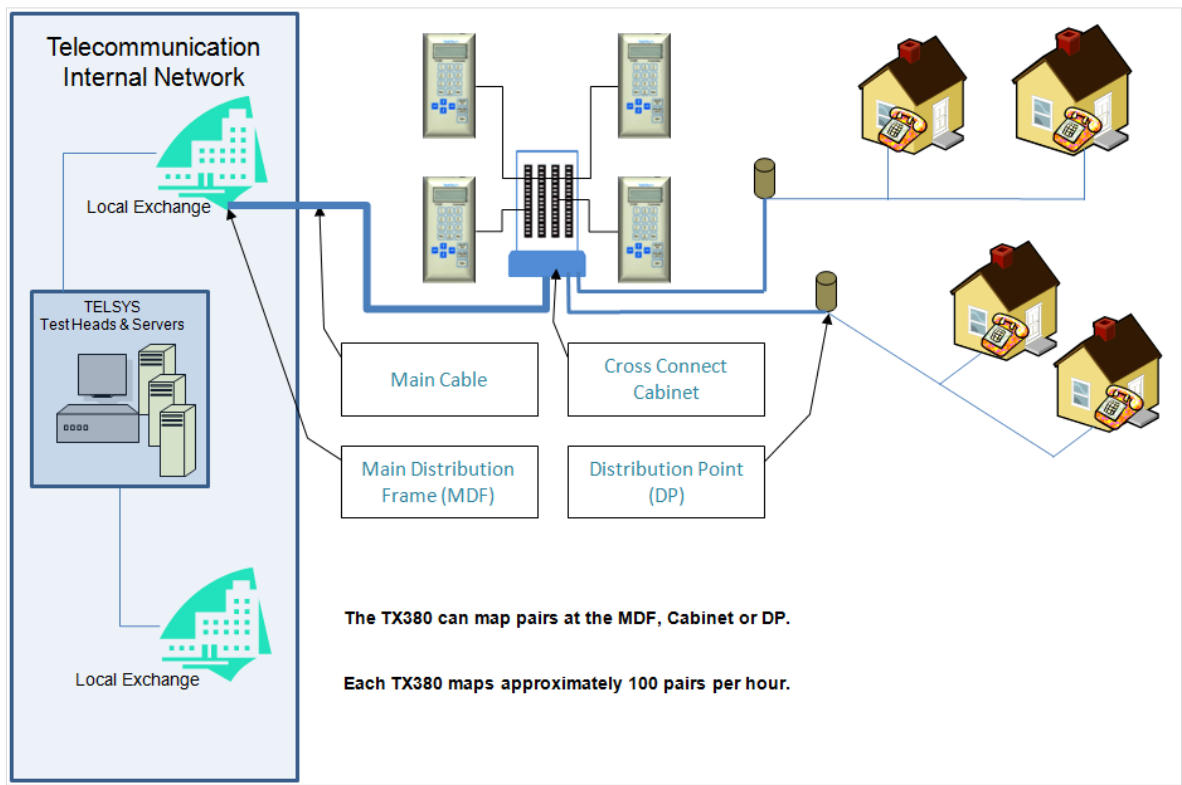


# TELSYS Cable Mapping System



telsys  
by teletech.

## TELSYS is the proven way to accurately map, test and verify a telecommunications copper cable network



### TX380 - fast, accurate testing and verification of a copper cable network.

Teletech have taken a new approach to the issue of cable/pair mapping and verification. Instead of the mapping process being centred solely at the cabinet, Teletech has reversed the concept and utilises the potential of their proven TELSYS Central Responder Unit (CRU) technology.

The centrally located intelligent test heads and servers give unrivalled mapping and testing capability.

The centrally located system allows an unlimited number of Teletech field mapping instruments (TX380s) to be working simultaneously, passing data and information back and forth to TELSYS.

Traditionally, only one instrument is used per cabinet. Using the TELSYS System, many

TX380s are connected at once, significantly reducing the time taken to map a cabinet.

The system consists of:

- Field instruments (TX380s)
- Connector multiplexers
- CRU, central database and webserver

This system is able to map:

- Main Distribution Frame
  - Vertical side
  - Horizontal side
  - DSL Link In-Out
- Cabinets
  - Exchange side
  - Customer side
  - DSL Link In-Out
- Sub-Distribution Frame (SDF) and/or DPs.

