA

Phone: 61 2 9439 3744 Fax: 61 2 9439 7439
Email: service@irtelectronics.com

Drawing List Index

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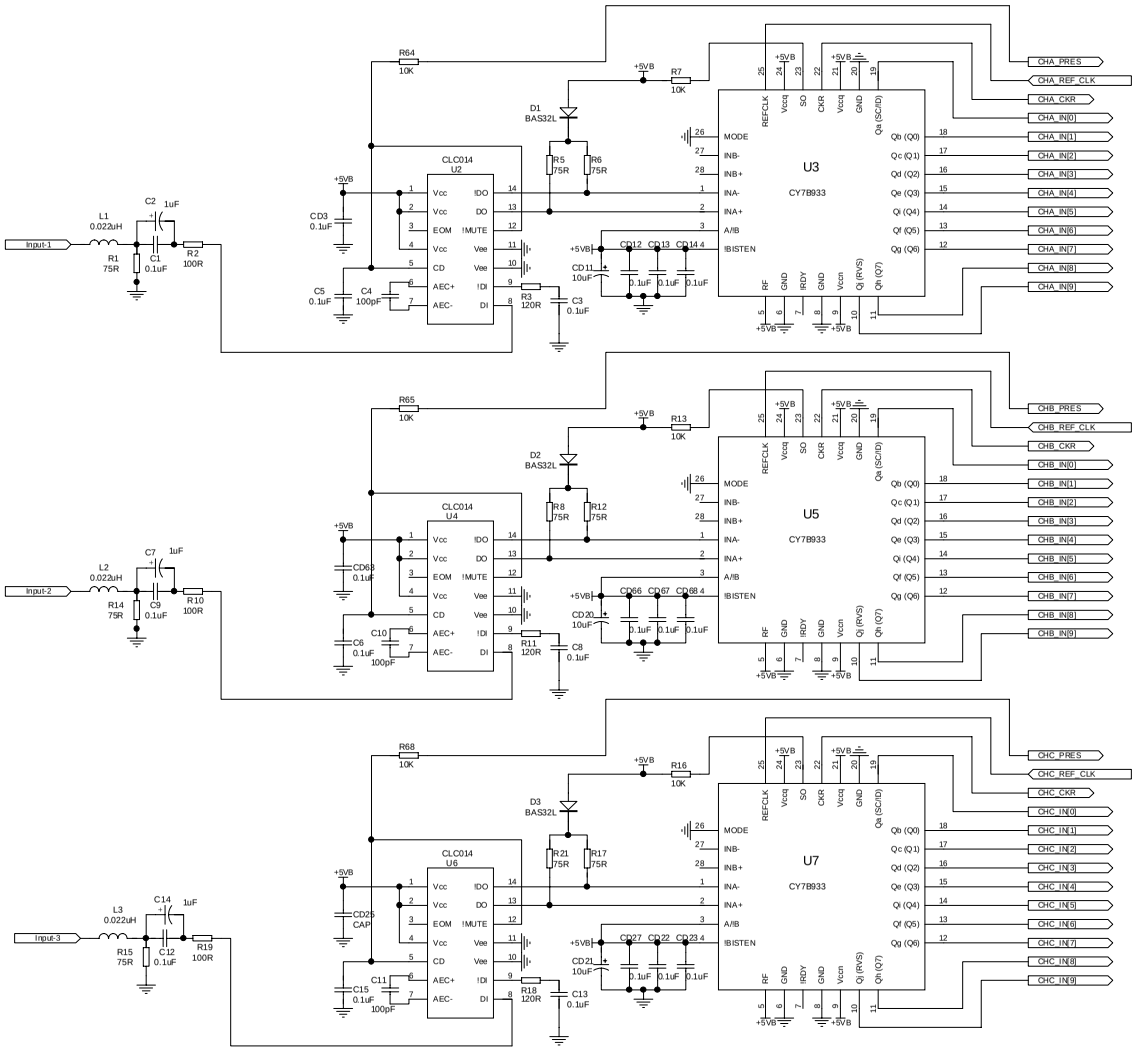
804607	3	MMX-3230 G.703 to 3 Channel ASI De-Multiplexer schematic – sheet 3