# TELSYS the complete mapping system

The TELSYS database retains a permanent record of the:

- Telephone number of working services;
- Electrical properties of the cables (both working and faulty cable); and
- Broadband capability of the cables.

TELSYS can be configured to interface into a Telco's cable record system. Once an interface is set-up TELSYS reconciles the records against the Telco's existing cable records at the completion of mapping. A file is then produced for update of the cable record system.

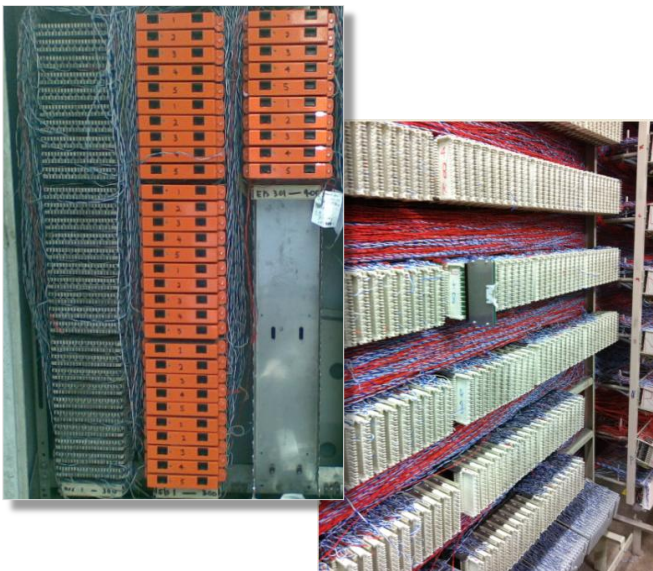
## Speed

Using the TELSYS system, in one day a single operator can map cabinets as large as 1,800 pairs. This includes the mapping, broadband testing and the identification of incorrect records.

All cable data and processing is completed centrally by TELSYS, making the TX380 an easily transported small lightweight field instrument.

Several TX380s can be connected to the same vertical or cabinet. This is the recommended configuration.

The system architecture allows for limitless expansion of the CRU.



## Accuracy

Using TELSYS, working service telephone numbers are collected in a fully automated process with little chance of operator error.

TELSYS and the TX380 collect data on each pair whether it is working, spare or faulty.

## Verification of cable records

The cable records can be automatically corrected and updated immediately upon the completion of the mapping.

TELSYS has sophisticated checking algorithms to ensure that the mapping is completed correctly. The accuracy of TELSYS mapping is further enhanced by using a systemic approach to auditing of the mapping effort. Management can know with mathematical certainty that mapping has been accurately performed.

## More than just testing and mapping your existing copper cabinets and pairs.

### Capital works

When additions are made to the copper network, TELSYS can be used to test and record the commissioning of new cabinets. This improves accuracy and speed compared to using paper and tick sheets.

### NGN and Exchange cutovers

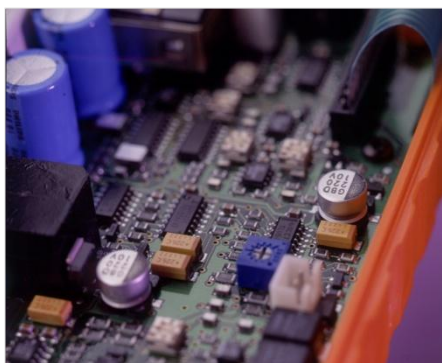
When commissioning new exchange equipment, TELSYS and TX380s can be used to map before and after cutover to both eliminate error and dramatically reduce the time taken to maintain the exchange records.

## TX380

### A sophisticated test instrument for accurate testing of cable parameters

#### TX380 – Test Instrument

As well as mapping the cable pairs, the TX380 can be set to perform accurate testing of a comprehensive number of cable parameters. The results of the tests are stored in TELSIS for future analysis.



#### Tests Performed

These tests include:

- DC and AC Voltage;
- Line Current;
- Insulation Resistance;
- Capacitance;
- Capacitance Balance;
- VF and Broadband Noise

#### Broadband

The TX380 can perform noise tests to check a pair's suitability for Broadband services. It is possible to estimate a pair's Broadband attenuation and Signal to noise Ratio and calculate the ADSL upload and download speeds.

#### Connector Types

The TX380 can be connected to 100 pairs or more via a multiplexer connector. These are termed multiplexer shoes.

A range of multiplexer shoes have been developed to connect to various manufacturers' connectors, including, , Krone, Pouyet , Quante, R&M and Siemens.



A TX380 tests and maps all the pairs connected via the multiplexers' shoes. Each TX380 is completely independent so several units can operate simultaneously on the same cabinet. This has significant accuracy and speed advantages.

Compared to manual mapping the system has proven to be more accurate and quicker. Using a manual methodology involves clipping onto each pair, dialling a CLI number and writing down a phone number on a piece of paper. This very laborious 'Tick and Flick' process is very prone to translation and transcription errors. As TELSIS collects the phone numbers automatically from the TX380 and the multiplexer shoes these manual errors are eliminated.

# TELSYS - a window to the health of the cable network



TELSYS is both a test equipment data management system and an integrated, multi-level reporting tool. It has three major components;

- Field instruments
- Webserver/reporting tools
- CRU Test Heads and Servers.

## Web Server and Database

The TELSYS database and webserver provides reporting to support the MDF or cabinet mapping.

If required, reports can be made available to the Internet via tight security, using user-names, passwords and a challenge and response system.

Some of the many reports in TELSYS are:

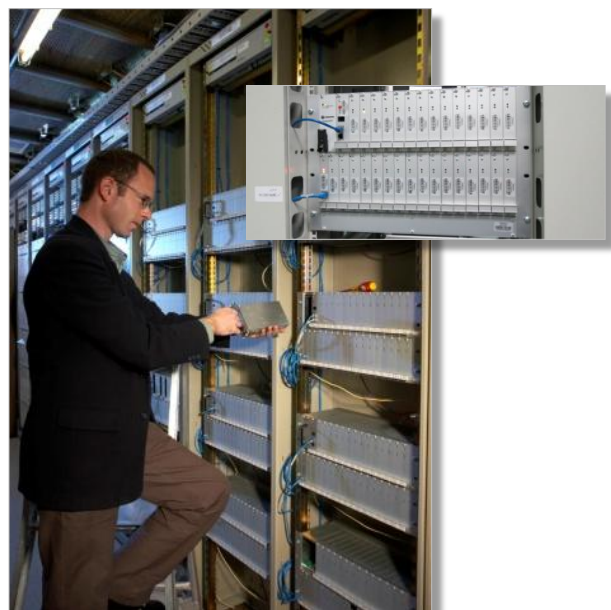
- Mapping Register – controlling the mapping process and contractors;
- Progress and performance of individuals or teams; and
- Test Browser to view the test results from a TX380;
- Sophisticated reports covering individual test results, equipment and operators; and
- Reports identifying possible mapping errors and flagging items for third party audits.

## CRU Test Heads

The TELSYS CRU provides the interface to the TX380s. It has the following features:

- Integrated with the TELSYS servers via the system's own network;
- It is a very secure firewall between the field equipment and the servers and telco network;
- Data from TX380s are loaded via CRU directly into the database; and
- Data is immediately available via the web reports.

The CRU test heads communicate with the TX380 field instruments and control aspects of the testing and measurement integral to the system.



# TELSYS - REPORTING

## A new era in auditing copper networks

### Displaying Broadband quality of mapped locations

Broadband Quality Browser (Summary View)

Phase: 3 Exchange: ALL Cable Type: ALL Cabinet: ALL

Line quality for regions in Malaysia for phase 3

Region	DATE	PSTN ADSL	PSTN BB-OK	PSTN BB-UNFIT	PSTN NA	E FAULTY	E SPARE BB-OK	E SPARE BB-UNFIT	E SPARE NA	E SPARE NIS	D FAULTY	D SPARE BB-OK	D SPARE BB-UNFIT	D SPARE NA	D SPARE NIS
Malaysia	2010-03-10	137598	349371	35836	28659	198790	412639	66641	137161	420502	248368	428338	116931	22	863483
JB (Johor Barat)	2011-11-26	1054	3192	389	28	1663	2763	386	17	2933	3872	3091	5792	0	12353
JS (Johor Selatan)	2011-12-15	1454	2084	442	59	2080	1489	171	83	2209	4255	4949	1436	0	10957
KK (Kota Kinabalu)	2011-08-28	11486	20021	4773	5254	11236	15632	2609	30130	46573	39158	72975	12169	7	131123
KKR (Kuala Kangasari)	2011-12-11	1440	3532	398	31	1101	2140	313	194	1858	3951	3	9051	0	13052
KL (Kuala Lumpur)	2011-01-25	22707	37135	3683	1373	18547	82269	13260	9110	73576	6410	27028	2248	0	54138
LK (Lembah Kinta)	2011-06-19	4459	7025	182	2	2446	7267	1141	344	7395	10667	16984	3351	0	32599