804605S2
804605S2.SCH

804605S3
804605S3.SCH

PC 804606

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3	27-02-2002		

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ENG.APR.	SCALE N.T.S.	Drawing No. 804605	Sheet 1 of 3
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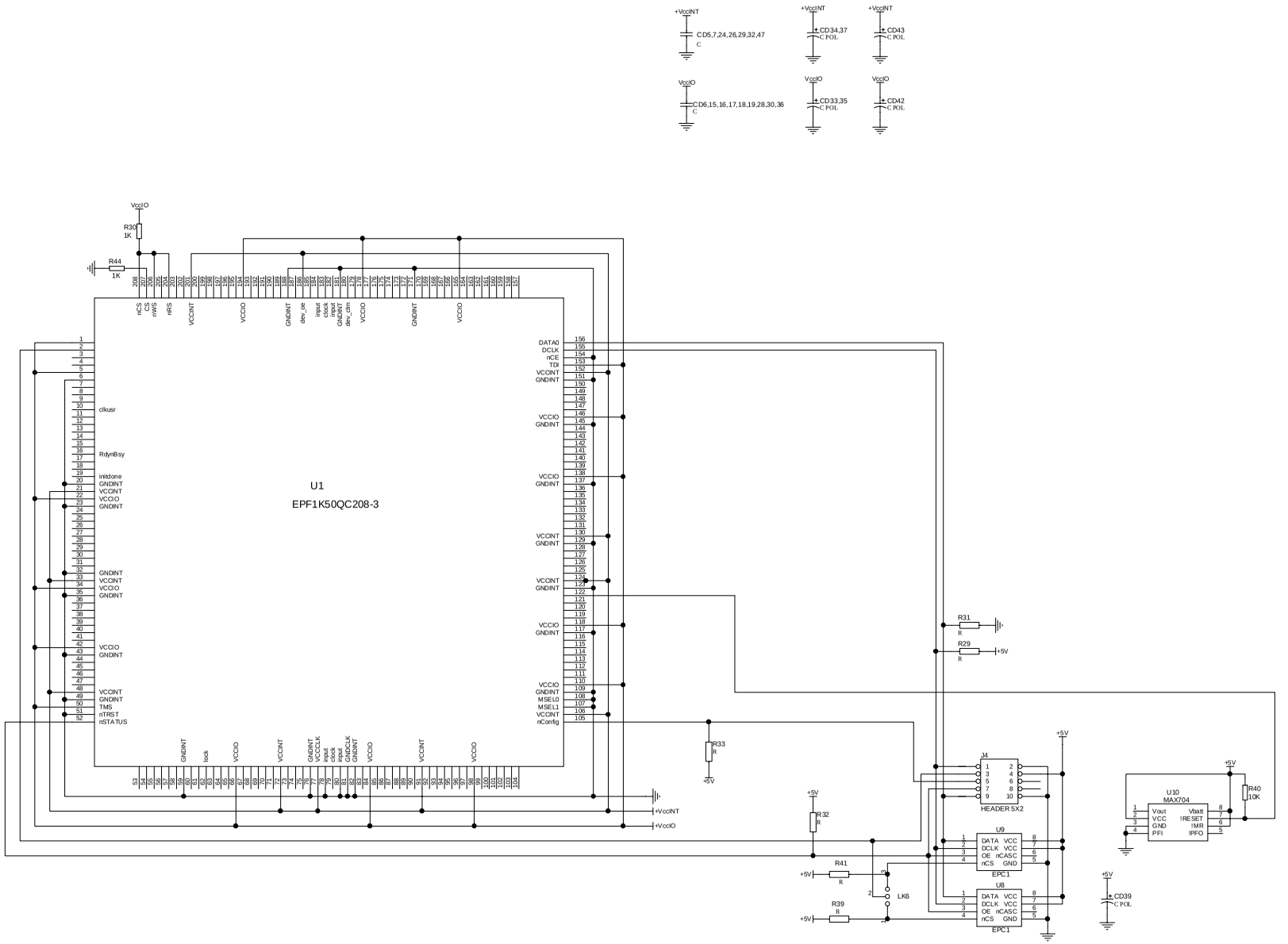
Date: 27-Sep-2002			