Broadband Quality Browser (Detailed View)

Exchange: (NM (naram))

Cable Type: Copper Cabinet: 002

Line quality for cabinet C001 at INM (naram)

771 broadband capable on the E-side  
399 broadband capable on the D-side

Side	Pair	When Done	PSTN	Status
D	001	2011-10-05		SPARE/BB-OK
D	002	2011-10-05		SPARE/BB-OK
D	003	2011-10-05		SPARE/BB-OK

### Reporting of each pair mapped and the line conditions found

28 manual traces found  
36 confirms found  
7 tests found

V-Side  
1200 tested, 510 PSTNs, 494 spares, 171 faulty, 25 other

	1	2	3	4	5	6	7	8	9	10
1	095660198	095660212	095660214	FAULTY	095664592	FAULTY	095674732	FAULTY	095660216	095670124
11	095660135	095689695	095660945	095660209						
21										
31										
41	FAULTY	095662570	095683833	095666641	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
51	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
61	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
71	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
81	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
91	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
101		BUGY	095671302	FAULTY	FAULTY	095671533	095671166	095660978	095663925	095671068
111	095665637	095686680	095673807	095686680	095662071	FAULTY	095662093	095678889	095681808	
121	095673971	095661951	FAULTY	FAULTY	095661233	095662028	095660104	095663008	FAULTY	
131	FAULTY	095675289	095662092	095664172	FAULTY	FAULTY	095666829	FAULTY	095661655	095673833
141	095671577	095662397	095688806	095662470	095675308	095678308	095660826	095670720	095674094	095679128
151	095671677	095688832	095671021	FAULTY	FAULTY	FAULTY	095661079	095661086	095661189	095661208

### A Browser showing Test Results

Test Browser

Region: PJ (Petaling Jaya) Exchange: PJ (Petaling Jaya Centre) Cable Type: MDF MDF No.: ALL Vertical No.: 002

Date From: 2011-08-01 Date To: 2012-02-1

Serial No.: Operator: Sequence No.:

Number of tests found: 800

Date Time	Region	Exch	Side	Cab/MDF	Cable	Vert	Pair	Service ID	Instrument	Serial	Operator	Sequence	V (A-B)	Status
2011-12-24 10:08:05	PJ	PJC	V	001	MDF	002	200	-	TX380	2050065	Khairul/Mat	104344149	0.06	SPARE/BB-UNFIT
2011-12-24 10:08:05	PJ	PJC	V	001	MDF	002	199	-	TX380	2050065	Khairul/Mat	104344149	0.12	SPARE/BB-UNFIT
2011-12-24 10:05:49	PJ	PJC	V	001	MDF	002	198	0379601295	TX380	2050065	Khairul/Mat	104344129	-46.72	PSTN
2011-12-24 10:05:12	PJ	PJC	V	001	MDF	002	196	-	TX380	2050065	Khairul/Mat	104344122	0.01	SPARE/BB-UNFIT
2011-12-24 10:05:12	PJ	PJC	V	001	MDF	002	195	-	TX380	2050065	Khairul/Mat	104344122	0.01	SPARE/BB-UNFIT
2011-12-24 10:05:12	PJ	PJC	V	001	MDF	002	194	-	TX380	2050065	Khairul/Mat	104344122	0.01	SPARE/BB-UNFIT
2011-12-24 10:05:12	PJ	PJC	V	001	MDF	002	197	0379602934	TX380	2050065	Khairul/Mat	104344122	-46.64	PSTN
2011-12-24 10:03:41	PJ	PJC	V	001	MDF	002	193	0379582639	TX380	2050065	Khairul/Mat	104344101	-44.34	PSTN
2011-12-24 10:02:50	PJ	PJC	V	001	MDF	002	192	0379582563	TX380	2050065	Khairul/Mat	104344089	-43.42	PSTN
2011-12-24 10:02:13	PJ	PJC	V	001	MDF	002	190	-	TX380	2050065	Khairul/Mat	104344076	0.01	SPARE/BB-UNFIT
2011-12-24 10:02:13	PJ	PJC	V	001	MDF	002	189	-	TX380	2050065	Khairul/Mat	104344076	-0.01	SPARE/BB-UNFIT
2011-12-24 10:02:13	PJ	PJC	V	001	MDF	002	188	-	TX380	2050065	Khairul/Mat	104344076	0.01	SPARE/BB-UNFIT
2011-12-24 10:02:13	PJ	PJC	V	001	MDF	002	187	-	TX380	2050065	Khairul/Mat	104344076	52.02	ULF