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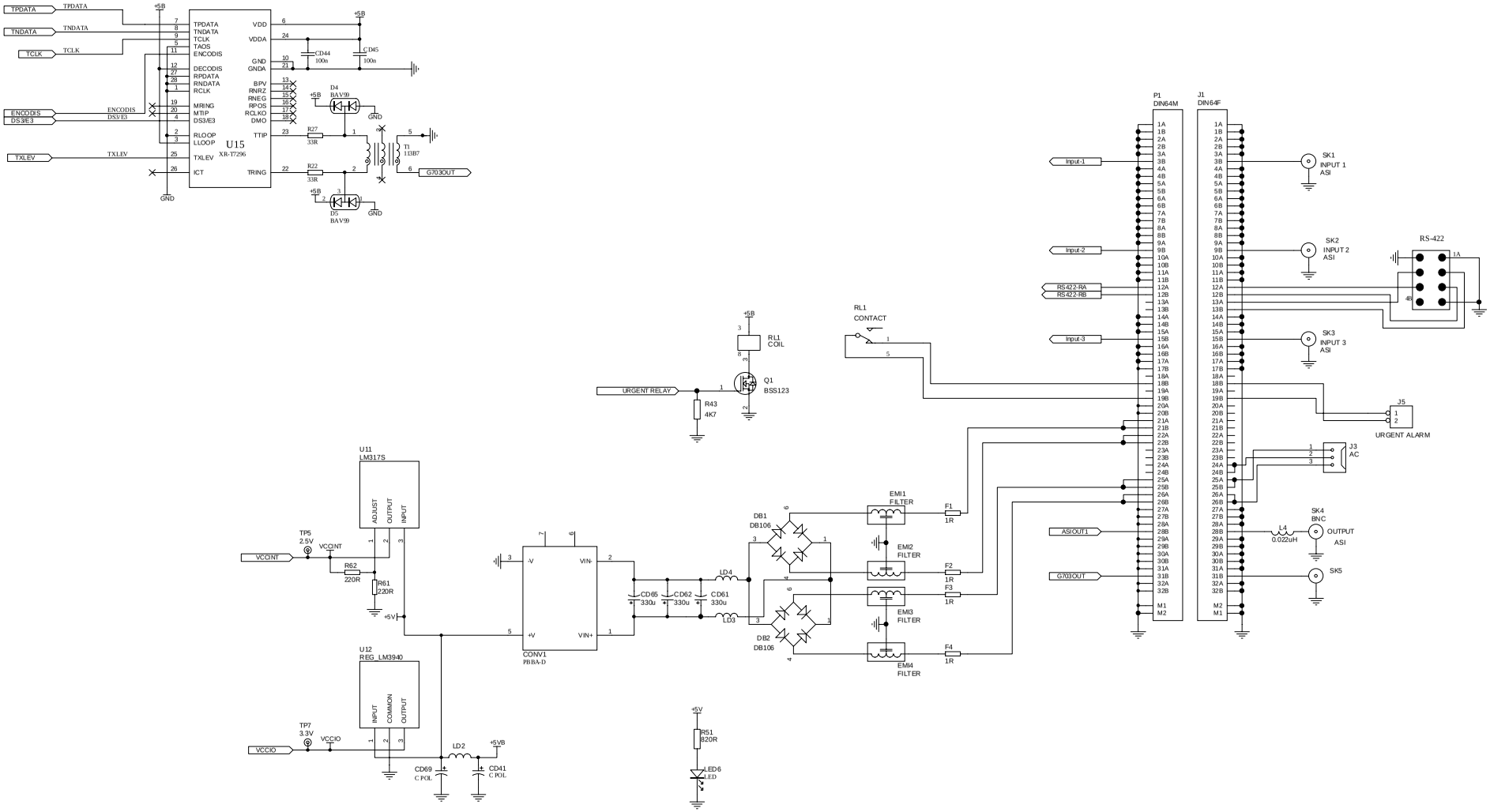
Date: 27-Sep-2002			