### Reports tracking sub-contractor progress

Mapping Progress Report - by Contractor

Home Back Weekly

Contractor	Total	All Contractors									
		February 2010	January 2010	December 2009	November 2009	October 2009	September 2009	August 2009	July 2009	June 2009	
AZU ONES	4	4	0	0	0	0	0	0	0	0	
Bumi Rava	229	33	99	97	0	0	0	0	0	0	
CompuDyne	141	13	52	70	6	0	0	0	0	0	
Dava Maju	113	23	62	27	1	0	0	0	0	0	
Greenqold	125	5	54	66	0	0	0	0	0	0	
Mega Amity	47	2	36	9	0	0	0	0	0	0	
TEGUH BINA	6	6	0	0	0	0	0	0	0	0	
UR Taste	139	24	88	27	0	0	0	0	0	0	
<b>Total</b>	<b>804</b>	<b>110</b>	<b>391</b>	<b>296</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

## TECHNICAL DETAILS

The TELSIS CRU test heads support the following cable testing:

Description	Test Type	Notes
<b>DC tests</b>		
	Voltage	[A-B, A-E, B-E]
	Loop resistance	[A-B]
	Loop current	[A-B]
	Insulation resistance	[A-B, A-E, B-E]
	Capacitance	[A-B, A-E, B-E]
<b>Voice frequency (VF) tests</b>		
	AC voltage	[A-B, A-E, B-E]
	Line insertion loss	(300Hz to 3,400Hz)
	Noise measurements	3 kHz flat & Psophometric
	Power spectral density (PSD)	
	Propagation delay	
	Echo level and delay	
	Return loss	
<b>Broadband tests (with broadband terminating unit)</b>		
	Line insertion loss	(300Hz to 2.2MHz)
	Noise measurement	
	Flat, D,E, and F filters	
	Power spectral density (PSD)	
	xDSL noise margin and bit rate	

**TELSIS supports various field test equipment instruments:**

- Teletech TX320/TX320B/TX325/TX380
- Radiodetection RD6000 CTS

### TX380 Cable Tests

Description	Range	Resolution	Notes
Resistance (A-B, A-E, B-E)	1 – 100MΩ	0.1MΩ	3Vdc/200kΩ source
Capacitance (A-B, A-E, B-E)	1 – 2000nF	1nF	
DC Line Voltage (A-B, A-E, B-E)	1 – 400V	0.1V	
AC Line Voltage (A-B, A-E, B-E)	0 – 250Vrms	0.01V	
Current (A-B)	0 – 100mA	0.1mA	500Ω termination
VF Noise (A-B) 300Hz to 3kHz	-70 to -20dBm	0.1dB	600Ω terminating impedance
Broadband Noise (A-B) 26kHz to 138kHz	-70 to -20dBm	0.1dB	100Ω terminating impedance
Broadband Noise (A-B) 138kHz to 1.1MHz	-70 to -20dBm	0.1dB	100Ω terminating impedance



Teletech is an established, Australian company supplying a unique range of telephone cable test instruments to the global market. Our products are acclaimed for their accuracy, dependability and the delivery of end-user costs benefits. At Teletech, we deliver increased efficiency and innovative products into the hands of network operators and line managers via easy-to-operate test and diagnostic tools.

Teletech's products include a range of single-operator pair identifiers with remote control of the line termination. These include the Loop-a-Line range consisting of TX905, TX910, TX915, and TX935.

The Teletech instrument range includes cable testers to check the quality of lines for various broadband services including ADSL, HDSL, ISDN and SHDSL. These instruments include our TX120A and TX125 and a Multi-Line Identifier TX180.

Teletech also make systems such as TELSIS, which have testers residing in the central office telephone exchange and operate with several field instruments including our TX320, TX320B, TX325 and TX380.

Teletech supplies a unique range of telephone cable test instruments and solutions to the global market.

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