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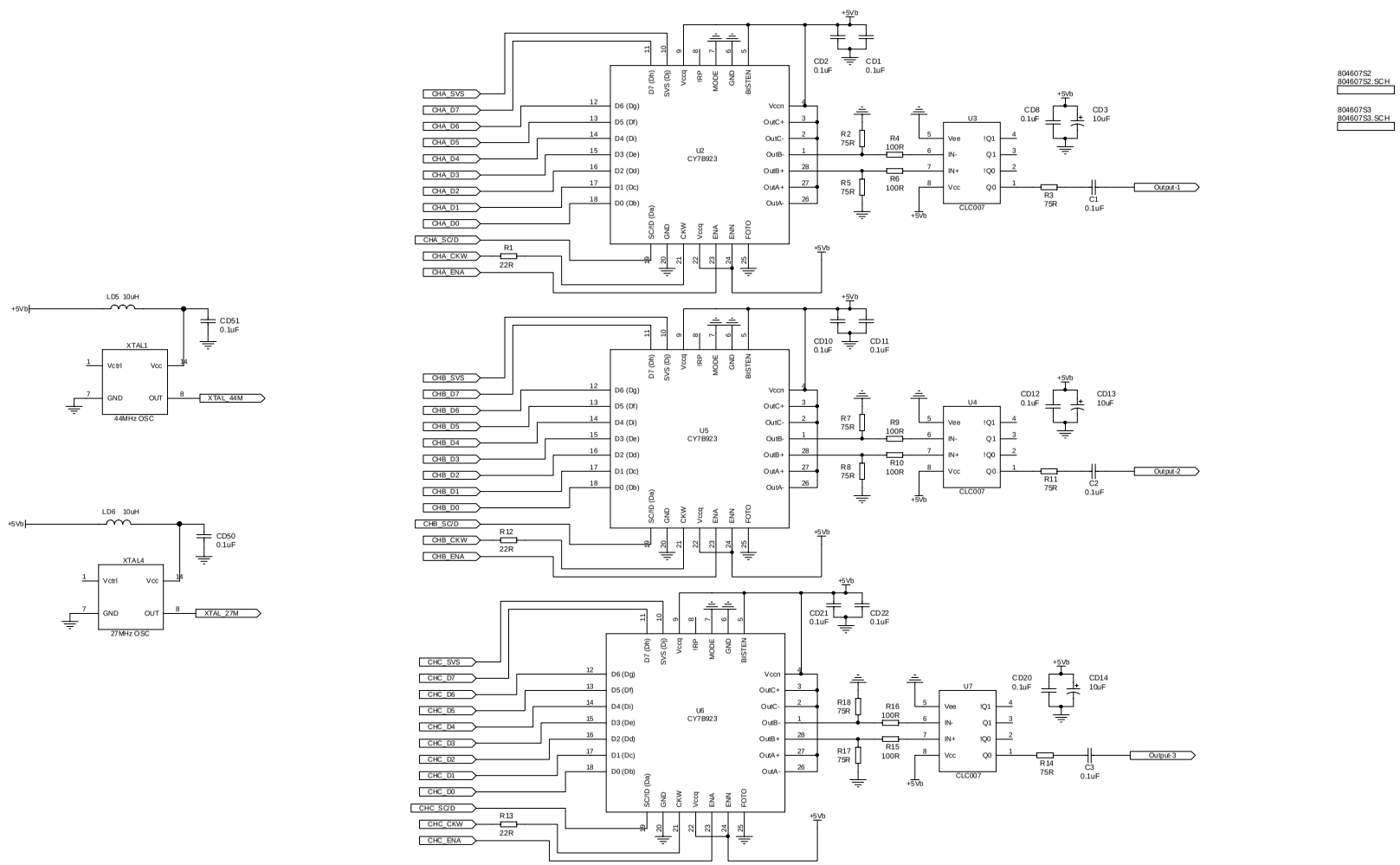
Date: 27-Sep-2002		



PC804608

3 27-02-2002
2 07-01-2002

DRAWN C.McK
ENG.APR.
CHECKED
Revision: 1
Date: 24-Sep-2002

IRT

SIZE A4

Title MMX-3230
G703 DEMUX TO 3xASI

SCALE N.T.S.

Drawing No. 804607

Sheet 1 of 3

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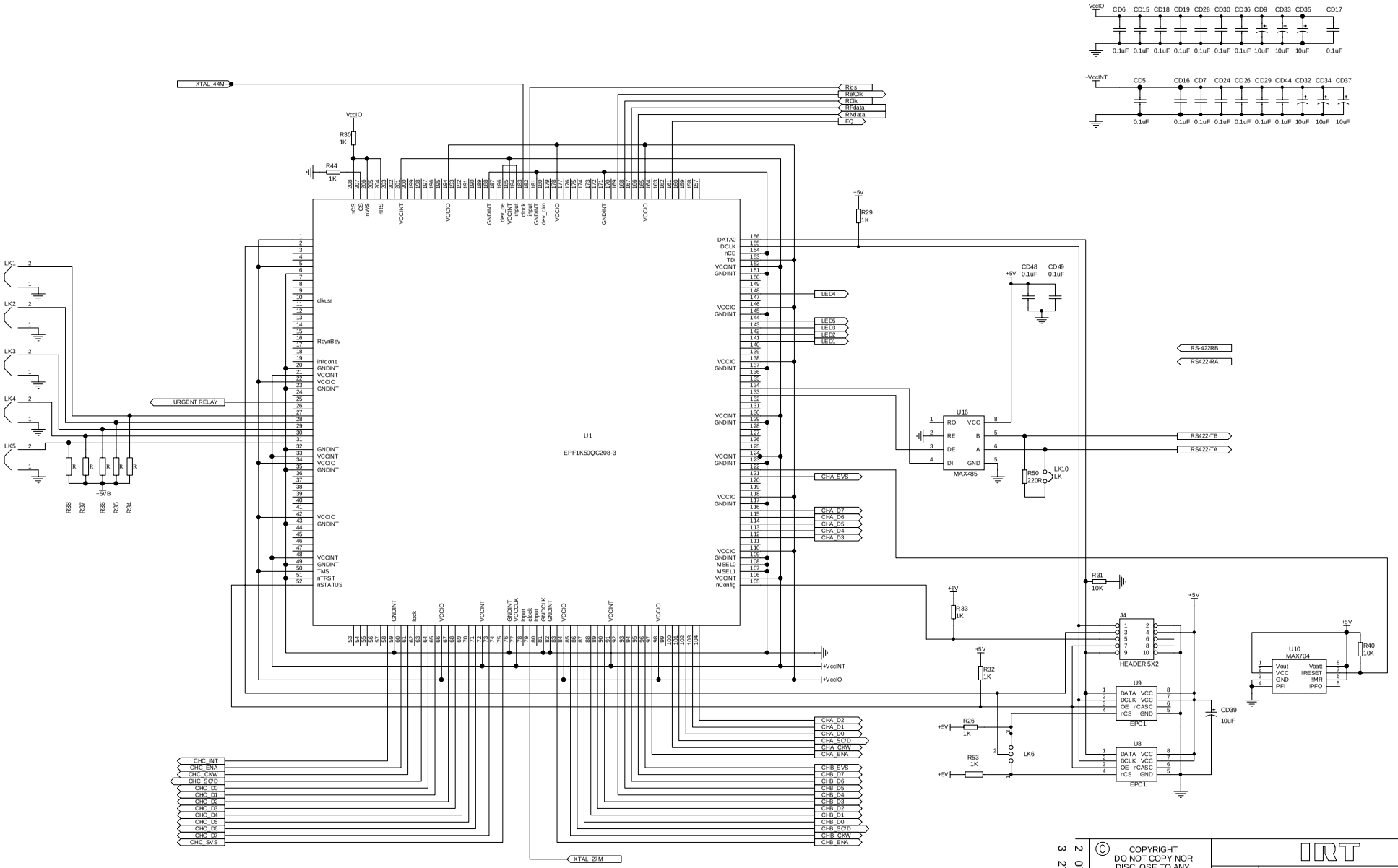

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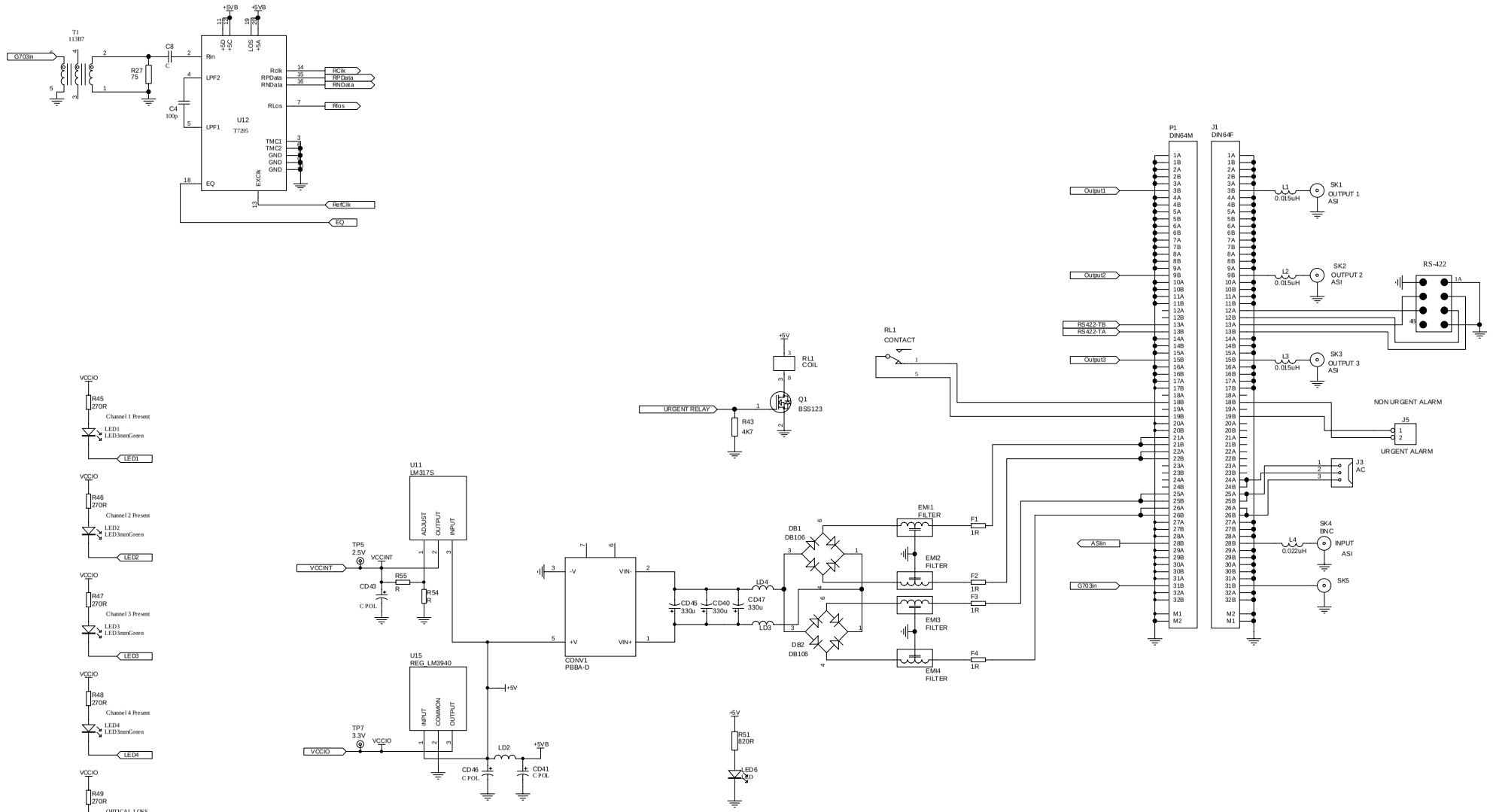

2 07-01-2002 3 27-02-2002	© COPYRIGHT DO NOT COPY NOR DISCLOSE TO ANY THIRD PARTY WITHOUT WRITTEN CONSENT	IRT	
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